INDIA'S NUCLEAR POLICY AND THE INFRASTRUCTURE

By

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INTRODUCTION

"The true might of a nation is to be sought for not so much in the strength of its Army, which is but the means of materializing this might, but in the health of its spirit, that is its will (NATIONAL WILL) to preserve itself from dangers external and internal".

- Major General JFC Fuller

The decades of the 80s and the 90s witnessed the gradual deterioration of India's security environment as a result of nuclear and missile proliferation. Nuclear weapons increased and more sophisticated delivery systems were inducted in India's neighbourhood. India, in this period became the victim of externally aided and abetted terrorism, militancy and clandestine war through hired mercenaries. China has constructed several all-weather roads into Tibet and running along the Sino-Indian border, railway line from Xining to Lhasa and several airfields and military bases in Tibet. China is upgrading the Karakoram Highway to link western China to the Indian Ocean at Gwadar deep-sea port (constructed with Chinese assistance) and plans to lay oil and gas pipeline from Gwadar to western China. The convergence of perceptions and interests, of China and Pakistan, is seen as posing increasing challenges to India. India's adversaries perceived it as a "Soft State" incapable of strong military responses even when under external / internal threat. India after sixty years of being a "Soft State" needs to get into a resurgent mode befitting her size and resources. It needs to develop the capabilities like overwhelming military superiority in South Asia and relative parity with China in both nuclear and conventional military fields; force projection capabilities (especially Air and Naval); and nuclear deterrence strong enough to deter even major powers to attempt political or military coercion[1].

Ever since India achieved independence, its response to global nuclear non-proliferation measures has been a dominant theme in the country's overall evolution

of nuclear policy. India was of the view that 'a nuclear weapon free world would enhance not only India's security but also security of all nations'. Addressing the Lok Sabha on 2 April 1955, shortly after a major hydrogen bomb test had been conducted, Pandit Jawahar Lal Nehru said, " Nuclear, chemical and biological energy and power should not be used to forge weapons of mass destruction"[2]. India's nuclear test in 1974 was termed a 'peaceful nuclear explosion'. Subsequently in 1998, India conducted nuclear tests and claimed to have attained nuclear weapons capability. The draft document of nuclear doctrine released stated that India would not conduct more nuclear tests, join the Comprehensive Test Ban Treaty with some modifications and enter negotiations to stop fissile materials production without conditions[3]. India was to pursue a 'no-first use' policy vis-à-vis non-nuclear weapon states and, finally, establish a 'credible, minimum nuclear deterrent'[4]. From the days when our leaders reasoned that nuclear weapons were not weapons of war but weapons of mass destruction, to the realization of the fact that in the absence of universal and non-discriminatory disarmament, a regime that creates an arbitrary division between nuclear haves and have-nots, is not acceptable is the transformation in Indian polity. The first quantities of plutonium were produced in 1964. "Idealism had ended on 29 December 1962, when the Jan Sangh in the debate in Parliament, for the first time articulated a need to manufacture an atom bomb".[5]

After the 1962 conflict and the Chinese nuclear test in 1964, dialogue was initiated with United Kingdom, Union of Soviet Socialist Republics and United States, but as these parleys yielded no results, India understood that in matters of security it must stand alone. India is not a signatory to either the Nuclear Non-Proliferation Treaty (NPT) or the Comprehensive Test Ban Treaty, but did accede to the Partial Test Ban Treaty in October 1963. India had acceded to the Geneva Protocol in 1930, the Biological Weapons Convention on 15 July 1974 and the Chemical Weapons Convention on 3 September 1996. A Comprehensive Test Ban Treaty (CTBT) was opened for signature in 1996, after over 2000 tests had been conducted. In its final shape, this treaty left much to be desired. It was neither comprehensive nor was it related to disarmament.

India had conducted its first nuclear test in 1974. "Successive governments, thereafter, continued the policy to safeguard the nuclear option. This was also the primary reason underlying the 1996 decision in the country not subscribing to the underlying CTBT, a decision that met the unanimous approval of the house yet again".[6] India perceived that subscribing to the CTBT would limit India's nuclear potential at an unacceptably low level. India's nuclear establishment had to tread a long and uphill road – of mastering different facets of nuclear science

and technology, building nuclear infrastructure and related industrial capacity even while overcoming constraints of a severe nuclear blockade, imposed on India by Western powers after the first Indian atomic detonation at Pokhran in 1974.[7]

India exploded five weapons of 12 kiloton, 45 kiloton and three sub – kiloton i.e., 0.2, 0.3, and 0.6 kiloton on 11 and 13 May. Pakistan's reaction was prompt by conducting six tests at Chagai hill, in May 1998. India became a Nuclear Weapon State (NWS) as was Pakistan. "This category of NWS is not, in actuality, a conferment. Nor is it a status for others to grant. It is rather an objective reality".[8] Subsequent to the tests, the government stated that India would now observe a voluntary moratorium. This voluntary declaration was aimed to convey the sincerity of our intent for meaningful engagement.

"The world's inventory of nuclear weapons has increased from zero to fifty thousand. On an average each of them has a destructive power thirty times that of the Hiroshima Bomb".[9] Pokhran II told both Islamabad and Beijing that deterrence is a two-way street and it also forced Pakistan to react. "American pressure to sign CTBT has increased following Pokhran II" [10] by slamming economic sanctions as also isolating India. India, in the meantime, released the draft Nuclear Doctrine in 1998 and announced the creation of a Nuclear Command Authority in January 2003. India's nuclear doctrine adheres to the principle of "no first use" and " no use against non nuclear states" and is only interested in acquiring "minimum nuclear deterrence"[11]. According to former Defence Minister Jaswant Singh, "No other country has debated so carefully and, at times, tortuously over the dichotomy between its sovereign approach and a realistic one, and between a covert nuclear policy and an overt one". [12]

Hypothesis

A nuclear weapon state is called nuclear capable only if it has the requisite command and control set-up and the infrastructure to execute the nuclear strike. It may not be necessary to create an ideal nuclear infrastructure in the short or the medium term. There is a need to analyze the imperatives of force structure that, when suitably supported by the infrastructure, would meet the conditions for a viable deterrence.

Aim

To propose the infrastructure necessary to pursue India's stated Nuclear Policy.

Scope

The layout of the thesis is as under :

(a) *Chapter I* - Evolution of India's Nuclear Policy. This chapter covers the evolution of India's nuclear doctrine since its Independence, the consistent policy that India has adopted with regards to the non-proliferation of weapons of mass destruction and the factors leading to the decision to develop nuclear weapons. The views of various political parties on India's Nuclear Policy have also been included in the chapter.

(b) *Chapter II* - Post Pokhran II - India's Evolving Nuclear Doctrine. This chapter follows the evolution of India's Nuclear Doctrine in the period post-Pokhran II, India's response to Biological and Chemical Attack and against a conventional attack targeting India's Nuclear Forces.

(c) *Chapter III* – Command and Control Systems. This chapter discusses the requirement of an effective command and control system for the nuclear weapons and the existing command and control systems of the United States, Soviet Union (Russia), China and Pakistan. The aspects of the control of weapons, targeting procedures, attack assessment and communications have been covered. A brief discussion of India's nuclear arsenal has also been included to facilitate an analysis of the requirement of command and control infrastructure for India.

(d) *Chapter IV* - Nuclear Command Infrastructure - India. This chapter evaluates the Nuclear Command Authority and the Strategic Forces Command created by India to exercise effective control over the nuclear forces in accordance with the country's nuclear policy.

(e) *Chapter V* - Force Structure. This chapter covers the aspects pertaining to the creation of Headquarters Integrated Defence Staff, its interaction with the three services and the Strategic Forces Command. An analysis of the progress made by this set-up has also been included.

(f) *Chapter VI* – Conclusion. This chapter summarizes the shortcomings in India's Nuclear Policy and infrastructure. It can be seen that acquiring the nuclear deterrent and creation of requisite infrastructure for command and control of nuclear forces was inescapable.

CHAPTER 1

EVOLUTION OF INDIA'S NUCLEAR DOCTRINE

The Need

A Regional Power. In the light of Indian history, culture, civilization, and immediate international environment, India's emergence as a major power should be the key objective of the policy makers.[13] In order to achieve the long - term objective of a major power status, India had to pursue its goal of nuclear capability. " Because of incoherent policies of our political leadership, even after 50 years of independence India remains an insecure country".[14] In the words of Lee Kuan Yew "A military muscular and self confident India will at once become more out-ward looking and economically open and energetic. In the event it is also likely to be more understanding of its sub continental neighbours and serve the large strategic purpose of containing China by introducing in South and SE Asia an indigenous geo-political balance the absence of which is forcing the countries of the region to kow-tow-to Beijing".[15]

The China Factor. India's policy has had to cater for China, which poses by far the biggest strategic challenge. Some of the factors that must be kept in mind are :

(a) Territorial dispute wherein China occupies 48,000 sq km and claims another 94,000 sq km.

(b) Internal tensions related to Tibet and Xinjiang.

(c) Enhanced conventional and nuclear force.

(d) Transfer of nuclear / missile technology to Pakistan.

(e) Continuing strategic uncertainty of how China may use its dramatically growing economic, military and political power in South and South East Asia".[16]

The Prevailing Scenario. "Heavy pressure was brought to bear on India starting from 1991 to forego its nuclear policy".[17] In the 90s due to aggressive non proliferation India had to either submit and be disarmed without any solution to its security concerns or cross the threshold and establish its nuclear credentials. The violation of Non Proliferation Treaty norms by China and France, transfer

of missiles by China to Iraq, Pakistan and Saudi Arabia had to be deliberated and factored into the security environment. Discussing the Pakistan-China Nuclear Axis, MV Ramana and C Rammanohar Reddy say[18] that "while the precise quantum of Chinese aid remains unclear, there seems to be evidence enough of some, fairly continuous cooperation since 1976".

There is a need to concentrate on safety, storage, command and control aspects of India's arsenal. The system must be robust, supported by effective intelligence and an early warning capability. The ultimate authority of use would be vested with the Prime Minister. To assist him in decision-making, "the Cabinet Committee on Security" is an adequate instrument for collective decision-making. The Cabinet Committee on Security constituted the Political Council and the Executive Council of the National Command Authority. The Executive Council, chaired by National Security Advisor gives the inputs to the Political Council, which authorises a nuclear attack when deemed necessary. The Political Council is chaired by the Prime Minister, and advised by the Executive Council, chaired by the National Security Advisor. Their directives are to be operationalised by a new Strategic Forces Command. The Strategic Command, Nuclear Command Post and nomination of a Nuclear Force Commander are the aspects that need to be factored into our Nuclear Policy to attain the state of Minimum Level of Deterrence. Missiles and warheads have accompanied problems of security, storage, survivability and transportation. Support systems in terms of surveillance, safeguards against rogue action, communication and civil defence have to be built in to avoid time differential in various facets for execution of nuclear strike. Detailed deliberations on the aspects discussed above suggest a sound infrastructure required by India. The efficacy of nuclear strategy revolved around the competence with which nuclear forces can be controlled during peace and war. Command and control infrastructures must have supporting intelligence systems/ set up, communications and survivable equipment, command post(s) to ensure a respons capability to a pre-emptive nuclear strike by an adversary.

Evolution Of India's Nuclear Doctrine

The organisational theory and strategic culture (neo-cultural theory), along with Realism have helped to explain the evolution of India's nuclear doctrine. Organisational theory examines the decision-making process. Strategic culture examines the influence of domestic politics and culture on doctrine. Thus the dynamic process behind the evolution of India's nuclear doctrine was on account of three variables: the perceived threat; the role of organizations; and the influence of domestic politics and strategic culture. The events[19] that triggered specific decisions in the evolution of India's nuclear policy are :

(a) The Chinese explosion of 1964 (following the Indo-Chinese conflict of 1962) which led to the first reconsideration of India's nuclear objectives.

(b) The presence of the nuclear-powered and armed USS Enterprise in the Bay of Bengal during the Bangladesh War of 1971.

(c) The increasing frequency of statements from political, military and scientific leaders in Pakistan, beginning around 1987, announcing the availability of nuclear weapons with them.

(d) The pressures exerted, chiefly by the United States, against the conduct of any further nuclear or missile tests during much of the 1990s. India has been particularly sensitive to what it sees as efforts to exert preassure, and its policy has generally 'evolved' in reaction to such efforts.

The evolution of India's nuclear doctrine has been through four distinct phases:[20] the 'weapon option' phase (from the establishment of the Atomic Energy Commission in 1947 to the first nuclear tests in 1974); the 'un-weaponised' phase (from 1975 when India virtually slowed down its march towards weaponisation to around the mid-1980s when the decision to weaponise the option was made); the 'non-weaponised deterrence' and 'recessed deterrence' phase (from the covert development and fabrication of nuclear weapons and their delivery systems in the mid-1980s to the overt nuclear tests in May 1998) and the present 'credible minimum deterrence' phase (since May 1998).

Weapon Option Phase. The option to make weapons was possibly built into the programme from its inception in the late 1940s and that both India's first Prime Minister Jawaharlal Nehru and Homi Jehangir Bhabha, the Chief of the Indian Atomic Energy Commission were its principal architects. This built-in ability to weaponise came to be known as the 'weapon option'. The option became viable in 1965, when India had completed construction of the 40 MW CIRUS plutonium production reactor, the Trombay plutonium reprocessing plant and drew up plans for the Subterranean Nuclear Explosion Project. The nuclear test (18 May 1974) was carried out when the scientists were ready to test and Prime Minister Gandhi agreed primarily for domestic political reasons.

Un-weaponised Phase. A few years before the 1974 nuclear tests, the Annual Report of the Minister of Defence noted the Chinese trend of developing 'ballistic missiles with nuclear warheads' and estimated that China had stockpiled about 150 nuclear and thermo-nuclear weapons, with a capacity of producing forty weapons of 20 kilotons annually. The report seemed particularly concerned

about the medium range ballistic missiles (with a range of up to 3,200 km), which when operational were 'capable of reaching targets in India from launching bases in Tibet'[21]. Therefore, with the growing threat posed by the Chinese nuclear arsenal, there was a case to enhance India's nuclear weapon capability. Instead, this capability was curtailed on account of a number of factors. Following the 1974 nuclear test the availability of fissile material went 'from one to zero'. This was partly on account of the sharp international reaction as also because of the closure of the Trombay plutonium separation plant for refurbishment. Prime Minister, Morarji Desai ensured that during his tenure the 'weapon' option remained 'un-weaponised'. In 1977, work began on a new 100 MW plutonium production reactor named 'Dhruva'. The Prime Minister, however, approved the purchase of Jaguar aircraft that could be designed to carry first generation of nuclear weapons. The return of Indira Gandhi in 1980 saw a move to resume nuclear tests in 1982 as also the launch of an ambitious Integrated Guided Missile Development Programme, which was tasked to develop at least two nuclear-capable missiles: the Prithvi and the Agni.

Recessed Deterrence Phase. 1974 onwards (more evidently since the premiership of Rajiv Gandhi in 1985), India developed a missile-based delivery system and started to adopt a deterrence policy, without actually deploying nuclear weapons. Scholars have described this situation as 'recessed deterrence' or 'non-weaponised deterrence' or even 'existential deterrence'[22]. The 1980s witnessed a series of crises between India and Pakistan that stopped short of actual war. These included the reports that India would attack Pakistan's nuclear weapon production facilities and the conduct of exercise Brasstacks. Although the crisis was resolved, Pakistan indicated that it had acquired nuclear weapons capability. After the crisis, Rajiv Gandhi ordered nuclear scientists to develop weapons in 1988[23]. In the wake of Pakistani exercise Zarb-i-Momin, conducted in late 1989, there was a sudden spurt in the insurgency movement in Kashmir. Pakistan is reported to have threatened to weaponise their nuclear capability to counter any Indian attack. Thus, in response to these crises of the 1980s, India's military doctrine moved from a purely conventional deterrent (in 1983-84) to one that incorporated nuclear weapons. Nuclear deterrence was based on a doctrine of no-first-use and second-strike retaliation. This phase continued until the nuclear tests of 1998, which ushered in the phase of 'minimum credible deterrence'.

May 1998, Kargil and Minimum Credible Deterrence. The Indian tests of May 1998 (followed by the Pakistani blasts) raised three primary challenges.

First, India attempted to justify its right to bear nuclear arms and to provide element of recognition of this right. Second, to portray and prove itself as a responsible member of the exclusive nuclear weapon club through its declarations and actions. Thus, soon after the tests while India declared its desire to create a 'minimum credible deterrence' it also offered a 'no-first-use guarantee'. India also offered to join the NPT but only as a nuclear weapon state. India also readily agreed to provide negative security guarantees for proposed nuclear weapon free zones in its vicinity. India followed by Pakistan also declared a unilateral moratorium on further nuclear tests. Third, there was fear that the region might become the flash point (accidental or deliberate) for a nuclear exchange.

Soon after the Kargil crisis India unveiled a draft nuclear doctrine on 17 August 1999. This doctrine categorically stated India's quest to establish a 'minimum credible deterrent'. Prime Minister Vajpayee said in an interview to the *New York Herald Tribune* on 21 September 2000, 'A unilateral moratorium on explosive tests, a policy of "no-first-use," a tight export control regime and a willingness to engage with other countries on all aspects of international security are the principles of India's nuclear policy.' Almost three years later New Delhi also elaborated its nuclear command and control structure.

Views of the Major Political Parties of India. The standpoint of the Bharatiya Janata Party, Communist Party of India (Marxist) and Indian National Congress as regards India's nuclear policy have been discussed below :

(a) The Bharatiya Janata Party. The views of the party are expressed in the Party Manifesto of 2004. The party claims that the Pokharan-II blasts in May 1998 triggered a process of national resurgence. India successfully beat back post-Pokharan sanctions imposed by big powers and these countries are now keen on strengthening comprehensive relations with India. There has been a significant reduction in cross-border terrorism. India has also played a widely acclaimed role in creating international awareness and solidarity on the issue of jehadi terrorism. The BJP has suggested specific measures for inclusion in the National Democratic Alliance's Manifesto for Election 2004. As regards Defence, the BJP said that it has always attached the highest importance to national security. "We are proud of the National Democratic Alliance Government's historic initiatives to strengthen India's defence capability and preparedness. We commit ourselves to carrying forward the work done in the past five years. Our priorities will be: speedy implementation of all the ongoing programmes for modernization, acquisition and capability enhancement; minimizing delays and procedural bottlenecks, which push up costs and

cause obsolescence; achieving greater efficiency in defence spending; giving a further boost to indigenization of defence production and encouragement to private sector participation; and making defence exports a thrust area"[24].

(b) Communist Party of India (Marxist). The Communist Party of India (Marxist) Manifesto for the 14th Lok Sabha Elections, 2004, expresses the views of the party on National Security as under :

(i) Cancellation of Indo-US military cooperation, which links up India with the US global strategy.

(ii) Revert to nuclear policy of using nuclear energy for civilian and peaceful purposes. Provide parliamentary sanction for moratorium on testing. Open talks with Pakistan for de-nuclearised environment in South Asia.

(iii) Removal of nuclear weapons from the US military base in Diego Garcia in the Indian Ocean.

(iv) Promote the policy of 'no foreign military bases' in South Asia.

(v) Create a national security apparatus that will work within the framework of the parliamentary democratic system.

(c) Indian National Congress. The Indian National Congress as per its Party Manifesto 2004[25] is committed to a credible nuclear weapons programme. Its views on Defence, National Security and Foreign Policy as given in their Election Manifesto 2004 express that "The Congress is committed to maintaining a credible nuclear weapons programme while at the same time it will evolve demonstrable and verifiable confidence-building measures with its nuclear neighbors. The Congress will make the National Security Council a professional and effective institution. It will immediately have a discussion in Parliament on the Subrahmanyam Committee report on Kargil and move resolutely to implement its recommendations to strengthen our intelligence networks".

CHAPTER II

POST-POKHRAN II—INDIA'S EVOLVING NUCLEAR DOCTRINE

"Action, it is said, is the means to reach the heights of yogic strength;

Once reached, though– it is said, again –Restraint is the proper course."

Bhagavad Gita

The international reaction to the Indian nuclear testing in 1998 was characterized by a deep division among the P-5/G-8 governments about the ways to deal with the situation. United States, Canada and Japan imposed economic sanctions against India. Canada and Australia imposed a ban on ministerial level talks with India as a sign of their displeasure. Others (especially the United States, France, Canada and the United Kingdom) sought diplomatic engagement with India based on two parameters – non-proliferation and Indian security[26]. The draft report of the National Security Advisory Board on India's Nuclear Doctrine (17 August 1999) highlighted that the very existence of offensive doctrine pertaining to the first use of nuclear weapons and the insistence of some nuclear weapons states on the legitimacy of their use even against non-nuclear weapon countries constitute a threat to peace, stability and sovereignty of the state (India). The draft doctrine (see Appendix 'A') outlines the broad principles for the development, deployment and employment of India's nuclear forces. Subsequently, the Cabinet Committee on Security on 4 January 2003, summarized the salient features of the draft doctrine as follows.[27]

(a) Building and maintaining a credible minimum deterrent.

(b) Policy of "No First Use" (NFU): nuclear weapons will only be used in retaliation against a nuclear attack on Indian Territory or on Indian forces anywhere.

(c) Nuclear retaliation to a first strike by the opponent will be massive and designed to inflict unacceptable damage.

(d) The civilian political leadership through the National Command Authority can only authorize nuclear retaliatory attacks.

(e) Non-use of nuclear weapons against non-nuclear weapon states.

(f) In the event of a major attack against India, or Indian forces anywhere, by biological or chemical weapons, India retains the option of retaliating with nuclear weapons.

(g) A continuance of strict controls on export of nuclear and missile related materials and technologies, participation in the Fissile Material Cutoff Treaty negotiations, and continued observance of the moratorium on nuclear tests.

(h) Continued commitment to the goal of a nuclear weapon free world, through global, verifiable and non-discriminatory nuclear disarmament.

The basic elements of the Indian nuclear posture are :

(a) A declared unilateral moratorium on nuclear tests.

(b) The need to build a 'minimum credible deterrent' based on a nuclear 'triad'. Minimum deterrence may be defined as "a small force of survivable nuclear weapons that would deter an adversary from initiating military action that would threaten a nation's vital interests"[28].

(c) A no-first-use and non-use of nuclear weapons against non-nuclear states. Prime Minister Atal Behari Vajpayee had declared in a policy statement in parliament on 4 August 1998 that India's nuclear doctrine will be based on the morally justifiable concept of 'No-First-Use' and that India will maintain "a minimum but credible nuclear deterrent"[29]. While the proposed nuclear doctrine is yet to be formally adopted officially, it could be stated that a broad national consensus has emerged on a 'no first use' policy and the need to develop a 'credible minimum deterrent'[30].

(d) An implied second-strike posture.

(e) The need to maintain a de-alerted or non-deployed posture.

(f) A civilian or 'divided control' of nuclear forces.

Countering a Biological and Chemical Attack

Doctrinal pronouncements in the wake of the establishment of the Strategic Forces Command (SFC) in 2003 conveyed India's threat to use of nuclear weapons to counter even a biological or chemical attack. Almost all of India's neighbours and potential adversaries have signed and ratified the Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC), which not only prohibit the possession but also ban the use of these weapons. The countries

in India's neighbourhood, which have signed but not ratified the CWC and BWC such as Afghanistan, Bhutan and Myanmar, do not have the capability to use these weapons against India even if they had them. Moreover, even if a chemical attack had been launched, for instance, from Afghanistan, it would be highly unlikely that New Delhi would retaliate with a nuclear strike, especially given the presence of the international forces in Afghanistan. This only leaves North Korea, Egypt, Libya, Syria (non-signatories to the CWC) and Israel and Kazakhstan (non signatories to the BWC), which could use these weapons against India. However, the reasons as to why any of them would use these weapons against India are not clear.

More importantly, even if the above countries did manage, in an improbable scenario, to use these weapons against India, it is highly unlikely that New Delhi would be able to mount a successful nuclear retaliation against any of them. This posture, however, is not set in stone and remains dynamic in nature. In fact, all the elements are under pressure on account of domestic and external factors, and could change in the future. For instance, some scientists have challenged the unilateral moratorium and have insisted that India still needs to conduct further tests. Similarly, while the Bharatiya Janata Party led coalition may insist on a 'minimum credible deterrent', the Congress party may have different views. However, it is extremely unlikely that any political party is likely to reverse the 'minimum credible deterrent' posture and revert back to the 'weapon option' posture. Moreover, the no-first-use commitment has been variously articulated at different times and in one instance was not considered to be applicable to non-nuclear states allied to nuclear weapon states.

Conventional Strike Against Nuclear Force

It is not clear whether a conventional strike against the Indian nuclear force would be considered as a first strike and, therefore, could justify an Indian nuclear response. This is best illustrated in India's response to China's nuclear weapons posture. From New Delhi's point of view, Beijing's military build up and its missiles reportedly located in Tibet present a clear and present danger. While China has consistently denied the presence of missiles in Tibet, the lack of transparency, however, makes it difficult to ascertain either the veracity of China's disclaimer or to accurately assess the extent of the direct threat India is faced with. Thus Beijing's continuing qualitative and quantitative improvement of its nuclear arsenal, its complete lack of transparency and its on-going cooperation with Pakistan in the nuclear and missile fields will have a direct impact on India's present nuclear posture.

CHAPTER III

COMMAND AND CONTROL SYSTEMS

A nuclear weapon state would normally need to have the following infrastructure in place to ensure that it has a functionally effective nuclear force[31] *:*

(a) Research and development laboratories and testing facilities, including for computer simulation based testing.

(b) Weapons manufacturing complex.

(c) The nuclear arsenal to include ready warheads and the delivery systems.

(d) The base required for storage and maintenance.

(e) An integrated satellite, aerial and ground based surveillance system to provide intelligence and to gather data for targeting.

(f) An early warning and attack assessment system to detect and provide inputs of warning and categorise attacks.

(g) A command and control structure to analyse data, make decisions, plan, direct and control the targeting and employment of nuclear weapons.

(h) A reliable communication system with built–in redundancy to link the surveillance, early warning and command and control systems with the nuclear forces.

(i) A well-conceived and rehearsed civil-defence system to minimize damage.

It is well understood that the American and Soviet systems cannot even be remotely appropriate for the Indian system. The nuclear postures of these countries compelled them to build costly early warning, reconnaissance, and surveillance infrastructures. The difference between their requirements and ours are too stark and the following aspects need to be kept in mind as we discuss their systems :

(a) The command and control systems of these two countries were designed to manage nuclear arsenals running into several thousands of weapons. The Indian deterrent, on the other hand, is unlikely to exceed two or three hundred.

(b) Their systems were meant for a strategic nuclear war only, with no direct relationship to a conventional or a theatre nuclear war (that could take place in Europe). In the Indian case, it is expected that in all probability, it will be a conventional war that will escalate to a nuclear war. The system must, therefore, cater for it.

(c) The technology levels of the Americans and the Soviets in the nuclear, space and electronics fields were far above the current Indian levels.

(d) The two superpowers were separated by several thousands of kilometers that gave them a warning time of about 30 minutes (7 – 12 minutes in the case of SLBMs – sea launched ballistic missiles–launched at Washington from the Atlantic) to react after the enemy launch. This was a major factor in their nuclear strategy and the design of their nuclear command and control systems. India's nuclear adversaries are in its neighbourhood and so the warning time will be negligible.

United States Nuclear Command and Control System

National Military Command Center, Pentagon is the hub of nuclear command and control of the United States. The President and the Secretary of Defence constitute the National Command Authority (NCA). The nuclear chain of command extends from the President to the Secretary of Defence, and then to the unified and specified commands through the Joint Chiefs of Staff. In an emergency, the NCA has a direct link to the offensive nuclear forces. The unified and specified commands exercise direct control over their nuclear forces. The NCA and each command have alternate as well as airborne command posts[32].

During Eisenhower's time, the President alone held the authority to release the weapons, and a release order from him would have sent the entire nuclear force, then comprising over 3,400 warheads, towards their targets in the USSR, China, and East Europe. Kennedy and Mc Namara, however, went for a change in 1961 with the adoption of the strategy of Flexible Response. Retaliation was to be deliberate and authorized by the President whereas earlier (as authorized by Eisenhower), the Commanders – in – Chief of commands had the authority to retaliate if attacked with nuclear weapons[33]. Flexible Response required a command and control system to perform many more tasks. The nature of the enemy attack had to be analyzed and the appropriate response calibrated[34]. The damage caused by the retaliatory strike had to be assessed and repeated attacks ordered, if required.

American Strategic Imperatives

The mission allotted to the US nuclear forces was to achieve a high level of damage in terms of targets. The overriding importance of achieving the laid

down damage affected the command and control system. It was the United States' perception that an enemy nuclear attack would begin with about 10 airbursts whose Electro Magnetic Pulse effect would cover the entire country and blank out all communications. This would be followed by an attack on the national capital (from off – shore nuclear propelled ballistic missile submarines) to destroy the command and control system. Simultaneously, there would be a massive attack by missiles on other important targets[35].

It was felt that if the United States nuclear forces were to react after absorbing an enemy nuclear strike, then a proportion of nuclear forces would definitely be destroyed and the command and control system disrupted making it difficult to achieve the specified degree of damage. The answer to this was to ensure that the retaliatory attack was launched before the enemy weapons impacted on their targets. This was termed "prompt launch" by the Americans.

Prompt launch has had a fundamental effect on the nuclear command and control system in the following ways[36] :

(a) Sophisticated sensors became necessary to provide timely early warning.

(b) The entire process from the receipt of warning to the launch of retaliatory attack had to be carried out in 30 minutes.

(c) The plans became rigid, as there was no time to make significant changes.

(d) Authority had to be delegated to ensure response effected in time.

Targetting Procedure. The procedure is as follows :

(a) The NCA is responsible for the finalisation of Single Integrated Operational Plan[37] which formulates the options available under different contingencies, finalises targetting plans, coordinates employment policy with weapons capability and carries out perspective planning for development of capabilities.

(b) The Joint Targetting Planning Staff makes the war plan. The targets are selected and strategic weapons allocated to them.

(c) Options formulated for various contingencies.

(d) Single Integrated Operational Plan (final target list with the technical details), is then approved by the NCA.

Attack Warning and Assessment System

The system uses a variety of means like satellites, radars, electronic and communications interception as well as the human intelligence sources to obtain

the information. Agencies like the Central Intelligence Agency, National Security Agency, Defence Intelligence Agency and Aerospace Defence Command are used for this purpose.

As per Linton F Brooks, Administrator, National Nuclear Security Administration, the United States, a truly responsive infrastructure would assist in the following :

(a) Fix Stockpile Problems.

(b) Achieve a capability to modify or repackage existing warheads within 18 months of a decision to enter engineering development.

(c) To be able to design, develop, and begin production of a new warhead within 3-4 years of a decision.

(d) To restore sufficient production capacity to produce new warheads in sufficient quantities to meet any defense needs that arise without disrupting ongoing refurbishments.

(e) Assure that services such as warhead transportation, tritium support, etc., are capable of being carried out on a time scale consistent with the ability to deploy weapons.

(f) The efforts to improve test readiness are a prudent hedge against the possibility of a problem arising in the stockpile that cannot be confirmed without a nuclear test.

The United States Administrator, National Nuclear Security Administration, said if the above infrastructure can be employed to produce new or replacement warheads on a timescale in which geopolitical threats could emerge, or in response to stockpile "surprise", then reducing the standing stockpile can be easily achieved. He further adds that by late next decade, United States can drastically reduce non-deployed weapons, depending on the new infrastructure for our (United States) hedge[38].

Soviet Nuclear Command and Control System

Russia is believed to have inherited the infrastructure created by the Soviet Union. The authority over the nuclear weapons in the Soviet Union resides in the General Secretary of the Communist Party of the Soviet Union. This function has passed into the hands of the Russian President. The decision on employment of nuclear weapons has become the exclusive prerogative of the political leadership.

The Soviet Strategic Imperatives

The Soviets were of the view that a nuclear war would be suicidal and their primary goal should, therefore, be to protect the upper echelons of the leadership. It planned to respond in keeping with the threat. This required the leadership to retain firm control at all times so that it could continue to direct operations. The system was, thus, more flexible than that of the US as it could react according to the situation[39].

Targetting Procedure

The political authorities did the targetting in the Soviet Union. They selected the targets as well as allocated the weapons to them. Targets were divided into four categories – nuclear forces, other military targets, political and administrative centres, and war supporting industries. Cities were not included as targets[40]. The planning process and the control measures adopted were[41]:

(a) The formulation of options delegated to General Staff. Evaluation of options and the decision to employ remained with the political leadership. The General Staff serves as the executive and operational staff of the wartime supreme headquarters.

(b) The control measures are stringent leaving little scope for flexibility in a rapidly escalating politico-military situation.

(c) The command hierarchy is dependent, almost entirely, on hardened command shelters.

Warning and Assessment System

The Soviets established warning and attack assessment system that comprised satellites, a network of Hen House radars, large phased array radars and over the horizon radars. Early warning was obtained through the Soviet Military Intelligence (GRU) and Soviet Continental Air Defence Forces (PVO) and corelated with the National Intelligence Agency (KGB) by the General Staff Branch. Its conclusions were forwarded to the Stavka – the wartime General Headquarters of the Soviet Supreme High Command. The Centre for Analysis of Space and Missile Situation was directly linked to The Minister of Defence and the Chief of General Staff – either of them could contact the General Secretary of the Communist Party of the Soviet Union, to discuss the warning of an attack and the counter action to be taken[42].

United Kingdom

In the United Kingdom, the Prime Minister exercises authority over the nuclear forces. The Prime Minister can order the use of nuclear weapons only

with the assistance of at least one other person, possibly the Chief of Defence Staff. " Incomplete codes for authorising a nuclear strike are held by both individuals and only when the two sections are brought together can a fully authenticated launch order be transmitted to Britain's Nuclear Forces"[43]. The Defence Communications Network provides the communications support.

China's Nuclear Command And Control

China's Nuclear Command and Control (NC2) network appears to be highly centralised under the Chairman of the Central Military Commission (CMC) of the Communist Party. The Second Artillery Corps is said to have direct links with the CMC. Operational command, however, apparently is exercised by the General Staff Directorate (GSD)[44]. According to David Shambaugh[45]: It is not certain exactly how communication to launch missiles is conveyed via the GSD, but it is believed that there are also separate and secure communications lines from the CMC to Second Artillery headquarters and thence to all launch brigades. The Second Artillery has additionally undertaken significant efforts to develop a "paperless" network-centric system for distributing information. This process of "informatisation" enables real-time monitoring of personnel, vehicles, support equipment and weapon systems. It is also understood that a launch brigade must receive separate communications from the CMC and GSD before a launch is authorized. CMC offices are apparently now located on the top floor of the new downtown Beijing offices of the Ministry of Defence, which were completed in 2000.

The GSD maintains a hardened facility in Xishan (in the western suburbs of Beijing) from where the People's Liberation Army leadership controls its strategic missile forces. All operational orders originate from there. The Second Artillery Headquarters complex is located not far away, in Qinghe. The sea-based strategic systems do not seem to be under the command of the Second Artillery. In the light of the here-to-fore rudimentary state of Chinese NC2, it is widely speculated that operational units have been given pre delegated launch authority under certain conditions. Moreover, when time is not of the essence, there may be no operational problem with low-tech, but politically reliable, 'messengers' for launch authorisation. However, in terms of the chances of accidental nuclear war, such primitive NC2 procedures would be problematic.

A relatively new and potentially difficult issue concerns the continuing bifurcation of military and political elites within China's leadership. To a large extent, this tendency simply reflects the increased professionalisation of the People's Liberation Army over the last two decades—an evolution that clearly tends towards more effective NC2. However, a major problem arose during 2002-2003 because

China's most senior leadership was split between the Politburo of the Central Committee, headed by President Hu Jintao, on the one hand, and the CMC, chaired by ex-President Jiang Zemin. Jiang's retirement from the CMC in September 2004 reduced the confusion, but the Politburo remains almost entirely civilian in composition, while the CMC is almost entirely military. There is as yet no fusion of military and civilian policy-makers, as in the US National Security Council. This bifurcation raises questions about the command and control structure, not all of which were resolved by Hu Jintao's ascendance to chairmanship of the CMC.

Pakistan's Command and Control Structure

In April 1999 the Chief of Army Staff, General Pervez Musharraf, said the central command system to use nuclear and missile technology would be ready within one month. He said that the four broad components of the system are[46]:

(a) The creation of a national command authority.

(b) Developmental control by a governing body.

(c) Strategic force command, and

(d) Secretariat for all these three commands.

However, this new military command and control structure was not implemented at that time. The unwillingness of the civilian leadership to take the military leadership into confidence on nuclear weapons control matters is said to have figured in the October 1999 military coup by General Musharraf. Following the overthrow of the civilian government, on 2 February 2000 the National Security Council approved the establishment of the National Command Authority (NCA) to control policy on nuclear weapons. The National Command Authority is responsible for policy formulation and will exercise employment and development control over all nuclear forces and strategic organizations. It consists of an Employment Control Committee and a Development Control Committee, as well as the Strategic Plans Division which acts as its Secretariat.

The Employment Control Committee is chaired by the head of the Government and includes Ministers of Foreign Affairs (Deputy Chairman), Defence, Interior, Chairman of Joint Chiefs of Staff Committee, Services Chiefs, Director-General of Strategic Plans Division (Secretary) and Technical Advisers.

The Development Control Committee is also chaired by the head of Government and includes Chairman of Joint Chiefs of Staff Committee (as

Deputy Chairman of the Committee), Services Chiefs, Director-General of Strategic Plans Division, Representatives of the strategic organizations, and scientific community. This Committee controls the development of strategic assets.

The Strategic Plans Division, headed by a senior army officer, was established in the Joint Services Headquarters under the Chairman of Joint Chiefs of Staff Committee to act as the Secretariat for the NCA and perform functions relating to planning, coordination, and establishment of a reliable command, control, communication, computers and intelligence network.

India's Nuclear Arsenal

Though India has not made any official statements about the size of its nuclear arsenal, the Natural Resources Defense Council estimates that India has a stockpile of approximately 30-35 nuclear warheads and claims that India is producing additional nuclear materials. Joseph Cirincione at the Carnegie Endowment for International Peace[47] estimates that India has produced enough weapons-grade plutonium for 50-90 nuclear weapons and a smaller but unknown quantity of weapons-grade uranium. Weapons-grade plutonium production takes place at the Bhabha Atomic Research Center, which is home to the Cirus reactor acquired from Canada, to the indigenous Dhruva reactor, and to a plutonium separation facility.

According to a January 2001 United States Department of Defense report, "India probably has a small stockpile of nuclear weapon components and could assemble and deploy a few nuclear weapons within a few days to a week."

According to a report in *Jane's Intelligence Review* [48], India's objective is to have a nuclear arsenal that is "strategically active but operationally dormant", which would allow India to maintain its retaliatory capability "within a matter of hours to weeks, while simultaneously exhibiting restraint." However, the report also maintains that, in the future, India may face increasing institutional pressure to shift its nuclear arsenal to a fully deployed status.

The reputable *Bulletin of Atomic Scientists* 2005 database estimates thatIndia has "approximately 40-50 assembled nuclear warheads"[49]. The number is expected to grow in time, although at present the US department of Defense states "India probably has a small stockpile of nuclear weapon components and could assemble and deploy a few nuclear weapons within a few days to a week. This correlates with the Center of Defense Information estimates, which places India's nuclear arsenal at 60 warheads of varying core sizes[50].

A Table of Indian Nuclear Forces, 2002 as assessed by Natural Resources Defense Council is given at Appendix 'B'[51]. The role of Prithvi I with a strike range of 150 km has not yet been clearly conveyed to Pakistan. Although it is being maintained officially for conventional warhead use, projections by media and analysts suggest its nuclear capability. Doubts have often surfaced about the operational efficiency of Prithvi as a battlefield missile. The air of confusion persists as Prithvi launched with conventional warhead can be misjudged by Pakistan for a nuclear attack against it thereby initiating a nuclear exchange between the two countries.

Agni II with 2000 Km plus range can be said to prove a definitive second-strike capability against Pakistan. But Agni II will not be sufficient for striking any valuable target in China because of the range factor of the missile. After the second flight test of Agni I (700-800 Km range), the missile was to be inducted by the year-end of 2003. Despite the fact that a missile group for efficient handling of Prithvi had been raised as long back as 1994, there is no official word yet on who shall be handling the Agni missiles, other than the SFC.

Besides the yet to be introduced Brahmos, there seem to be few other cruise missiles on the anvil. A naval platform for nuclear launch is still to be developed. The current status of Sagarika programme is also not known. Sagarika is sea-based missile that was planned under the Integrated Guided Missile Development Programme, started since 1983.

Admiral Madhvendra Singh, then Navy Chief, was quoted saying in December 2002, only a month before assuming the additional charge of the Chairmanship of Chiefs of Staff Committee (COSC) in January 2003 that "India being a declared nuclear state with no-first-use doctrine must have a nuclear triad with the strongest arm being at sea preferably underwater." But the programmes for the indigenous development of nuclear submarine are still in the development stage.

Admiral Singh while talking to the media in New Delhi on 16 January 2003, explained that there would not be any problem over transfer of nuclear weapon assets from the three services to SFC. And, SFC will decide on the "utilisation and use" of nuclear weapons.

Taking stock of the current level of defence preparedness, apparently India has not achieved the NFU capability to deter any Chinese threat for two main reasons. First, there is non-availability of higher range credible delivery systems, and, second, lack of survivable nuclear naval assets[52].

India's Nuclear Doctrine

India has a declared nuclear no-first-use policy and is in the process of developing a nuclear doctrine based on "credible minimum deterrence." In August 1999, the Indian government released a draft of the doctrine, which asserts that nuclear weapons are solely for deterrence and that India will pursue a policy of "retaliation only". The document also maintains that India "will not be the first to initiate a nuclear first strike, but will respond with punitive retaliation should deterrence fail" and that decisions to authorize the use of nuclear weapons would be made by the Prime Minister or his designated successor(s). Please see Appendix 'A' for the Draft Report of National Security Advisory Board on India's Nuclear Doctrine (17 August 1999).

According to the Natural Resources Defense Council, despite the escalation of tensions between India and Pakistan in 2001-2002, India remains committed to its nuclear no-first-use policy. But an Indian foreign ministry official told *Defense News* in 2000 that a "'no-first-strike' policy does not mean India will not have a first-strike capability."

India has not signed the Comprehensive Test Ban Treaty (CTBT) or the Non-Proliferation Treaty (NPT). India is a member of the International Atomic Energy Agency, and some of its nuclear reactors are subject to international safeguards.

Despite promoting a test ban treaty for decades, India voted against the United Nations General Assembly resolution endorsing the CTBT, which was adopted on 10 September 1996. India objected to the lack of provision for universal nuclear disarmament "within a time-bound framework." India also demanded that the treaty ban laboratory simulations. In addition, India opposed the provision in Article XIV of the CTBT that requires India's ratification for the treaty to enter into force, which India argued was a violation of its sovereign right to choose whether it would sign the treaty. India favours any step aimed at destroying nuclear weapons, but considers that the treaty in its current form is not comprehensive and bans only certain types of tests.

CHAPTER IV

NUCLEAR COMMAND INFRASTRUCTURE –INDIA

The command and control requirements for limited nuclear arsenal, unlikely to exceed 100, would be inherently far less complex than that of the United States or the Soviet Union. This is more so when the exercise of the release option would only be a retaliatory one. The implications of command and control at the head of State level include:

(a) Instruments to analyse the threat.

(b) Evolution of nuclear doctrine.

(c) A suitable force structure.

(d) Evolving control mechanism to ensure security of nuclear weapons.

(e) Evolving a suitable command infrastructure for the control and conduct of nuclear strategy.

To perform the functions enumerated above, a command system with the following components is required:

(a) A National / Nuclear Command Authority.

(b) A Military Strategic Command element.

(c) An Integrated Intelligence Instrument.

(d) National Command Centers.

(e) Weapons Research, Development and Production.

(f) Communications.

Nuclear Command Authority

General Pervez Musharraf disclosed in end December 2002, that he was all ready to unleash 'unconventional war' on India — presumably with nuclear weapons — had a single Indian soldier crossed the border during the recent 10-months-long standoff. India's Cabinet Committee on Security was quick to announce the formation of a Nuclear Command Authority of India as the nodal agency for all command, control and operational decisions regarding India's nuclear weapon stockpile. More than four-and-a-half years after declaring itself a nuclear

weapon power, India made public a set of political principles and administrative arrangements, on 3 January 2003, to manage its arsenal of atomic weapons. Maximum restraint in the use of nuclear weapons, absolute political control over decision-making and an effective interface between civilian and military leaders in the management of its atomic quiver are at the heart of an announcement by the Government.

The Government revealed that a two-layered structure, called the Nuclear Command Authority (NCA), was responsible for the management of its weapons. Three elements of the NCA and the official 'nuclear doctrine' — publicly summarised for the first time — are significant. First, like the 1999 'Draft' made by the National Security Advisory Board, this doctrine too emphasises a 'credible minimum deterrent', with which India will inflict 'massive' and 'unacceptable damage' upon any adversary which strikes it first. The scope and scale of the 'deterrent' is highly ambitious and open-ended. The US had frowned on the original 'Draft' (which was never officially adopted), but relented in the post-9/11 situation. Second, there is an amplification of India's no-first-use commitment. New Delhi will now retaliate with nuclear weapons 'in the event of a major attack against India or Indian forces anywhere' — an attack made not just with nuclear weapons, but with 'biological or chemical weapons' too. In this, India is emulating the US' December 2002 'National Strategy to Combat Weapons of Mass Destruction'. Third, a nuclear strike can only be authorised in India by the political leadership through the two-tier NCA. Only the NCA's Political Council, chaired by the prime minister, has such authority. The Executive Council, chaired by the National Security Adviser, will provide 'inputs' for decision-making and execute the Political Council's directives. While this reiterates the well-known position that India's nuclear trigger can only be pulled by a civilian finger, the new structure is actually meant to facilitate greater involvement of the military in nuclear decision-making. The Executive Council is likely to include armed forces personnel, who will tender advice on security threats. It is also reported that scientists and engineers entrusted with manufacturing nuclear weapons will share with the armed forces information about their exact capability and yield.

Military Strategic Command

The Strategic Forces Command (SFC), the nation's third tri-service command / establishment was created on 4 January 2003, under the Air Force. The C-in-C of SFC will now be allotted the strategic nuclear assets which will constitute the triad of land-based missiles, air or space-delivered weapons and sea-based platforms.

For optimum utilisation, nuclear assets will, in peacetime, be earmarked and allocated to SFC, its operational control vested with C-in-C SFC. While the

single service will continue to administer the strategic nuclear assets, the exception would be in the case of the 333 and the 334 Prithvi Missile Groups. These together with the short range Agni I manned by Army Artillery Corps will become integral to SFC. Since the Mirage 2000, Jaguars and Su 30 MKI are all dual use fighters, even after being made nuclear capable these will remain on the orbit of IAF and be allotted to SFC, when required. The third leg of the nuclear triad, naval platforms, is not operational yet[53].

The NCA's directives are to be operationalised by a Strategic Forces Command under the control of a Commander-in-Chief of the rank of Air Marshal (or its equivalent) in charge of the management and administration of the tactical and strategic nuclear forces. Taken together, these administrative arrangements form the crucial link between the civilian and military leadership on nuclear decisions and their execution.

Expressing "satisfaction with the overall preparedness" of its arsenal, the Cabinet Committee on Security, in 2003, reiterated the decision to limit India's capability to a "credible minimum deterrent" and the commitment to use nuclear weapons only in retaliation. India also reaffirmed that it would not use the weapons against non-nuclear weapon powers. Against nuclear weapon powers, its strategy would remain one of "no-first use". While India has consciously chosen not to use nuclear weapons first, it warned potential adversaries that the "nuclear retaliation to a first strike will be massive and designed to inflict unacceptable damage." It also emphasised strict control over the export of sensitive technologies and materials, readiness to join multilateral arms control agreements, continued observance of the moratorium on tests and a commitment to global disarmament.

Command Centers

India's then Defence Minister Shri George Fernandes in an interview[54] on 5 October 2003 said that Chief of Defence Staff (CDS) set-up would be in place within a "few months". Expanding on the Nuclear Command Authority, Fernandes said that any nuclear power had to take care of issues like having a credible second strike capability and setting up of nuclear command and nerve centers. "India as a declared nuclear weapon state has been on this job from day one" (after 1998 Pokhran nuclear tests), the Defence Minister said, adding this just did not entail nuclear nerve centers, but also dealt with educating people about nuclear dangers, making hospitals ready for nuclear emergencies and other connected issues. Declaring that both short and medium-range nuclear-capable Agni ballistic missiles were ready for deployment, he said that the country's nuclear command chain, including alternative "nerve centers," was in place, giving India an effective retaliatory capability. "We have established more than one (nuclear control) nerve center".

He disclosed that other nuclear command and control structures like nuclear command shelters and Very Important Persons' shelters had also been established. Elaborating on the process of deployment of 700 km-range Agni-I and 1,500 to 2,000 km-range Agni-II missiles, it was mentioned, "these have been handed over to the Army for deployment". The production of longer-range variant of the missile - Agni-III - was under production. Though Agni-I and Agni-II along with surface-to-surface Prithvi missiles had been handed to the Army, the newly raised strategic forces command had its responsibilities and would fulfill them.

India, which for 50 years regarded reliance on nuclear weapons for 'security' as a strategic folly and a moral-political perversity, is gearing itself for actual nuclear war-fighting by putting together weapons assemblies and all other components of a full-fledged nuclear arsenal, including costly, high-risk, command-and-control systems. Its Strategic Forces Command will place the nuclear warheads in the custody of the Department of Atomic Energy, the detonation assemblies with the Defence Research & Development Organisation, and the delivery vehicles with the armed forces.

The NCA may be seen as the first stage in the development of an effective and robust Command-and-Control and Indications-and-Warning systems and infrastructure for India's strategic nuclear forces. The composition of the supreme Political Council, however, has not yet been officially declared. But, it is believed to include the Prime Minister, the deputy prime minister and the minister of defence, external affairs and finance. The alternative chain of command, when the first tier command is hypothetically immobilized or obliterated, is said to be in place even though, for security reasons, it has not been officially announced[55].

Pakistan's Nuclear Command

Pakistan's Nuclear Command was established almost three years earlier, in February 2000. Pakistan is believed by international experts to be more advanced than India in marrying nuclear warheads to missiles. Its doctrine permits a nuclear first strike. There are several indications that Pakistan was at a high level of readiness to strike during the Kargil war and in the standoff in 2001-2002 (OPERATION PARAKRAM) with India. Although its nuclear programme has all along been under the military's control, Islamabad conveyed, in February 2000, that the head of Government (the Prime Minister) would chair the NCA. Even Prime Minister Benazir Bhutto had to beg the US for information on it because her own generals refused it to her. Similarly, Mr Nawaz Sharif discovered in July 1999 that his generals had plans for a nuclear attack on India — not from them, but from President Clinton of the US. The 6 January 2003 Pakistan NCA meeting did not dilute the military's control over nuclear weapons.

An Analysis of India's NCA

In the case of India, New Delhi has two nuclear capable neighbours, Pakistan and China, with past hostile records. It stands logical for New Delhi to have its defence build-up in tune with national security requirements. But, in the process of building and maintaining nuclear deterrent, has India evolved the tools of projecting its areas of strength in its true perspective? More transparency in its existing credible nuclear forces strength will not only increase pressure on Pakistan to refrain from making frequent nuclear threat calls, but will make China take India seriously in regional security matters. At the domestic front, with more transparency in national military strength, the government will receive better feedback in terms of national mandate in nuclear weapons development programme. The cost involved in nuclear development programmes will be better justifiable if the capability of emerging nuclear triad remains reasonably transparent in public domain.

See Appendix 'C' for the Anatomy of Nuclear Attack[56]. By posturing NFU, India has reassured the world of being a responsible nuclear weapon state. With civilian control over the country's nuclear arsenals, the NCA structure announced by the government sounds democratic in decision-making for NFU. The government may have its own security reasons for not elaborating on the status of nuclear force deployment. However, a little more transparency may bring in clarity for those who either underestimate or ignore the deterrence value of the existing arsenals. It will, in turn, also provide greater legitimacy to the nuclear command structure.

CHAPTER V

FORCE STRUCTURE

Background

Nine years after Pokhran II, nuclear India is still without a Chief of Defence Staff (CDS). Consequent to the submission of the Kargil Committee Report, a task force led by Mr Arun Singh was constituted by the Group of Ministers (GoM) headed by Deputy Prime Minister LK Advani to analyse the functioning of the higher defence organization in India and suggest remedial measures for improvement. Among the major recommendations was the creation of the post of CDS with a joint planning staff. The GoM accepted this recommendation.

However, while the tri-services Headquarters Integrated Defence Staff (IDS) was formed, it is still headed by a three-star officer who reports to the Chairman, Chiefs of Staff Committee (COSC). The Cabinet Committee on Security deferred approval of the four-star post of CDS pending further consultations. The lack of political consensus as well as opposition within certain sections of the armed forces was cited as the reason for the deferment[57]. It is well known that the Chairman, COSC, lacks the executive authority over the services other than his own. The COSC works primarily by consensus and cannot make hard decisions binding on all the services. All other major democracies have opted for the CDS system. Often during war, the fate of an entire campaign can hinge on a single decision. Such a decision can only be made by a specially selected defence chief and not by a committee like COSC that operates on the principle of the least common denominator.

Headquarters IDS

The newly established Headquarters IDS will undoubtedly meet the requirement in the years to come, but if it remains headless, its functioning will remain disjointed and it will never carry the clout necessary to ensure that difficult and sometimes unpalatable decisions are accepted by the three services without questioning. With India's "No First Use" nuclear strategy, the Cabinet Committee on Security would be in a real quandary if at a critical stage during war, when the adversary has unleashed the nuclear genie, the Chiefs of Staff (who to some extent will be guided by the impact of the use of nuclear weapons on their forward-deployed fighting troops) express divergent views on the payoffs of using nuclear weapons in a retaliatory strike and the type and nature of response. It is axiomatic that the differences among the Chiefs of Staff are resolved by the military professionals themselves, with one of them acting as an arbitrator. Only a CDS will be able to take a detached view and present an objective analysis of the situation along with the available options and the advantages and disadvantages of each option[58].

Strategic Forces Command

The newly constituted Strategic Forces Command (SFC) for the planning, coordination and control of India's nuclear weapons must function directly under the CDS even as nuclear warheads and delivery systems comprising the "Triad" remain with the respective services.

CDS

It is important that in nuclear decision-making the Cabinet must get 'single point military advice'. Before the declaration of NCA, there had been a concern shown by many experts on the existing system for higher direction of the

war. In the then existing scenario, all three Chiefs of Staff rendered military advice to the Cabinet Committee on Security. The COSC was only a recommendatory body with no real executive powers. It lacked the capability to coordinate and execute peacetime or wartime joint operational planning, or to assist the COSC in the execution of agreed joint operations[59]. A mechanism or forum to facilitate coordination between the three services was also found to be non-existent. Various experts have raised the need for a CDS and integration of Services headquarters with the defence ministry to evolve a single point decision-making center[60]. The CDS has not been appointed. In the interim, the Chairman, COSC, is performing the role of CDS in the current command and control system. The Commander in Chief SFC reports to him in the chain of command. This has ensured the unity in command and control.

There has been a mixed reaction from the strategists on the issue of CDS. While some are of the opinion that under the present arrangements, a three star ranking officer in charge of the strategic forces is working under another three star ranking officer who currently heads the integrated set-up. The latter is himself under the Chiefs of Staff Committee, which has no authority to integrate the nuclear infrastructure comprising nuclear scientists and intelligence agencies. The nuclear command, control and intelligence authority is therefore neither convincing, nor confuted of its shortcomings by the Government. Nuclear weapons have thus become part of the general drift and doubt in national governance[61].

Integration of Services Headquarters and Defence Ministry. The government has also taken the first step towards having a CDS by forming a Headquarters IDS in October 2001. A good beginning has been made in having horizontal integration between the Service Headquarters and the Defence Ministry. Headquarters IDS is staffed by officers and personnel from the three Services, the Ministry of External Affairs, Defence Finance and department of Defence Research and Development. Headquarters IDS has become the executive arm of the COSC, through which various decisions reached can be implemented.

The report on the first year of existence of Headquarters IDS by the Chief of Integrated Defence Staff is enlightening in terms of progress made[62]. Some of these are:

(a) The department of Defence, involves a large number of activities, active and full-time interaction with various ministries and agencies of goverment, DRDO, industry and so on, where the services' participation to the extent requiredwas missing. This has been a priority area for the staff of Headquarters IDS.

(b) Headquarters IDS has become the executive arm of the COSC, through which various decisions reached can be implemented. This was a 'gap' that has been bridged now.

Various commentators have noted the absence of integrated tri-service approach in decision-making. Nuclear command and control requires a very high level of coordination between the three services in the conduct of war. The initial delay and hiccups in coordination between the services in Kargil are the aspects often cited by strategists. There has also been some criticism of the 'turf war' between the three services on issues related to the control of nuclear assets, budgetary support and encroachment on their 'core competence' by the other services[63]. There is also a view, to restructure the Command structure in the field, and bring them under a single Service commander, who would function as the overall theatre commander.

The formation of IDS has resulted in increasing levels of integration between the three services. Some of the achievements on this score are mentioned in the first annual report of IDS[64]. These are:

(a) Preparation of tri-service 15 years' Long-Term Perspective Plan has started.

(b) Interaction has already taken place with the Institute of Defence Studies and Analyses and the United Service Institution of India.

(c) The Defence Intelligence Agency is fully operational and coordination between various intelligence organs of the State has improved, including between the various Services Intelligence Directorates.

(d) An office of Net Assessment, based on the US Model, has started functioning. The office seeks to provide the highest decision makers alternative futures and a framework for strategy development.

There has been a lot of work done in the recent times, on increasing the coordination of the three services. India also took a first step towards the system of having integrated theatre commands with the set up of Andaman and Nicobar Command. There have been a lot of joint exercises carried out by the three services where the emphasis has been on jointmanship. The formation of SFC (a tri-service command) responsible for the control of all nuclear warheads and delivery systems is a further step in the integration of the armed forces. The chief of strategic command reports to Chairman, COSC. The media reports suggest that the government has given the permission to transfer the two missile groups of the Army that are equipped with Prithvi Missiles to the SFC. The report also mentions that on induction, the Agni I (range 700 KM) and Agni II (range 2500 KM)

would first be made available to the SFC. This suggests that all the nuclear assets may not be with SFC due to the fact that many of these delivery platforms are dual-capable as they can be used for conventional weapon delivery also.

C4I2 Infrastructure

The nuclear non-proliferation groups and foreign experts believe that given the backward and abysmal technology infrastructure and accident and disaster prone geographical location, there is no way a credible C4I2 (Command, Control, Communication, Computers, Intelligence and Interoperable) system can be developed and deployed in India. C4I2 systems are tailored and customized to suit specific needs. The evaluation of Indian system should not be based on a view through the western glasses as their perspective is based on first strike doctrine which would call for a very complex C4I2 system as the objective would be to completely degrade the second strike capability of the adversary. It would call for counter-strike capabilities (strike against military formations and command and control infrastructure of the enemy) and needs real-time intelligence based on space, air, signal and human intelligence. It will call for rapid and real-time re-targeting solutions requiring immense computing resources and modern early warning system.

On the other hand, the Indian doctrine of NFU calls for a much simpler command and control system. The objective of Indian second strike is to cause an unacceptable damage to the adversary. The objective can be achieved by a strike against a few counter value targets, which does not require an elaborate real-time intelligence and complex command and control set-up.

Indian capabilities - both existing as well as emerging should not be underestimated. The technological competence of the nation is increasingly being acknowledged. Some of the Indian capabilities are discussed below[65]:

(a) Space Based Intelligence Assets. India has a very well established and highly advanced system of satellites that can provide ground imagery with resolutions ranging from 36 meters to as fine as sub-meter resolution.

(b) Space Based Communication. India has a fairly well established system of INSAT satellites that are used for communication. Though, currently there exists no dedicated military communication satellite, the same can be easily manufactured and launched.

(c) Existing/Planned C4I2 System. The Army has a fully automated communication network for its field forces – Army Radio Engineering Network and Army Static Communications Network for rearward

connectivity from field forces. To serve its C4I2 functions, an Army Strategic Information System (ASTROIDS) has been envisaged. The air force has a dedicated communication network for its air defence-complete with radar and communication links for providing surveillance to various air defence elements. The Indian Navy already has networked major command and control centers, logistic depots, maintenance organisations and ships. Its operational information system links the War Room in Delhi with three Command Maritime Operation Centers. Indian Navy has developed an encryption system called 'Trinetra' for secure communication in collaboration with Indian Institute of Technology.

(d) A Data Fusion Center - a module of National C4I2 is being conceptualised to function as a decision support system for theNational Command Authority at the National Command Post.

(e) Early Warning Capabilities. India already has considerable early warning capabilities through a network of Air Defence Direction Control. These form a vital part of Indian command and control set-up. The Indian Air Force is also setting up a monitoring center near Chennai. India is going to acquire its AWACS system soon. This will be based on Israeli PHALCON system mated to Russian IL-76 platform.

CHAPTER VI

CONCLUSION

Acquisition of nuclear weapons by India was inevitable in view of the two hostile nuclear neighbours. India has not yet acquired the capability to effectively deter China. India needs a lean and cost effective infrastructure that is quantitatively adequate and qualitatively appropriate to project India as a nuclear power capable of deterring war and of imposing unacceptable damage on the enemy, if provoked.

The declaration of Indian nuclear doctrine and NCA is a major milestone in India's march towards peace and security. It heralds the beginning of an era of transparency in security matters. It gives greater credibility to Indian deterrence and promotes stability in the region. The No-First-Use posture not only reflects the maturity and restraint adopted by India, it also shows the confidence of the nation in its capabilities. It is a policy of nuclear restraint.

The doctrine also makes the command and control system simpler, affordable and easier to implement. It can be concluded that India's nuclear establishment consisting of a relatively small nuclear arsenal requires a simple but effective nuclear infrastructure which can survive a nuclear strike and yet be available for launching a retaliatory strike. Though a lot of work needs to be done in building up India's capabilities in terms of an effective triad and C4I2 infrastructure, it is reassuring to learn that a robust system is in place. The rapid pace of progress in most of the areas, the meetings of the political council and the strategic decisions made and declared indicate that strategic vision and thinking have taken root in the Indian decision-making.

Recommendations

Deterrence. While the political leaders must build public opinion, capacity and national resolve to effectively deal with terrorism through policy changes and strict enforcement, India must maintain readiness to test next generation nuclear weapons to demonstrate and refine the deterrent capability. This demands facilities for laboratory simulations, physical testing, secure communications and an effective command and control structure. An effective strategic capability depends upon a command capability whereby national political or military leaders can operate or control the resources according to a plan. It is recommended that the ongoing work for establishment of a visible Command and Control infrastructure and National Command Centers be speeded up. These projects could be pursued in an incremental and phased manner, consistent with changes in the international security regimes and threat perceptions.

Integration. There is a need to integrate strategic reconnaissance, surveillance and target information systems with aircraft and missile based strike forces.

Crisis Management Center. India and Pakistan need to discuss the ways and means of ensuring that there is no misunderstanding on the nuclear weapons. A joint Crisis Management Center or a direct communication link, to start with, between the two Governments / nuclear establishments would be a step in the right direction.

Hypothesis Proved

China's nuclear and conventional forces have been constantly upgraded and modernized. China had been supplying nuclear warhead designs and components to Pakistan well before Pokhran II. The Indian tests in 1998 forced Pakistan to reveal its nuclear weapons capability. India has acquired limited nuclear capability, though not yet deterrent against China.

The tests conducted, the draft nuclear doctrine released and the subsequent creation of National Command Authority as well as initiation of required actions to create the requisite infrastructure for command and control of nuclear forces are steps towards required deterrence capability.

An effective command and control of nuclear forces must have appropriate communications, credible intelligence capabilities, survivable surveillance and reconnaissance means and computer networks to process the inputs and present suitable options for targeting and attack. The hypothesis "a nuclear weapon state is called nuclear capable only if it has the requisite command and control set up and the infrastructure to execute the nuclear strike" has been proved.

References

1 Subash Kapila, "India's National Security And Defence- prescriptions", South Asia Pacific Group, Paper No.1148, 16 September 2004, p.2.

2 Ministry of External Affairs, *Evolution of India's Nuclear Policy*, Paper laid on the Table of the House, www. mea.gov.in

3 Mohammed B Alam, India's Nuclear Doctrine: Context and Constraints, South Asia Institute, Department of Political Science, University of Heidelberg, Working Paper No 11, October 2002, p.2.

4 Draft Report of National Security Advisor on Indian Nuclear Doctrine, 17 Aug 1999, available at: http: //www.indianembassy.org/policy/CTBT/ nuclear_doctrine_aug_17_1999.html.

5 Raja Menon, *A Nuclear Strategy for India,* Delhi : 2000, p. 73.

6 Ministry of External Affairs, Paper Laid on the Table of the House, http:// meadev.nic. in/news/ official

7 OP Sabherwal, *India's Tryst with the Atom, Unfolding the Nuclear Story,* New Delhi : UBS Publishers, 2004, p. 8.

8 Jaswant Singh, " Against Nuclear Apartheid", *Foreign Affairs,* vol 77 n. 5, September – October 1998, p.49.

9 Robert Mc Namara, *Blundering into Disaster,* Washington D.C. : 1986, p.5.

10 Dilip H Mohite and Amit Dholatia, *India and the Emerging World Order,* New Delhi : 2001, p.253.

11 SK Mishra, *India's Nuclear Policy, Disarmament & International Security,* New Delhi : 2006, p.6.

12 Jaswant Singh, "Against Nuclear Apartheid," *Foreign Affairs* 77, n. 5, September/October 1998.

13 P M Kamath, "National Objective India as a Major Power", ML Sondhi, ed., *Nuclear Weapons and India's National Security,* New Delhi : 2000, p.55.

14 Brahma Chellany, "After the Tests: India's Options" *Survival* vol 40, winter 1998 – 99, p.93.

15 Bharat Karnad, "Introduction" in Bharat, ed . *Future Imperiled: India's Security in 1990 and Beyond,* New Delhi :1994, pp 1 – 12.

16 P M Kamath, " US – China Relations Under the Clinton Administration: Comprehensive or the Cold War Again?" *Strategic Analysis,* vol 22, August 1998, pp 699 – 704.

17 Jasjit Singh, *Nuclear India,* New Delhi : July 1998, p.23.

18 MV Ramana and C Rammanohar Reddy ed, *Prisoners of Nuclear Dream,* New Delhi : 2003, p 39.

19 Roddam Narasimha, Evolution of India's Nuclear Policies, National Institute of Advanced Studies, Bangalore, 8 June 2001, http:// www.iisc.ernet.in/nias/amaldi.

20 Waheguru Pal Singh Sidhu, Evolution of India's Nuclear Doctrine, Occasional Paper Number 09, April 2004, Centre for Policy Research, New Delhi, available on www.cprindia.org.

21 Ministry of Defence (MOD) Annual Report 1970-71 (New Delhi : Government of India 1971), pp. 1-2.

22 Waheguru Pal Singh Sidhu, n.20.

23 Raj Chengappa, 'The Bomb Makers', *India Today*, 22 June 1998, p. 29.

24 Bhartiya Janata Party Manifesto, 2004, http://www.indianelections.com/party.

25 Indian National Congress, Party Manifesto 2004, http:// www.indianelections.com/partymanifestos.

26 Ashok Kapur, *Pokhran and Beyond, India's Nuclear Behaviour,* New Delhi : 2001, p 220.

27 Prime Minister's Office Press Releases, "Cabinet Committee on security Reviews Progress in Operationalizing India's Nuclear Doctrine", http:// pib.nic.in/archieve/lreleng/lyr2003/rjan2003/ 04012003/r040120033.html

28 Gurmeet Kanwal, "Command and Control of Nuclear Weapons in India", *Strategic Analysis*, January 2000.

29 K. Subrahmanyam, "Vajpayee Propounds Nuclear Doctrine," *Times of India*, 5 August 1998.

30 Gurmeet Kanwal, n.28.

31 Ibid.

32 Thomas P Coakley, *C3I: Issues of Command and Control,* Washington : 1991, p 203.

33 Raja Menon , *A Nuclear Strategy for India,* Second Printing 2000, New Delhi : p 52.

34 Pran Pahwa, *Command and Control of Indian Nuclear Forces*, New Delhi : 2000, Knowledge World, pp15 -16.

35 Ibid.

36 Ibid, pp.16-17.

37 Vijay Nair, *Nuclear India,* New Delhi : Lancers International, 1992, p111.

38 Linton F Brooks, Administrator National Nuclear Security Administration, US Nuclear Weapons Policies and Programs Presented to the Heritage Foundation Conference: US Strategic Command: Beyond the War on Terrorism May 12, 2004, http//en.wikipedia.org/wiki.

39 Pran Pahwa, n.34, p.24.

40 Ibid, p 25.

41 Vijay Nair, n.37, p112.

42 Pran Pahwa, n.34, p 25.

43 Gurmeet Kanwal, n.28.

44 Stephen Polk, "China's Nuclear Command and Control", *Air Power Journal* vol. 2 no. 4 Winter 2005 (October-December), Centre for Air Power Studies, New Delhi.

45 David Shambaugh, *Modernising China's Military: Progress, Problems, and Prospects*, Berkeley : 2002, p.169.

46 National Command Authority established, Associated Press of Pakistan 03 Feb 2000 and Pakistan – Nuclear, Voice of America 03 Feb 2000. http://en.wikipedia.org/wiki/ Pakistan_National Command Authority

47 Joseph Cirincione, John B. Wolfsthal and Miriam Rajkumar, *Deadly Arsenals*, Carnegie Endowment for International Peace, June 2002, pp. 191-206.

48 TS Gopi Rethinaraj, "Nuclear Diplomacy Returns to South Asian Security Agenda", *Jane's Intelligence Review,* May 2002, pp.40-43.

49 Nuclear Notebook: India's nuclear forces, 2005, Bulletin of the Atomic Scientists, Sep/Oct 2005. http://en.wikipedia.org/wiki

50 India and Weapons of Mass Destruction, http://en.wikipedia.org/wiki/

51 NRDC Nuclear Notebook-Table of India's Nuclear Forces, 2002. http://en.wikipedia.org/wiki

52 Rajesh Kumar Mishra, India's Nuclear Command and the Force Preparedness for NFU, http://www.saag.org/papers/paper589.html

53 Ashok K Mehta, A Strategic Forces Command, finally, Feb 10, 2003, "http://en.wikipedia.org/ wiki/Strategic_Forces_Command"

54 Defence India, News dated 06 Oct 2003. "http://en.wikipedia.org/wiki/Strategic_Forces_Command"

55 Rajesh Kumar Mishra, n.52.

56 Nuclear Command Authority (India), http://en.wikipedia.org/wiki/nuclear_Command_Authority_(India).

57 Gurmeet Kanwal, Chief of Defence Staff a Necessity - An idea whose time has come, internet, p.1.

58 Ibid.

59 Gurmeet Kanwal, "Command and Control of Nuclear Weapons in India", *Strategic Analysis* vol XXIII No. 10, Jan 2000. http://www.ciaonet.org/olj/sa/sa_00kag01.html

60 P. R. Chari, "Command and Control Arrangements", IPCS, 18 Aug, 1998, http://www.ipcs.org/ipcs/ issueIndex2.jsp

61 VR Raghavan, *The Hindu*, 7 May 2002, "India's nuclear balance sheet".

62 Official website of IDS http://ids.nic.in/welcome.html

63 Rahul Bedi, "A Credible Nuclear Deterrent?" Frontline http:// www.frontlineonnet.com/fl2007/stories /20030411003009700.htm

64 Dinesh Mannan, A Study of the Indian National Command Authority, Bharat Rakshak Monitor, Volume 6(2) Sep Oct 2003. http:// www.bharat-rakshak.com/MONITOR/ISSUE6/sbm.html

65 Dinesh Mannan, A Study of the Indian National Command Authority, n. 64.

BIBLIOGRAPHY

PRIMARY SOURCES

Government Papers

1. "Draft Report of NSAB on India Nuclear Doctrine", available at http:// www.indianembassy.org/policy/CTBT/nuclear_doctrine_aug_17_1999. html.
2. "Ministry of Defence, Annual Report 1970-71", New Delhi: Government of India, 1971.
3. "Paper Laid on the Table of the House on Evolution of India's Nuclear Policy", available at http://www.indianembassy.org /pic/nuclear policy. htm.
4. Prime Minister's Office Press Releases, "Cabinet Committee on security Reviews Progress in Operationalizing India's Nuclear Doctrine", http:// pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003 / r040120033.html
5. "Report of the Group of Ministers on National Security", Chapter VI, available at http://mea.india.nic.in.

SECONDARY SOURCES

Books

1. Bhola PL, *Pakistan's Nuclear Policy,* New Delhi : Sterling, 1993.
2. Bhushan K and Katyal G, *Nuclear, Biological and Chemical Warfare,* New Delhi : APH Publishers, 2002.

3. Chand A, *Nuclear Policy and National Security,* New Delhi : Mittal Publications, 1993.

4. Chari PR, *Indo Pak Nuclear Standoff : The Role of USA,* New Delhi : 1995.

5. Chengappa Raj, *Weapons of Peace,* New Delhi : Harper Collins Publishers India, 2000.

6. Kamath PM, " National Objective India as a Major Power", in ML Sondhi, ed., *Nuclear Weapons and India's National Security,* New Delhi, 2000.

7. Kanwal Gurmeet, *Nuclear Defence Shaping the Arsenal,* New Delhi : Knowledge World, 2001.

8. Kapur Ashok, *Pokhran and Beyond India's Nuclear Behaviour,* New Delhi : Oxford University Press, 2001.

9. Karnad Bharat, *Future Imperiled :India's Security in the 1990 and Beyond,* New Delhi : Penguin Press, 1994.

10. Karnad Bharat, *Nuclear Weapons and Indian Security,* New Delhi : Macmillan India, 2002.

11. Kartha Tara, "Ballistic Missiles and International Security" in Singh Jasjit ed., *Nuclear India,* New Delhi : Knowledge World, 1998.

12. Khanna SK, *India a Nuclear Power,* New Delhi : Commonwealth Publishers, 1998.

13. Matoo Amitabh, ed. *India's Nuclear Deterrent: Pokhran II and Beyond,* New Delhi : Har-Anand Publications, 1998.

14. Menon Raja, *A Nuclear Strategy for India,* New Delhi : Sage Publications, 2000.

15. Mishra SK ed, *India's Nuclear Policy, Disarmament and International Security,* New Delhi : Radha Publications, 2006.

16. Mohite H Dilip and Dholatia Amit, *India and the Emerging World Order,* New Delhi : Kalinga Publishers, 2001.

17. Nair Vijay K, *Nuclear India,* New Delhi : Lancers International, 1992.

18. Nanda Ravi, *Strategic Compulsions of Nuclear India,* New Delhi : Lancers Books, 1998.

19. Nayar Baldev Raj, *India and The Major Powers After Pokhran II,* New Delhi: Har-Anand Publications, 2001.

20. Pahwa Pran, *Command and Control of Indian Nuclear Forces,* New Delhi : Knowledge World, 2002.

21. Pathak KK, *Nuclear Policy of India, A Third World Perspective,* New Delhi : Gitanjali Prakashan, 1980.

22. Perkovich George, *India's Nuclear Bomb, the Impact on Global Proliferation,* New York : Oxford, 2000.

23. Ramana MV and Reddy CR ed, *Prisoners of Nuclear Dream,* New Delhi : Orient Longman, 2003.

24. Sabherwal OP, *India's Tryst with the Atom,* UPBSD Pvt Ltd, 2004.

25. Shambaugh David, *Modernising China's Military : Progress, Problems, and Prospects,* Berkeley : University of California Press, 2002.

26. Shaun Gregory R, *Nuclear Command and Control in NATO,* London : Macmillan Press Limited, 1996.

27. Singh Jasjit, *Nuclear India,* New Delhi : Knowledge World, 1998.

28. Singh Jasjit, ed. *The Road Ahead – Indo – US Strategic Dialogue,* New Delhi : Lancer International, 1995.

29. Singh Swaran, "*China's Nuclear Weapon and Doctrine*", in Singh Jasjit ed., *Nuclear India,* New Delhi : Knowledge World, 1998.

30. Subramanyam K, *Nuclear Proliferation and International Security,* New Delhi : Lancer International, 1985.

31. Subramanyan K, *Nuclear Myths and Realities, India's Dilemma,* New Delhi : ABC Publishing House, 1981.

32. Sunderji K, *Blind Men of Hindoostan: Indo–Pak Nuclear War,* New Delhi : UBS Publications, 1993.

33. Tellis Ashley, "*India's Emerging Nuclear Doctrine*", New Delhi : Oxford University Press, 2002.

34. Thomas P Coakley, *C3I: Issues of Command and Control,* Washington : National University Press, 1991.

35. Thomas Raju GC and Gupta Amit ed, *India's Nuclear Security,* New Delhi : Vistaar Publications, 2000.

Periodicals

1. Banerjee Dipankar, "Evolving Nuclear Policy", *USI Journal*, July-September 1998.
2. Bhaskar C Uday, "Nuclear Weapons and No-First-Use: Need for Strategic Restraint", *Strategic Analysis*, January 1998.
3. Brahma Chellany, "After the Tests : India's Options", *Survival*,vol 40, Winter 1998.
4. Cirincione Joseph, John B. Wolfsthal and Miriam Rajkumar, Deadly Arsenals, Carnegie Endowment for International Peace, June 2002.
5. Kanwal Gurmeet, "Command and Control of Nuclear Weapons in India", *Strategic Analysis*, January 2000.
6. Kanwal Gurmeet, "Nuclear Targeting Philosophy for India", *Strategic Analysis*, June 2000.
7. Kanwal Gurmeet, "Safety and Security of Indian Nuclear Weapons", *Strategic Analysis*, April 2001.
8. Kamath PM, "US- China Relations Under the Clinton Administration: Comprehensive or the Cold War Again?", *Strategic Analysis*, August 1998.
9. Kapila Subash, "India's National Security and Defence –Prescriptions", South Asia Pacific Group, Paper No 1148, 16 September 2004.
10. Kondipalli Srikanth, "China's Response to Indian Nuclear Tests", *Strategic Analysis*, January 1999.
11. Lavoy Peter R and Khan FH, "Rogue or Responsible Nuclear Power? Making Sense of Pakistan's Nuclear Practices", *Strategic Insights*, February 2004.
12. Mishra RK, "India-Pakistan:Nuclear Stability and Diplomacy", *Strategic Analysis*, January- March 2005.
13. Pande Savita, "Chinese Nuclear Doctrine", *Strategic Analysis*, March 2000.
14. Ramanna Raja, "Security, Deterrence, and the Future", *Journal of the United Services Institution of India*, July-September 1992.
15. Saran Shyam, "Nuclear Non-Proliferation and International Security", *Strategic Analysis*, July-September 2005.

16. Singh Jasjit, "Against Nuclear Apartheid", *Foreign Affairs* 77, no 5. September/ October 1998.

17. Singh Jasjit, "India's Nuclear Policy: The Year After", *Strategic Analysis*, July 1998.

18. Stephen Polk, "China's Nuclear Command and Control", *Air Power Journal* vol. 2 no. 4 Winter 2005 (October-December), Centre for Air Power Studies, New Delhi.

19. TS Gopi Rethinaraj, "Nuclear diplomacy returns to South Asian security agenda," *Jane's Intelligence Review*, May 2002.

Magazines

1. Chengappa Raj, "The Bomb Makers", *India Today*, 22 June 1998.

2. Rahul Bedi, "A credible Nuclear Deterrent?", *Frontline*, http://www. frontlineonnet.com/fl2007/stories /20030411003009700.htm

Internet

1. "A Strategic Forces Command, finally", Mehta Ashok K, February 10, 2003, "http://en.wikipedia.org/ wiki/Strategic_Forces_Command".

2. "A Study of the Indian National Command Authority", Mannan Dinesh, Bharat Rakshak *Monitor*, Volume 6(2) Sep-Oct 2003. http://www.bharat-rakshak.com/MONITOR/ISSUE6/sbm.html.

3. "Command and Control_China Nuclear Forces", http://www.fas.org/ nuke/ guide/c3i/index.html.

4. "China's Nuclear Command, Control and Operations – 2005/2006", International Relations of the Asia Pacific, Ta-chen Cheng, Department of Public Administration, Tamkan University, Taiwan, abstract available at http:/ /irap.oxford journals. org/cgi/content/abstract/7/2/155.

5. "Command and Control Arrangements", P. R. Chari, IPCS, 18 August,1998, http://www.ipcs.org/ipcs/ issueIndex2.jsp.

6. "Chief of Defence Staff a Necessity - An idea whose time has come", Kanwal Gurmeet, http://www.ciaonet.org/olj/sa/sa_00kag01.html

7. "Evolution of India's Nuclear Doctrine", Occasional Paper No 09, April 2004, Waheguru Pal Singh Sidhu, Centre of Policy Research, New Delhi available on www.cprindia.org.

8. "Evolution of India's Nuclear Policies", Roddam Narasimha, National Institute of Advanced Studies, Bangalore, 08 Jun 2001 available on http:// www.iisc.ernet.in/nias/amaldi.

9. "India's Nuclear Doctrine: Context and Constraints", Alam Mohammed B, Heidelberg Papers in South Asian and Comparative Politics, Oct 2002, http://www.sai.uni-heidelberg.de/sapol/hpsap.htm.

10. "India's Nuclear Command Authority", Wikipedia

11. "India's Nuclear Command and the Force Preparedness for NFU", Mishra RK, http://www.saag.org/papers/paper589.html.

12. "India's Nuclear Weapons Programme –The Momentum Builds Up: 1989-1998", nuclear weapon archive.org/india/IndiaMomentum.html.

13. "India and Weapons of Mass Destruction", http://en.wikipedia.org/ wiki/

14. "National Command Authority established", Associated Press of Pakistan 03 Feb 2000 and Pakistan – Nuclear, Voice of America 03 Feb 2000,http:// en.wikipedia.org/wiki/PakistanNationalCommand Authority

15. "Nuclear Command Authority (India)", http://en.wikipedia.org/wiki / nuclear _Command_Authority_(India).

16. "Nuclear Notebook: India's nuclear forces, 2005", Bulletin of the Atomic Scientists, Sep/Oct 2005. http://en.wikipedia.org/wiki.

17. "Nuclear Weapons-India Nuclear Forces", www.fas.org/nuke/guide /india/ nuke/index.html

18. "Nuclear Command Authority Meets", Josy Joseph., www.rediff. com/ news/2003/sep/01nuke.htm.

19. "Nuclear Command and Control Systems", Paulose TT, asianaffairs. com/ feb2003/India_nuclear.htm.

20. "Nuclear Weapons Policies and Programs, Presented to the Heritage Foundation Conference: May 12, 2004", http//en.wikipedia.org/wiki.

21. Official website of IDS http://ids.nic.in/welcome.html.

22. "Opening Remarks by NSA Mr Brajesh Mishra at the Release of Indian Nuclear Doctrine", http://meaindia.nic.in/disarmament/dm17aug99.htm #1.

23. "Pak's Nuclear Arsenal Comparable to India's: Report", Dawn, www.dawn.com/2000/08/26/nat1.htm.

24. "Strategic Forces Command", http://wikipedia.org/wiki/Strategic Forces Command.

25. "Table of Indian Nuclear Forces, 2002", Natural Resources Defense Council. www.nrdc.org/nuclear/nudb/datab20.asp.

26. "The Indian Nuclear Command Authority", May 09,2003, www.media monitors.net/zafarnawazjaspal 1.html

27. "US Strategic Command: Beyond the War on Terrorism", Linton F Brooks, Administrator National Nuclear Security Administration, US 25. World Nuclear Arsenals-Fact Sheet, www.thesouth-asian.com/nov2003 / world_nuclear_arsenal_fact_sheet.htm.

Newspapers

1. Bidwai Praful, "A Deadly Deterrence", *The Times of India,* 26 June 1998.

2. *Defence India,* News dated 6 October 2003.

3. Fernandes, India's Nuclear Command In Place, news.indiainfo.com/ 2003/ 10/05/05/fernie.html.

4. India Sets Out Nuclear Command, http://news.bbc.co.uk/1/hi/world/ south_asia/2627867.stm

5. Josy Joseph, "India sets up Strategic Forces Command", *The Hindu,* 4 January 2003, http://www.thehindu.com/stories/2003010504810100 .htm.

6. Josy Joseph, "India Nuclear Infrastructure Nearly Ready", The Rediff Special, 10 October 2003, rediff.com

7. JN Dixit speaks to Harinder Baweja, Nov20, 2004, http://www. tehelka. com/story_ main8asp.

8. Mohan C Raja, "Nuclear Command Authority comes into being", *The Hindu*, 5 January 2003.

9. Raghvan VR, "India's Nuclear Balance Sheet", *The Hindu*, 7 May 2002.

10. Rejig Push for Nuclear Command, The Telegraph, Calcutta, http:// www.telegraphindia.com/1070812/asp/nation/stoey_8182507.asp.

11. Subrahmanyam K, "Vajpayee Propounds Nuclear Doctrine," *Times of India*, 5 August 1998.

Appendix 'A'

(Refers to Chapter II & Chapter III)

DRAFT REPORT OF NATIONAL SECURITY ADVISORY BOARD ON INDIAN NUCLEAR DOCTRINE (17 AUGUST 1999)

Preamble

1.1. The use of nuclear weapons in particular as well as other weapons of mass destruction constitutes the gravest threat to humanity and to peace and stability in the international system. Unlike the other two categories of weapons of mass destruction, biological and chemical weapons which have been outlawed by international treaties, nuclear weapons remain instruments for national and collective security, the possession of which on a selective basis has been sought to be legitimised through permanent extension of the Nuclear Non-proliferation Treaty (NPT) in May 1995. Nuclear weapon states have asserted that they will continue to rely on nuclear weapons with some of them adopting policies to use them even in a non-nuclear context. These developments amount to virtual abandonment of nuclear disarmament. This is a serious setback to the struggle of the international community to abolish weapons of mass destruction.

1.2. India's primary objective is to achieve economic, political, social, scientific and technological development within a peaceful and democratic framework. This requires an environment of durable peace and insurance against potential risks to peace and stability. It will be India's endeavour to proceed towards this overall objective in cooperation with the global democratic trends and to play a

constructive role in advancing the international system toward a just, peaceful and equitable order.

1.3. Autonomy of decision making in the developmental process and in strategic matters is an inalienable democratic right of the Indian people. India will strenuously guard this right in a world where nuclear weapons for a select few are sought to be legitimised for an indefinite future, and where there is growing complexity and frequency in the use of force for political purposes.

1.4. India's security is an integral component of its development process. India continuously aims at promoting an ever-expanding area of peace and stability around it so that developmental priorities can be pursued without disruption.

1.5. However, the very existence of offensive doctrine pertaining to the first use of nuclear weapons and the insistence of some nuclear weapons states on the legitimacy of their use even against non-nuclear weapon countries constitute a threat to peace, stability and sovereignty of the state.

1.6. This document outlines the broad principles for the development, deployment and employment of India's nuclear forces. Details of policy and strategy concerning force structures, deployment and employment of nuclear forces will flow from this framework and will be laid down separately and kept under constant review.

2. Objectives

2.1. In the absence of global nuclear disarmament India's strategic interests require effective, credible nuclear deterrence and adequate retaliatory capability should deterrence fail. This is consistent with the UN Charter, which sanctions the right of self-defence.

2.2. The requirements of deterrence should be carefully weighed in the design of Indian nuclear forces and in the strategy to provide for a level of capability consistent with maximum credibility, survivability, effectiveness, safety and security.

2.3. India shall pursue a doctrine of credible minimum nuclear deterrence. In this policy of "retaliation only," the survivability of our arsenal is critical. This is a dynamic concept related to the strategic environment, technological imperatives and the needs of national security. The actual size components, deployment and employment of nuclear forces will be decided in the light of these factors. India's peacetime posture aims at convincing any potential aggressor that :

(a) any threat of use of nuclear weapons against India shall invoke measures to counter the threat: and

(b) any nuclear attack on India and its forces shall result in punitive retaliation with nuclear weapons to inflict damage unacceptable to the aggressor.

2.4. The fundamental purpose of Indian nuclear weapons is to deter the use and threat of use of nuclear weapons by any State or entity against India and its forces. India will not be the first to initiate a nuclear strike, but will respond with punitive retaliation should deterrence fail.

2.5. India will not resort to the use or threat of use of nuclear weapons against States which do not possess nuclear weapons, or are not aligned with nuclear weapon powers.

2.6. Deterrence requires that India maintain:

(a) Sufficient, survivable and operationally prepared nuclear forces,

(b) A robust command and control system,

(c) Effective intelligence and early warning capabilities, and

(d) Comprehensive planning and training for operations in line with the strategy, and the will to employ nuclear forces and weapons.

2.7. Highly effective conventional military capabilities shall be maintained to raise the threshold of outbreak both of conventional military conflict as well as that of threat or use of nuclear weapons.

3. Nuclear Forces

3.1. India's nuclear forces will be effective, enduring, diverse, flexible, and responsive to the requirements in accordance with the concept of credible minimum deterrence. These forces will be based on a triad of aircraft, mobile land-based missiles and sea-based assets in keeping with the objectives outlined above.

Survivability of the forces will be enhanced by a combination of multiple redundant systems, mobility, dispersion and deception.

3.2. The doctrine envisages assured capability to shift from peacetime deployment to fully employable forces in the shortest possible time, and the ability to retaliate effectively even in a case of significant degradation by hostile strikes.

4. Credibility and Survivability

The following principles are central to India's nuclear deterrent.

4.1. Credibility: Any adversary must know that India can and will retaliate with sufficient nuclear weapons to inflict destruction and punishment that the aggressor will find unacceptable if nuclear weapons are used against India and its forces.

4.2. Effectiveness: The efficacy of India's nuclear deterrent be maximised through synergy among all elements involving reliability, timeliness, accuracy and weight of the attack.

4.3. Survivability:

(i) India's nuclear forces and their command and control shall be organised for very high survivability against surprise attacks and for rapid punitive response. They shall be designed and deployed to ensure survival against a first strike and to endure repetitive attrition attempts with adequate retaliatory capabilities for a punishing strike which would be unacceptable to the aggressor.

(ii) Procedures for the continuity of nuclear command and control shall ensure a continuing capability to effectively employ nuclear weapons.

5. Command and Control

5.1. Nuclear weapons shall be tightly controlled and released for use at the highest political level. The authority to release nuclear weapons for use resides in the person of the Prime Minister of India, or the designated successor(s).

5.2. An effective and survivable command and control system with requisite flexibility and responsiveness shall be in place. An integrated operational plan, or a series of sequential plans, predicated on strategic objectives and a targetting policy shall form part of the system.

5.3. For effective employment the unity of command and control of nuclear forces including dual capable delivery systems shall be ensured.

5.4. The survivability of the nuclear arsenal and effective command, control, communications, computing, intelligence and information (C4I2) systems shall be assured.

5.5. The Indian defence forces shall be in a position to execute operations in an NBC environment with minimal degradation;

5.6. Space based and other assets shall be created to provide early warning, communications, damage/detonation assessment.

6. Security and Safety

6.1. Security: Extraordinary precautions shall be taken to ensure that nuclear weapons, their manufacture, transportation and storage are fully guarded against possible theft, loss, sabotage, damage or unauthorised access or use.

6.2. Safety is an absolute requirement and tamper proof procedures and systems shall be instituted to ensure that unauthorised or inadvertent activation/use of nuclear weapons does not take place and risks of accident are avoided.

6.3. Disaster control: India shall develop an appropriate disaster control system capable of handling the unique requirements of potential incidents involving nuclear weapons and materials.

7. Research and Development

7.1. India should step up efforts in research and development to keep up with technological advances in this field.

7.2. While India is committed to maintain the deployment of a deterrent which is both minimum and credible, it will not accept any restraints on building its R&D capability.

8. Disarmament and Arms Control

8.1. Global, verifiable and non-discriminatory nuclear disarmament is a national security objective. India shall continue its efforts to achieve the goal of a nuclear weapon-free world at an early date.

8.2. Since no-first-use of nuclear weapons is India's basic commitment, every effort shall be made to persuade other States possessing nuclear weapons to join an international treaty banning first use.

8.3. Having provided unqualified negative security assurances, India shall work for internationally binding unconditional negative security assurances by nuclear weapon states to non-nuclear weapon states.

8.4. Nuclear arms control measures shall be sought as part of national security policy to reduce potential threats and to protect our own capability and its effectiveness.

8.5. In view of the very high destructive potential of nuclear weapons, appropriate nuclear risk reduction and confidence building measures shall be sought, negotiated and instituted.

Appendix B

(Refers to Chapter III)

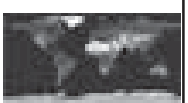
TABLE OF INDIAN NUCLEAR FORCES, 2002

Type/Designation	Range(km)	Payload(kg)	Comment
Aircraft MiG-27 Flogger/Bahadhur	800	3,000	At Ambala Air Base
Jaguar IS/IB/Shamsher	1,600	4,775	At Hindan Air Base
Missiles Prithvi I	150	1,000	Only deployed ballistic missile, may have nuclear role
Agni I	1,500	1,000	Tested but status unclear
Agni II	2,000	1,000	Test fired in January 2001, deployment expected soon

Appendix C

(Refers to Chapter IV)

THE ANATOMY OF NUCLEAR ATTACK

Symbol	Code	Stage	Detail
	FADE OUT OR PEACETIME OPS	Stage 5	The nuclear core is kept in secure and concealed storage facilities managed by the Atomic Energy Commission. The Army trains with Agni and Prithvi with dummy warheads and Air Force practices toss bombing manoeuvres.
	DOUBLE TAKE	Stage 4	If Army goes on full alert, then some of the nuclear cores are mated to warhead by DRDO. Strike plans are reviewed.
	ROUND HOUSE	Stage 3	As alert levels increase, the warhead is mated to missile and Army begins to chalk out operational plans for moving it into launch positions. Plans for next higher condition are readied and reviewed. No proactive measures will be taken.
	FAST PACE	Stage 2	Preliminary action is taken to permit the most rapid transition to maximum readiness, if necessary. The missiles may be moved to launch positions.
	COCKED PISTOL	Stage 1	A maximum state of readiness posture and the highest state of preparedness to execute strike plans. Targets are decided upon and a launch is imminent. Clearance is awaited for the encrypted code that would give the order from the Prime Minister to fire.

BIOTERRORISM: THE INDIAN PERSPECTIVE

By

COLONEL (MRS) RAKHI SINGH

INTRODUCTION

"Genetic Engineering for biological agents? There would be no protection. These are the Weapons of the future and Future is coming closer and closer."

…….William Cohen,

Secretary of State for Defence1988

Primum non nocere. First, do no harm. This ancient maxim has guided doctors since the time of the Greeks more than by the development of art or literature or trade or political institutions.

Background to the study. The use of biological weapons in warfare is as old as history itself. Several countries have used them in the last century. What is new at this juncture, especially after 9/11, is fears that biological weapons might be used to cause mass disruption, if not mass destruction, and against very arduously defensible targets like agricultural crops and livestock. Terrorist groups are known to be interested in developing and using biological weapons. Several countries are also known to be currently researching into these weapons. The technological, legal and political challenges stopping the proliferation of biological weapons are intricate and immense. The security analysts rate security threats in relation to Bioterrorism quite high in the years to come. India and its neighbours are no exception, hence the study.

Aim

To analyse Bioterrorism as a Weapon of Mass Destruction and instrument of international terrorism, and concretise India's bioterrorism concerns and preparedness for the same and likely effect of the same on National Security.

Scope

This study includes analysis of various modalities of inflicting bioterrorism, the causative agents, proliferation and monitoring measures against the same, bioterrorism preparedness status in India and on the basis of its level of preparedness, its security impact on India at present or in near future. The study is based on review of literature.

Hypothesis

The hypothesis is that the threat of bioterrorism is real and will affect India too with possible ramifications impinging on National Security. It is therefore, vital for India to prepare to combat bioterrorism and keep pace with international advances in preventing, monitoring and combating bioterrorism.

The Chapterisation

The study is built up on the following chapters:

(a) Introduction- The instant chapter.

(b) Chapter I: Bioterrorism: An Overview - This chapter defines 'Bioterrorism' and traces its historical background.

(c) Chapter II: Biological Warfare Agents - This chapter highlights the various types of bioweapons and their characteristics.

(d) Chapter III: Bioterrorism: Threat Perception - An assessment of the threat of bioterrorism in today's context is made in this chapter.

(e) Chapter IV: Bioterrorism: A Weapon of Mass Destruction - This chapter brings out the role of bioweapons as one of the weapons of mass destruction and its comparison with the other two WMD.

(f) Chapter V: Biodefence - This chapter outlines the pillars of biodefence and the key recommendations to ensure biosafety.

(g) Chapter VI: Bio-weapons Proliferation and Monitoring-Various international efforts made to monitor bioweapons proliferation are elaborated in this chapter.

(h) Chapter VII: Bioterrorism: India's Status-This chapter brings out the crux of the hypothesis in regard to India's position on the perception of bioterrorist action and threat assessment; in addition, India's level of preparedness to combat bioterrorism is highlighted.

(j) Chapter VIII: Conclusion.

CHAPTER I

BIOTERRORISM: AN OVERVIEW

"... Behold, the hand of the Lord will come with very severe murrain on your livestock which are in the field, on the horses, on the donkeys, on the camels, on the herds, and on the flocks..."

Exodus 9:3

Introduction

The most common question which comes to mind after the 11 Sept 2001 attack on World Trade Centre is "What Next"? Bioterrorism is one of the most feared and fatal options available to the terrorists of this world. Today, the growing threat that biological weapons might be used to cause devastating epidemics that could spread internationally is universally recognised. All countries are potentially at risk. The release of organisms causing smallpox, plague, anthrax or other diseases could prove catastrophic in terms of the resulting illnesses and deaths compounded by the panic such outbreaks would generate. Simultaneously, there is a growing potential for production of new microbial agents, as expertise in biotechnology grows and methods for genetic manipulation of organisms become simpler.

Terrorism aims to achieve political or other goals, whereas, conventional or guerilla forces aim at direct military victory. Thus, some social scientists refer to guerrilla warfare as the "weapon of the weak" and terrorism as the "weapon of the weakest"[1].

Definition of Terrorism

On 17 March 2005, a UN panel described terrorism as any act "intended to cause death or serious bodily harm to civilians or non-combatants with the purpose of intimidating a population or compelling a government or an international organization to do or abstain from doing any act."[2]

What is Bioterrorism?

Bioterrorism is the unveiled or veiled dispensing of disease pathogens by

individuals, groups, or governments for the express purpose of causing harm for ideological, political, or financial gain.

Biological agents, with the exception of smallpox virus, are typically found in nature in various parts of the world. They can be, however, weaponized to enhance their virulence in humans, make them resistant to vaccines and antibiotics and put the agent in an easily disseminable form. Bioterrorism agents may be disseminated by various methods, including aerosolization, through specific blood-feeding insects, or food and water contamination.

Terrorists may choose to use bio-weapons to achieve their goals because bioterrorism gives the biggest "bang" for the buck. For instance, use of conventional weapons would cost an estimated $2,000 per square kilometer, nuclear weapons would cost $800, chemical weapons - $600, and biological weapons would only cost an estimated $1 per square kilometer[3].

Defining Bioterrorism

Bioterrorism is terrorism by intentional release or dissemination of biological agents (bacteria, viruses or toxins); these may be in a naturally occurring or in a human-modified form.

According to the U.S. Centers for Disease Control and Prevention (CDC)[4], a *bioterrorism attack* is the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants.

Encyclopedia Britannica[5] defines biological warfare as:

"Military use of disease-producing or poisonous agents and the means for defending against such agents".

Biological warfare, as defined by the United Nations[6], is the use of any living organism (e.g. bacterium, virus) or an infective component (e.g., toxin), to cause disease or death in humans, animals, or plants. In contrast to bioterrorism, biological warfare is defined as the "state sanctioned" use of biological weapons on an opposing military force or civilian population.

The Office of Population Research Foundation, Princeton University[7], has defined Bioterrorism as, "the threat or use of biological agents that, like most forms of terrorism, is intended to make political, religious or personal statements to governments and populations through attacks primarily aimed at civilians or resources that affect the civilian economy". As against Bioterrorism, Biocrime has been defined as, "the threat or use of biological agents for individual objectives such as revenge or financial gain". Bioaccident is defined as, "the unintentional

release of an agent from a laboratory or other facility".

Caruss (1998)[8] defines Bioterrorism as "the threat or use of biological agents by individuals or groups motivated by political, religious, ecological, social or for other ideological objectives to inculcate fear or cause illness or death in order to achieve their objective".

Historical Perspective

History is replete with examples of the use of biological weapons. Notable examples include:

(a) In 184 BC, Hannibal ordered that pots filled with serpents be thrown onto the decks of enemy ships[9].

(b) In 1346, the Tartar army catapulted bodies of plague victims into Caffa.

(c) In 1763, the British army provided the Delaware Indians with blankets that had been used by smallpox patients[10 11 12].

(d) During World War I, the Germans used various human and animal pathogens as agents of germ warfare in Europe.

(e) During World War II, the Japanese used germ warfare against the Chinese and Soviets.

Following World War II, several countries maintained bio-weapons programmes, including the US, the Soviet Union, Canada, and United Kingdom. However, all ended their programmes by the early 1970s. In 1972, more than 140 countries signed the Biological and Toxin Weapons Convention, which called for termination of all offensive biological weapons research and development and destruction of existing biological weapons stocks.

Despite these positive events aimed at curtailing the availability of biological weapons, Soviet Union continued to expand its biological weapons programme throughout the 1980s and early 1990s. Key aspects of the programme included the production of large amounts of smallpox virus and the development of mechanisms to weaponize it. Eradication of naturally occurring smallpox and the cessation of routine vaccination against the disease in 1980 was seen by Soviet Union as an opportunity to use smallpox virus as a biological weapon. Anthrax was another disease actively studied by Soviet Union, as evidenced by the outbreak of inhalational anthrax that followed release of aerosolized anthrax from the Sverdlosk bioweapons production facility in 1979. Seventy-seven cases of anthrax were identified and 66 of the patients died. After the demise of Soviet Union,

many of the scientists who worked in the biological weapons programme left the country.

After the Gulf War, it became clear that Iraq had developed an extensive biological weapons programme, predominantly involving anthrax and botulism toxin. Experts are also concerned that Iraq, and possibly North Korea, may have gained access to smallpox virus.

The threat of using such agents against civilian populations through bioterrorism attacks has emerged over the past few years. Bioterrorism, which had been largely a topic of speculation, became a serious reality for the United States in October 2001, when anthrax cases following exposure to contaminated mail occurred in New York, New Jersey, and Washington, DC.

The only successful recent biological attack in the United States, prior to 2001, was in 1984. Members of the Rajneeshee cult used Salmonella typhimurium to poison salad bars at ten local restaurants. Seven hundred and fifty-one cases of Salmonella were documented, and authorities only found out about the Rajneeshee role in the outbreak during an unrelated investigation a year later[13]. This example underscores the difficulty of detecting biological attacks and the inability of surveillance methods to determine the cause of the outbreak.

In India, B Ramana[14] takes a look at the new- age terrorism:

- Scrub Typhus 1965, North East India
- Bubonic and Pneumonic Plague 1994, Beed and Surat
- Dengue Haemorrhagic Fever 1996, New Delhi
- Anthrax 1999, Midnapore
- Mystery Encephalitis 2001, Siliguri

These events were proved to be diabolically plotted germ attacks to kill thousands of citizens and disturb and distract the Government of India.

CHAPTER II

BIOLOGICAL WARFARE AGENTS

"*Jihad has at last discovered how to win the holy war-lethal germs*".

Nasser Asad Al-Tamimi, Islamic Radical

Biological Weapons Characteristics

Fig 1. The International Biological Hazard Symbol

(It represents a mature cellular organism in the background which has produced three partially formed offspring in the foreground.)

To be effective, a biological agent should have certain characteristics useful to the attacker.[15] (Table 1:O Appendix A).In addition, according to criteria developed by the United States Army in 1964, biological agents should be manufacturable on a large scale, capable of efficient dissemination, stable after dissemination, difficult to detect or protect against, and able to produce desired psychological results[16]. The ultimate goal of bioterrorism is to induce fear, panic and chaos by high morbidity and mortality rates to break down the existing political, economic and social structure. For bioweapons to be successful, "The biological agent should consistently produce the desired effect of death or disease. It should be highly contagious with short and predictable incubation period and infective in low doses. The disease should be difficult to identify and be suspected as an act of bioterrorism. The agents should be suitable for mass production, storage, weaponization, and stable during dissemination. The target population should have little or no herd immunity and little or no access to treatment. The terrorist should have means to protect or treat their own forces and population against the infectious agents or the toxins[17]."

Although biological agents used in biological weapons can be manufactured quickly and easily, the primary difficulty is delivery in an infective form to a vulnerable target. For example, anthrax is considered an effective agent for several reasons. First, it forms hardy spores, perfect for dispersal aerosols. Second, pneumonic infections of anthrax usually do not cause secondary infections in other people. Thus, the effect of the agent is usually confined to the target. A mass attack using anthrax would require the creation of aerosol particles of 1.5 to 5 micrometres.

Diseases considered for weaponization, or known to be weaponized include anthrax, ebola, bubonic plague, cholera, smallpox, etc. Naturally-occurring toxins that can be used as weapons include ricin, SEB, botulism toxin, saxitoxin, and many mycotoxins. The organisms causing these diseases are known as select agents. Their possession, use, and transfer are regulated by the CDC Prevention's Select Agent Program.

Attacking crops and animals

Microbial pathogens cause enormous problems in agriculture and some of these are clearly suitable for deliberate use. Animal husbandry is particularly vulnerable, partly because it is very often very intensive, with many animals kept in confined areas and also, because the animals reared are often from very limited stock so that a large percentage of them could succumb to a single strain of pathogen.

Soviet Ministry of Agriculture had successfully developed variants of foot-and-mouth disease and rinderpest against cows, African swine fever for pigs, and psittacosis to kill chicken. These agents were prepared to spray them down from tanks attached to airplanes over hundreds of miles. The secret programme was code-named "Ecology"[18].

Types of Biological Agents

The Critical Agent List created by CDC (Table 2. Appendix B) classifies a relatively short list of possible biological weapons to be used in either biological warfare or bioterrorism. There are at least seventy different types of biological agents that can be weaponized, not including agents that do not already exist in nature. Of the diseases caused by these seventy agents, only 20-30 percent are currently treatable through reliable methods. Of greater concern are the agents that have been altered by scientists. It is known that the former Soviet Union created antibiotic resistant strains of anthrax, changed smallpox in order to reduce the incubation period, and developed new diseases by combining agents such as ebola and anthrax[19]. In addition, there are reports and suspicions that other nations and organizations are working towards genetically altering agents to target specific populations[20 21].

Dr. Gary Weaver, of the Center for Food and Nutrition Policy at Virginia Tech, classifies these infectious diseases into categories of bioweapons in the following manner[22]:

(a) Tactical

(i) Tularemia Bacteria

(ii) Anthrax Bacterial Spores

(iii) Venezuelan Equine Encephalitis

(iv) Brucellosis Bacteria

(v) Others

(b) Theater

(i) Ebola Virus

(ii) Marburg Virus

(iii) Others

(c) Strategic

(i) Smallpox Virus

(ii) Plague Bacteria

Based on effects on the end-effects, agents can be divided into two groups:

(Table 3. Appendix C)

(a) Those capable of causing death

(b) Those capable of causing incapacitation.

A bioterrorist could elect to target livestock in an attempt to disrupt national food supplies. A list of potential biological agents against animal populations is given in Table 4 (Appendix D).

Delivery of Biological Weapons

(a) Scud missiles may be used to deliver bioweapons with a range of about 500 miles.

(b) A motor vehicle could cruise the streets of a city while emitting a fine spray of biological weapon - Aerosol through a fake tail pipe or other small vent.

(c) A hand pumped sprayer can be used.

(d) An individual carrying a large suitcase or backpack could disperse biological weapon material while walking the streets.

(e) A book / letter can be contaminated with biological weapon like anthrax.

(f) Umbrella weapon consists of a projectile weapon buried in the disguise of an umbrella.

(g) Remote control devices can be used, they can even be set to release material periodically over several days depending on the direction of the wind.

(h) Robotic delivery offers another likely possibility.

(j) It may be solar powered so it could function independently for long periods.

Advantages of Biological Weapons (BW)

The attraction for BW is attributed to:

(a) They are "stealth" weapons, without very advanced detective methodology.

(b) It has no "smoking gun", i.e., immediate identification of the perpetrator is almost difficult.

(c) Low production costs- BWs are called the "Poor Man's Atomic Bomb".

(d) Methods of manufacture are easy to master.

(e) Easy to conceal e.g., slurry in a bottle or sprayer.

(f) Very small quantities are required, e.g., the quantity of botox in the dot of an 'I' is enough to kill 10 people when delivered properly; hence, easy to carry and execute the job.

(g) More a weapon of mass disruption than a weapon of destruction.

(h) Only weapons which multiply themselves when released.

Disadvantages of Biological Weapons

Some of the disadvantages of biological weapons are:

(a) To achieve full potential, they need technical mastery and inputs from different fields, viz., meteorological department, etc.

(b) Chances of self-contamination.

(c) Poor storage survival.

(d) Dissemination is not easy if required to produce mass casualty.

(e) Effective delivery problems: May be destroyed by UV light and drying.

(f) Difficulty in maintaining quality control and sufficient containment during growth and harvesting of agents.[23]

(g) Difficult to control once released.

CHAPTER III

BIOTERRORISM: THREAT PERCEPTION

"The threat of biological weapons from a madman with a batch of plague-inducing bacteria that could kill tens of thousands of people in a single act of malevolence is no longer a far-fetched scenario, but a real threat that is here and now".

William Cohen

Former US Secretary of Defence

Evolving Perception of the Bioterrorism Threat

Speaking at the World Economic Forum in Davos, Switzerland, on 27 January 2005, U.S. Senate Majority Leader William Frist stated that "The greatest existential threat we have in the world today is biological." He added the prediction that "an inevitable bio-terror attack" would come "at some time in the next 10 years."[24] He was seconded by Dr. Tara O'Toole, head of the Center for Biosecurity at the University of Pittsburgh: "This [bioterrorism] is one of the most pressing problems we have on the planet today."[25] Bio-weapons in the possession of hostile states or terrorists pose unique and grave threats to the security of nations. Thus, bioterrorism presents a new challenge to international security.

Bioterrorism: The Who, What and How

A brief overview of the threat of Bioterrorism is vital. First, who matters? Both state and non-state actors figure prominently. US, Russia, Syria, Iran, Egypt, China, North Korea, Taiwan, India, South Korea and Israel have the capability to produce bioweapons[26]. Al Qaeda is the non-state actor of greatest concern, as it seems to have the funding, logistical capabilities and motivation to pursue bioterrorism[27].

Second, what matters? Presently, policymakers are concerned about mass casualty bioterrorist attacks, since attacks on food or water supplies are conceivable. Focusing solely on mass casualty attacks, the Category A agents are of greatest concern[28].

Third, how would terrorists execute a bioterrorist attack? Terrorists need to acquire a strain of one of the Category A agents. Next, they need to grow the organism and store it and finally transport it to the target and then disperse it.

Defining the Bioterrorism Threat

The bioterrorism threat covers a wide spectrum. It ranges from hoaxes and use of relatively low casualty agents by non-state actors to the employment of classical biological agents that can produce mass casualties (Fig 2).

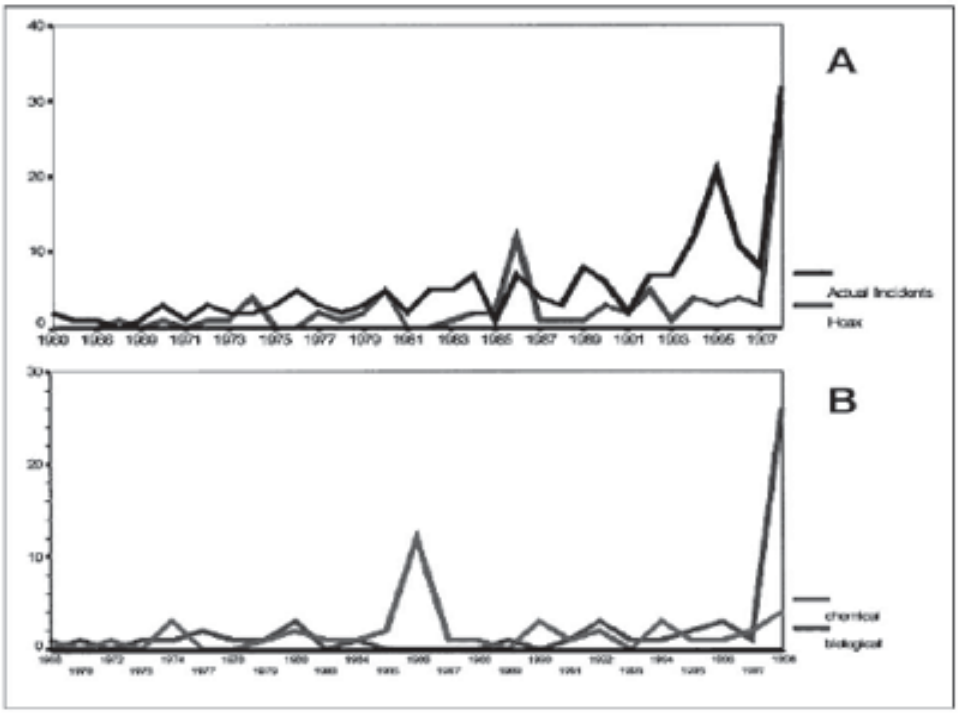


Figure 2. (A) Actual chemical and biological incidents vs. hoaxes, 1960—1998 (278 cases). (B) Chemical and biological hoaxes over time, 1960—1998 (93 cases: 43 chemical, 50 biological).

Powers and Ban[29] argue that assessments of the bioterrorist attacks are often narrowly focused on single factors. "The mismatch between threat assessments and preparedness efforts can be explained partly by the failure of threat assessment methodologies to take into account all the factors comprising the threat.

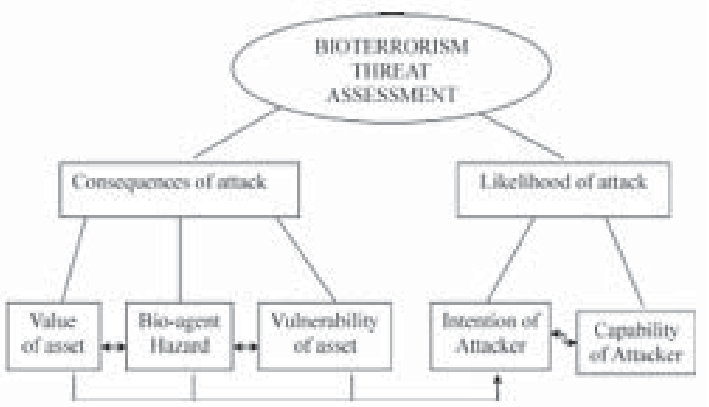
Single factor threat assessments …… do not indicate which scenarios are plausible or their comparative likelihood". The interaction of four key elements of the threat: "The who (the actor), the what (the agent), the where (the target) and the how (mode of attack)"determines the direction and impact of a bioterrorist attack.

A major weakness in correctly assessing the threat of bioterrorism is the possibility of an anonymous attack. "Biological threat assessments must take into account, not only capabilities that are challenging to monitor but also intentions that are even more difficult to discern"[30].

Threat Assessment

Various challenges involved in the assessment of the threat include—the persistence of political conflict and the changing nature of terrorist warfare, the present and future activities of state actors in bioweapons production and biodefense research, the rapid technological advances in the life sciences, the global spread of dual-use expertise and commercial biotechnological applications, and the risk of a rapid global spread of natural diseases.

The threat of bioterrorism is a function of the interaction between *the value and vulnerability of the asset being defended, the harm potential of the biological agent and intentions of potential attackers.* This construction is supported by the results of an interdisciplinary workshop organized by the Center for Nonproliferation Studies on *Bioterrorism Threat Assessment and Risk Management*[31] and is represented below:



The diagram indicates that firstly, various elements do not act independently as depicted by the arrows between the elements. Second, the intention of the attacker is dependent not necessarily on objective measures of the value and vulnerability of the target, or the harm potential of specific agents, but rather on the attacker's subjective perception of these attributes, which may or may not be close to their objective measures.

Motivations for Engaging in Bioterrorism

For the likelihood of a bioterrorism attack to be significant, terrorists must be both capable of conducting a biological attack and motivated to do so. A variety of ideological, strategic and tactical factors provides important motivational incentives and constraints which shape the inclination of terrorists towards or away from such action.

Likelihood of Use of Biological Weapons

Of the three regimes of weapons of mass destruction—nuclear, chemical and biological, it is the last one that is most potent, accessible and the weakest regime in the global efforts to prohibit and prevent. The reasons for increased potential use can be grouped into four major categories:

(a) Growth of militant religious groups with political agendas as a percentage of all terrorist groups.

(b) Increasing global availability of CBW information and stockpiles.

(c) The internationalization of the threat of terrorism.

(d) The clear evidence of terrorist interest and capabilities.[32]

The probability of a major biological attack by either a state or a terrorist group seems remote. In contrast, smaller acts of biocriminality are much more likely. While states can amass the resources and capabilities to wage biological terrorism, considerable disincentives keep them from doing so. The response to an attack with biological weapons could be devastating, which gives states reason for caution. The threat of retaliation is believed to deter states from using bio-weapons clandestinely against other states. There are three circumstances when a state might clandestinely wage biological terrorism[33]:

(a) As a means to forestall or to prevent a seemingly imminent defeat.

(b) If a state felt it could attack with biological weapons and be undetected, it might do so. For example, in World War I Germany sought to disrupt allied logistical capabilities by infecting horses with glanders[34]. There are a few other alleged wartime cases, but none in times of peace.

(c) A state seeking to perpetrate an attack against its own citizens. In the 1980s, both the Bulgarian and the South African governments used biological materials to kill domestic political opponents.

Thus, state bioterrorism is a low probability threat, albeit one with potentially catastrophic consequences. According to US intelligence sources, twenty-five terrorist organizations have expressed an interest in biological weapons and

eight have acquired them[35]. This list includes Osama Bin Laden, who referred to acquisition of bioweapons as a "religious duty"[36]. Three terrorist groups that have been innovative in their methods have one common aspect: the Tamil Eelam in Sri Lanka, the Japanese Aum Shinrikyo, and the al-Qaeda organization have all actively recruited among educated, college graduates, and specifically sought individuals with particular knowledge and training.

Catastrophic Bioterrorism

It is obvious from the rapid evolution of biotechnology that we neglect to think about large-scale attacks in the future at our peril. One person who has tried to think this issue through over a number of years is Richard Danzig, the former US Navy Secretary. He has been concerned with what he calls "catastrophic bioterrorism" and is far from sanguine about the problem. Danzig argues, in part, that the aim of the terrorist is to disable good governance, enhance divisiveness and undermine the confidence of citizens in their government. Writing in August 2003, he argued strikingly that[37]:

"…Biological terrorism affords the possibility of repeated attack, undermining confidence and forcing ever-escalating investments of resources to achieve a modicum of defence…"

He went on to point out that terrorists' ability to carry out repeated attacks could remain intact while a government's ability to manage the consequences of the attacks could be exhausted. Thus emerges the quite new concept of a terrorist *campaign* using bioweapons rather than the usual one of an isolated attack with biological weapons. This is a more serious problem for which Danzig advises to "Plan to defend against a campaign not just an attack."

Perception of Risk

The state of perception is an important aspect. Developed countries are more conscious of anthrax, botulism, pneumonic plague, tularemia and smallpox. Websites provide a lot of information on these diseases; however, they do not contain any information on diarrhoeal diseases, which can cause immense damage in developing countries. Poverty, ignorance, high population density and low levels of hygiene in developing countries coupled with incompetence and apathy on the part of public and medical authorities, make such diseases as cholera, pneumonic plague, tularemia, smallpox, etc effective weapons in the arsenal of a bioterrorist targeting developing countries.

Bioterrorism Threat Perception: India

In the Indian context threats like bioterrorism have become stronger in the last few years. This is mainly because of the changing nature of terrorism.

Today, terrorists are on the lookout for adopting new tools and tactics for spreading terror. On the other hand, India has made significant progress in biotechnology over the last few years and this has increased the 'easy availability' of material and knowledge to undertake acts of bio-terror. India is a potential victim of bioterrorism by sub-national groups, acting either alone, at the behest of a hostile country or the mafia.[38]

The bioterrorism threat in India is perceived to be primarily directed against the civilian population because the armed forces are relatively better protected. India's foremost internal security threat is from Jihadi fundamentalism. Individual Islamist terrorist groups based in Pakistan have often threatened to disrupt peace in India. Bioterrorism is but a short step to upping the same by an order of magnitude to dramatically highlight the 'cause' and gain international attention.

In mid-December 2001, the Haffkine Institute sent out a message. "We have just become aware of the threat of bioterrorism". On the question of preparedness, "we still have a long way to go", said Dr S Sapatnekar, the Director of Haffkine Institute.

Vulnerabilities to Bioterrorism: These include:

(a) Populated pockets in cities/metros

(b) Prestigious buildings/seat of Government

(c) Arrival/departure lounges of airports

(d) Major railway stations during rush hour

(e) Reservation offices/busy market places/ departmental stores

(f) Underground tubes, trains, shopping malls

(g) Political/religious rallies

(h) Hospitals

(j) Army camps/ stores/depots/strategic bottlenecks

(k) Clubs/cinema halls

(l) Temples/forts specially during festivities

(m) Ordnance/industrial/chemical factories

(n) Nuclear installations.

CHAPTER IV

BIOTERRORISM: A WEAPON OF MASS DESTRUCTION

"————- for Saddam, biological weapons were his weapons of choice. He seems to be really attracted to the idea of killing people with germs, because they tried so hard to keep us away from their biology program."

Richard Butler

UNSCOM Chairman

Emerging terrorist threats and tactics have become more lethal and intelligence failures could have catastrophic results. Despite terrorists' demonstrated preference for conventional explosive devices, the possibility that a weapon of mass destruction could be acquired and used by terrorists groups is now conceivable.

Disturbing Trends

Over the years, the face of terrorism has changed radically and is responsible for recognizing different trends.[39] The political terrorism of the 1980s was political in ideology. Today, religion is often used to justify terrorist violence. Today's terrorist operatives come from all classes and sectors of society. In the past couple of decades, two patterns in terrorist activities have raised the possibility that terrorists will turn to biological weapons as the preferred WMD. The first trend is the proven intent of some terrorist groups to cause the highest possible death tolls with evermore shocking attack methods, a dramatic change from the traditional terrorist practice of acts of violence calibrated to cultivate sympathy for a political group's political objectives.[40] The second trend is the growth in the number of incidents wherein terrorists are plotting biological attacks, acquiring biological substances, and trying to produce and disperse biological agents. To date, attacks that demonstrate a clear aptitude with biological weapons are atypical, with the 2001 anthrax letters being a prominent exception. At some point perhaps, due to advanced technologies, terrorists may be able to overcome routinely the technical obstacles to a mass casualty biological attack. At that juncture, the number of injuries and deaths from bioterrorist attacks, which are negligible in comparison to the huge casualties accumulating from suicide bombings, could skyrocket.[41]

Biological vs Chemical Weapons

Bio-weapons are substantially different from other WMD, such as chemical and nuclear weapons[42] There are some strategic advantages of using biological weapons over nuclear or chemical counterparts. Explanations for an increasing bio-weapons threat are shown in Table 7 (Appendix E).

Bio-weapon Threat vs Threat From other WMD

A survey was carried out in 2006 by CSIS among fifty-two senior US government officials to assess the biological threat. On the question of "How does the biological weapon threat compare to the threats from other WMD?" survey participants considered the bio-weapons threat to be grave. The likelihood of a bioterrorist attack in the next five and ten-years timeframe was also assessed among the survey participants. It will be seen that while in the next five-year period, forty-six percent of the participants opined that a bioterrorist attack was unlikely, but, the survey participants shifted toward a higher likelihood of a major biological attack for the ten-year timeframe, with one respondent forecasting that a mass casualty bio-weapons was certain to occur.

Types of Biological Attacks by Terrorists and Criminals

In general, terrorists or criminals can carry out three types of biological attacks.[43] First, the pathogen or toxin may be injected. This method is best used when the terrorist or criminal wishes to assassinate an individual. Second, a quantity of pathogens or toxins may be used to contaminate or poison foods, beverages, or fomites (such as food supplements and medicines taken by mouth). If done skillfully, this method could cause hundreds of casualties. Third, pathogens or toxins may be suspended in a wet or dry formulation (see below) and dispersed over a target area as aerosolized particles. This type of attack could produce thousands of casualties, if three conditions were met:

(1) The formulation was well designed for aerosol dispersal;

(2) The aerosol particles produced by the dispersal mechanism were of optimal size and could withstand environmental stresses; and

(3) Meteorological conditions were just right for blanketing the target area with aerosol particles.

Scenario of Likely Biological Attacks

It is highly probable that biological attacks by terrorists or criminals utilizing foodborne and waterborne pathogens or toxic chemicals will occur in

the next five years. As in the past, these attacks are likely to cause casualties ranging in number from a few to hundreds. Examples of past attacks include the Rajneeshee cult event in Oregon in 1984, and intentional food contamination in Texas in 1996. Events such as these will likely take place with increasing frequency in the years ahead for two main reasons; unprotected, unmonitored salad bars and other food displays have become ubiquitous and the number of persons with at least a modicum of training in microbiology is ever increasing.

The major biological threats facing society are infectious diseases of natural origin, in particular, emerging infectious diseases, reemerging infectious diseases, and transported infectious diseases. An example of the first was AIDS in the early 1980s and the Hantavirus outbreak in Four Corners in 1993. These types of diseases typically seem to appear out of nowhere and may cause tremendous damage and untold suffering among a susceptible population. Examples of the second type include the reemergence of cholera in South America after an absence in that continent since the early 1900s. There could be many reasons why diseases that have not been seen for a long time reemerge. In the case of cholera, a combination of factors were responsible, including an unusual El Niño condition and a breakdown in sanitary systems. An outbreak of Marburg hemorrhagic virus disease outbreak in Germany and the outbreak of West Nile fever in the New York area are examples of the third type. In these cases, the causative infectious agents are transported from an area where they are endemic to a new site where they have never been detected previously.

Biological weapons are seen as strategic in nature, because their impact extends beyond the battlefield. They are considered weapons of mass destruction because under optimal conditions if all the significant problems over production and delivery can be overcome they could, in theory, cause massive casualties. However, to execute an attack on a significant military target, such as a port or an air base, using a missile or an aircraft with a dissemination system, it has been asserted that at least 100 kilograms of agent would be needed[44]. In a theoretical scenario, with a single aircraft leaving a trail of 100 kilograms of anthrax along a line upwind of Washington, D.C., it is claimed that 1 to 3 million deaths could result. In comparison, a one megaton hydrogen bomb dropped over the US capital would 'only' cause some 0.5 to 1.9 million deaths[45].

CHAPTER V

BIODEFENCE

"Bioterrorism is a real threat to our country. It's a threat to every nation....It's important that we confront these real threats to our country and prepare for future emergencies."

President George W. Bush, 12 June 2002

Bioterrorism is a reality, for which, most countries are ill prepared. Although top priority must be given to ensuring that bioterrorism does not happen, it is equally important to enhance readiness for BW defense. In many countries bio- defense is not the duty of the armed forces, but responsible state agencies must rely on them because of their expertise in BW defense activities.

Biosafety

In the context of bioterrorism, biosafety can be defined as, 'effective implementation of measures that aim to prevent would-be terrorists, criminals and spies from gaining access to dangerous pathogens and toxins'[46].

In the pre-Cold War era, bio-defence was defined as an integrated set of measures designed to maintain the operational effectiveness of armed forces should they be subjected to a biological weapon attack[47]. In the current environment, the scope of defence also includes the civil population.

Meeting the Threat of Bioterrorism

The threat of bioterrorism cannot be treated the same as that posed by naturally occurring infectious diseases because there is a 'thinking enemy' whose aim is to inflict as many casualties and cause as much damage as possible[48]. A national strategy to address the challenges posed by bioterrorism should be formulated against this backdrop.

A major problem facing any biodefence policy is the need for huge investments. In fact, creation of an offensive bioweapon is relatively inexpensive. On the contrary, developing a new biodefence vaccine costs $300-400 million[49].

The basic approach to reduction of bioterrorism vulnerability should be based on a two-pronged strategy. First, formulation of a policy to prevent a 'germ

attack' and failing that, reducing the effects of disease spread. In combination, the proactive and reactive potentials within these two broad areas form the nucleus of the vital essentials for deterring and combating terrorism. These proactive and reactive activities could be termed as Active Defence and Passive Defence components of a biodefence policy.

Active defence comprises measures aimed at preventing the biological attack from reaching the target area. Passive defence deals with the doctrine and planning to exploit methods of active defence effectively. It also deals with the entire range of measures of civilian protection like hazard assessment, detection measures, techniques of physical protection, etc.

Biodefense for the 21st Century

Defending against BW attacks requires sharpening of the national policy, coordination, and planning to integrate the biodefense capabilities that reside at the national, state, local, and private sector levels.

Biodefence Policymaking

Any policy towards developing biodefence mechanisms generally addresses the issues viz :

(a) What are the essential ingredients of biodefence?

(b) What is the role of biotechnology in biodefence?

(c) How well prepared are those who may be attacked by biological weapon armed aggressors to deal with such contingencies?

(d) What steps have been taken to minimize vulnerabilities? What further steps seem warranted?[50]

Pillars of Biodefense Programme

The four essential pillars of effective and cooperative global and multi-sectoral efforts to combat bioterrorism are:

(a) Threat Awareness – including bioterror-specific intelligence, timely assessments, and strategies for anticipating future threats.

(b) Prevention and Protection – including proactive prevention activities and counter-proliferation efforts, along with critical infrastructure protection.

(c) Surveillance and Detection – including early detection and attack warning; disease diagnosis, identification, and the ability to discern unusual patterns of disease; epidemiological investigation to determine the extent and cause of the outbreak; laboratory testing to confirm the disease agent; provision of information regarding the outbreak to key stakeholders;

(d) Response and Recovery – including response planning, provision of treatment and the ability to contain the outbreak through focused public health intervention, mass casualty care, risk communication, medical countermeasure development (drugs and vaccines) and distribution, decontamination, and recovery from all effects of the outbreak. Each of these elements requires input, skill, and guidance from multiple sectors including military, law enforcement, intelligence, public health, agriculture, etc. To be effective, all these elements require sustained cross-border collaboration.

The dynamics of existing geopolitics do not offer much scope for development of active defence measures to tackle the threat of bioterrorism effectively. Hence, it is important to concentrate on passive defence tools comprising secondary preventive measures, to prevent or minimize the health consequences of an illness or injury by disease after the spread of infection.

Key Recommendations

Based on all of this, seven key recommendations[51] for international and intersectoral efforts to prevent and respond to bioterrorism are:

(a) Strengthen national and international abilities to identify and quickly detect unusual outbreaks which could indicate a bioterrorist attack and rapidly share that information with appropriate national and international policymakers.

(b) Improve multi-sectoral interoperability between biodefense, military, law enforcement, health, environmental, and agriculture agencies to combat bioterrorist threats to transatlantic security. Develop, promote, and conduct regular transnational, multi-sectoral training courses and exercises on preventing, preparing for, containing, and responding to bioterrorism.

(c) Increase the selection of countermeasures available and develop effective national and international mechanisms to distribute and share countermeasures to slow or stop the spread of a deliberately released pathogen.

(d) Plan *now* for international, multi-sectoral cooperation because local and national responses will likely not be sufficient.

(e) Develop civilian-military interoperable systems that prepare for the "reload" aspect of bioterrorism. Find ways that military skills and strategies can best adapt to the asymmetrical nature of bioterrorist attacks because it is harder to protect civilians in everyday life than military personnel on the battlefield.

(f) Recognize that it is in the explicit interest of nations that their neighbours and allies are able to prevent and, if necessary, contain and respond effectively to large epidemics. Uncontrolled contagious disease in other nations will spread across borders, with great potential to threaten populations, disrupt societies and destabilize economies.

(g) Develop and test effective risk communication strategies. People need to make sense of random and terrifying events, but epidemics elude quick and easy explanation thus presenting an unprecedented challenge for policymakers.

Bioterrorism preparedness as a Public Health Priority

Bioterrorism is viewed as a public health priority through two mechanisms:

(a) As a stand-alone threat that the public health system should be prepared for,

(b) As a subset of emerging infections and infectious diseases.

The best public health strategy to protect the health of civilians against biological terrorism is the development, organization, and enhancement of public health prevention systems and tools, including enhanced communications mechanisms and messages[52]. Other priorities include strengthened public health laboratory capacity, increased surveillance and outbreak investigation capacity, and education and training at the local, state, and national levels. Not only will this approach ensure that we are better prepared for deliberate bioterrorist threats, but it will also enable us to recognize and control naturally occurring new or re-emerging infectious diseases. A strong and flexible public health infrastructure is the best defense against any disease outbreak.

Biodefence in India

India is not immune to acts of bioterrorism. The threat to India is real and action needs to be taken urgently. With India having a well-developed bio-technology infrastructure that includes numerous pharmaceutical production

facilities, bio-containment laboratories for working with lethal pathogens, it is very necessary for the government to ensure that the biological agents do not fall into wrong hands[53]. This calls for larger participation by Indian physicians to build the emergency medicine infrastructure. Incorporating bioterrorism response measures into disaster management plans in emergency medicine is the best solution. In India, a formidable portion of the annual Budget goes into weaponry defence and a miniscule portion is allocated to health. It will be a challenge to the Indian administration, now to build a biological defence infrastructure, which falls on zones of both defence and health[54].

Regrettably, most of the safety initiatives undertaken by the government, academic and private biological research communities within the country concentrate mainly only on 'laboratory bio-safety and security', leaving open opportunities for theft, sabotage and/or transfer of knowledge/technology that could help a terrorist organization to launch such an attack. Also, there is a lack of adequate mechanisms to deal with the post-attack scenario, particularly in respect of maintaining a command and control center. Details of India's biodefence activities will be dealt with subsequently.

Should biodefence preparedness be public knowledge?

A question that is raised often is, 'whether it is wise to make the biodefence strategy and state of preparedness public knowledge?'[55] It is felt that the bioterrorist also gets to know of the detailed plans and defences built up and would act bypassing them. Three considerations in favour of transparency are:

(a) Biodefence is aimed at facing a bioterrorist attack, but preventing this is the better choice. Well-advertised preparedness against the best arsenal of a bioterrorist would be a deterrent.

(b) If the public come to know of what the governments and other agencies have been doing for their safety, their confidence in the public institutions would grow.

(c) Awareness of the governmental efforts may inspire private organisations and individuals to contribute to the national effort.

Thus, it is not wise to keep biodefence strategy under wraps, on the grounds that military strategy is a closely guarded secret.

Preparedness is always beneficial. Dr Sagar Galwankar, Founder Emergency Medicine, India, says: "The defenders have to be lucky all the time, but the destroyers, have to be lucky just once".

CHAPTER VI

BIOWEAPONS PROLIFERATION AND MONITORING

"When he fights with his enemies in battle, let him not strike with weapons concealed (in wood) nor with (such as are) barbed poison, or the points of which are blazing with fire".

Manu Smriti Chapter VII: 90

The moral and legal norms against bioweapons have been mentioned in history. In India, the Manu laws two and a half millennia ago, and the Vedic precepts from which they stemmed, forbade the use of poison weapons.

Biological and Toxin Weapons Convention

Building norms to ban biological and chemical weapons in modern times received focus in the heightened arms control atmosphere of the 1960s and 1970s.Several international covenants currently pertain to biological warfare and bioterrorism. They vary in their language and membership, but none have verification or enforcement regimes, so some signatories and "state parties" do not adhere to their provisions. The most widely established covenant is the Biological and Toxin Weapons Convention (BTWC), a convention prohibiting the production and storage of biological toxins and calling for the destruction of biological weapons stocks. This was signed in 1972. The BTWC entered into force in 1975. Since then, the States Parties have come together every five years (with one exception) to assess the status of the convention and update the prohibition against biological weapons (BW).

The 6th Review Conference was held between 20 November and 8 December 2006. The procedures and agenda for the three-week activity were adopted by the Preparatory Committee, which met during 26–28 April 2006. This Review Conference was a success. During the Conference, the BWPP reported daily on the discussions and maintained a dedicated website to enable fast access to conference documents, press discussions and analysis.

The Geneva Protocol

The Geneva Protocol was the first multilateral international agreement to address chemical and biological weapons. It bans "the use in war of asphyxiating, poisonous or other gases and of all analogous liquids, materials or devices" and prohibits "bacteriological methods of warfare". This Protocol is considered part of customary international law and therefore binds even states that are not signatories to it. It has no verification regime, and many of the signatories have stated that if biological or chemical weapons were used against them, they reserve the right to respond in kind.

Export Control Groups

Two export control groups which have an impact on the BW regime are the Australia Group and the Wassenaar Arrangement.

Australia Group

The Australia Group was established in 1985 and is an informal association of mainly NATO countries set up to limit the spread of BW through the control of BW agents and organisms. It includes forty western oriented countries. Among the lists of controlled items for export are the 70-odd select biological agents and dual use biological equipment such as centrifuges, fermenters, and freeze dryers.

Wassenaar Arrangement

This is composed of the same countries as the Australia Group and also includes Russia. One of the purposes of the agreement is to complement and reinforce the existing support control regimes for WMD and their delivery system by focusing on threats which may arise from transfers of sensitive dual-use goods and technologies.

US National and International Initiatives

The United States has pursued a broad range of national and international programmes and capabilities to combat bioterrorism and strengthen biodefense, viz :

(a) Strengthened global, regional and national programmes to prevent, detect, and respond to bioterror attacks, through increased biosurveillance, international laboratory cooperation, strengthened protection of agriculture and food supply systems, enhanced global mitigation and response capabilities.

(b) Developed and enhanced diverse programmes to limit the international proliferation of bioweapons expertise and facilities.

(c) Designed and implemented multi-nation exercises e.g., Silent Twilight and Global Mercury to improve global bioterrorism response communication and cooperation.

(d) Supported development of WHO's Global Smallpox Vaccine Reserve.

Role of NATO

NATO is fostering transatlantic collaboration on combating bioterrorism. Since 2002, NATO has created five specific initiatives to help deal with chemical and biological weapons, viz.,

(a) A deployable NBC analytical laboratory;

(b) An NBC event response team;

(c) A virtual center of excellence for NBC weapons defense;

(d) A NATO biological and chemical defense stockpile;

(e) A disease surveillance system.

NATO has also created the Protection of Civilian Populations Initiative to improve civil preparedness against, and manage the consequences of, possible bioterrorist attacks. An important step in this initiative was the development of the Civil Emergency Protection (CEP) inventory, an inventory of national civil and military capabilities that could be made available to assist stricken nations – a critical element of international cooperation.

Helping the United Nations combat bioterrorism

The U.N. General Assembly adopted a Global Counterterrorism Strategy in September 2006 in accordance with a mandate from the 2005 World Summit and the recommendations of Secretary-General Kofi Annan in his 2006 report "Uniting against Terrorism"[56]. Annan's report stressed, "Bioterrorism is especially under-addressed and in acute need of new thinking." In response, the General Assembly called for several biological initiatives: mobilization of biotechnology stakeholders to develop a programme to ensure that advances in biotechnology are not used for terrorist purposes; development, together with member states, of a single comprehensive database on biological incidents; and revitalization of the secretary general's capabilities for investigating allegations of the use of biological weapons. Also, the United Nations alone bears the responsibility for enforcing the ban on biological weapons.

A strengthened and operational capability for biological investigations maintained by the UN Secretary General and available to the Security Council would be a significant step forward for the BWC. It would tend to deter parties from gross violations, and would provide an alternative to military action in confronting serious biological threats[57]. But it would not be equivalent to a BWC compliance regime. The permanent Security Council members would effectively be excluded from investigation, and there still would be no routine or periodic measures for assessing compliance. Eventually when an appropriate BWC compliance regime is adopted, its inspectorate could be jump-started by a ready, skilled, and up-to-date U.N. biological investigation mechanism. Further, a competent U.N. investigational capability could evolve into a dedicated international biological inspection agency.

A major element in an effective biological regime is likely to be the monitoring of dual-use biological facilities by maintaining a constant possibility of inspection, with specified access required. Such a regime, which could be viewed as a "safeguards" mechanism, could be established through an agreement analogous to the Comprehensive Safeguards Agreements concluded with the IAEA by parties to the NPT to cover dual-use nuclear facilities.

To initiate such a process, a group of like-minded BWC parties could decide to negotiate a compliance agreement and facilitate the process by not requiring consensus[58]. The BWC compliance agreement could assign implementation to the secretary general whose biological inspection capability would be a critical asset. On approval, it could be opened for signature by all the parties to the BWC.

Strengthening the UNSC

As a consequence of September 2001 attacks, several UNSC resolutions were adopted. Also, the UN Counter-Terrorism Committee the UNSC was established, to monitor the implementation of resolution 1373 and other UN initiatives.

UNSC Resolution 1540

On 28 April 2004, UNSC unanimously adopted a resolution, asking states to deny and punish terrorists seeking weapons of Mass Destruction and their means of delivery. States are also directed to 'take cooperative action to prevent illicit trafficking', and adopt national rules and regulations where this has not been done.

Proposal for an International Biosecurity Convention

It has been proposed to develop an international biosecurity convention that could be a support to the BTWC. This convention would prevent proliferators and terrorists from acquiring bio-weapons, know-how and making tracing of agents used in bioterrorism attacks easier. There would be three parts:

(a) A legal commitment by the contracting parties;

(b) A set of universal standards for the physical protection, control, licensing, and reporting of dangerous pathogens and toxins;

(c) Mechanisms for overseeing national implementation through periodic meetings of parties, and modifying the list of controlled agents and biosecurity standards consequent to advances in bio- science and technology.[59] [60]

WHO role for biosafety and biosecurity

The WHO Biosafety programme exists to address these issues and to assist Member States in achieving uniform biorisk management. Formal biosafety activities have been part of WHO for more than three decades including the establishment the Biosafety Advisory Group. Five collaborating centres currently support WHO's biosafety activities, one each situated in Australia, Canada, Sweden and two in the US.

UNSC Resolution 1540 entails the states to report on their legislation measures; however, a convention on biosecurity is also required. The action that the international community could take now is to support actively and fund increased activity from the WHO/FAO/OIE to develop internationally accepted biosecurity standards.

CHAPTER VII

BIOTERRORISM: INDIA'S STATUS

"*The specter of biological weapons' use is an ugly one, every bit as grim, and foreboding as the picture which has been painted of a nuclear winter*."

Dr DA Henderson

Former Deputy White House Advisor

Security is a relative phenomenon. Threats to security are rapidly changing and throwing up challenges with new technologies, socio-economic factors and "global" politics. The lack of active public debate about bio-weapons and bio-terrorism afflicts both governments and the academia. This accounts for the absence of Indian research in this area.

Biological Overview

Some intelligence estimates suggest that India possesses biological weapons; however, there is very limited open-source information available about a possible Indian biological weapons programme. India has defensive biological warfare (BW) capabilities and has conducted research on countering various diseases, including plague, brucellosis, and smallpox. She also has an extensive and advanced pharmaceutical industry and is therefore technically capable of developing biological weapons. In January 2003, the Indian government announced changes in her nuclear use doctrine and stated that the new posture allows her to "retain the option of retaliating with nuclear weapons" in the event of a major biological or chemical attack against India or Indian forces anywhere. Earlier in December 2002, then Defence Minister George Fernandes also indicated that "the government has initiated necessary steps to ensure protection from a nuclear and bio-attack."

Agents and Delivery

Biotechnology was limited in India until approximately 20 years ago, when various government agencies and private entrepreneurs began to search for means to improve crop yields and seed production. She soon made great strides with wheat, pulses, and soy bean hybridization.These advances were largely facilitated using extensive knowledge of genetic engineering, which in turn provided information on the de novo synthesis of biological agents[61].

In terms of delivery, India possesses the capability to produce aerosols and has numerous potential delivery systems ranging from crop dusters to sophisticated ballistic missiles. However, no information exists in the public domain suggesting interest by the Indian government in delivery of biological agents by these or any other means. To reiterate the latter point, in October 2002, then President A.P.J. Abdul Kalam asserted that "we [India] will not make biological weapons. It is cruel to human beings..."[62]

Status of India's BW Programme

India has ratified the BWC and pledges to abide by its obligations. There is no clear evidence that directly points toward an offensive BW programme. New Delhi possesses the scientific capability and infrastructure to launch an offensive BW programme but has not chosen to do so. However, Indian companies such as NEC Engineers Private Limited and Protech Consultants Private Limited have sold dual-use plant equipment to the former Saddam Hussein regime in Iraq in violation of the government's regulations. Both companies were sanctioned by the United States in 2003 for their potential role in contributing to Iraq's alleged chemical and biological weapons programmes[63].

Who Will Use Biological Weapons Against Whom?

Non- State Actors In South Asia: The threat of bioterrorism exists in South Asia, but it need not be exaggerated. Hundreds of groups are fighting the State all over the region; amongst them the threat of bioterrorism is likely to emerge only from select groups[64]. Most of the militant groups fighting in India's Northeast for political reasons could be ruled out from using biological weapons. Non-state actors in South Asia include terrorists, communal organizations, naxalite/ criminal groups and private militias.

Militant Groups in South Asia: Militant groups are the most likely non-state actors to resort to bioweapons or biomaterials. South Asia has the highest number of terrorist groups as compared to any other region. According to a report prepared by a UN panel of experts, 'The risk of Al Qaeda acquiring and using weapons of mass destruction also continues to grow', and 'undoubtedly, Al Qaeda is still considering the use of chemical or bio-weapons to perpetrate its terrorist actions.' Al Qaeda's linkages with militant groups in South Asia, specially, Lashkar-e-Toiba, Jaish-e-Mohammad, Harkat-ul-Jihad-ul-Islami and Harkat-ul-Mujahideen(based in Kashmir) have been proved beyond doubt[65]. Therefore, there exists a possibility of use of bioweapons by these groups against the minority community in Kashmir, as part of their ethnic cleansing strategy. The Lashkar-e-Toiba and the Jaish-e-Mohammad are fighting for a religious cause and are not

bothered about popular support in India. The radical right wing groups are more likely to use such weapons. Al Qaeda's search for chemical and biological weapons also needs to be taken into account from this perspective. Second, groups such as the Lashkar and Jaish are more likely to use such weapons due to their proximity to the Al Qaeda, which is believed to possess such weapons or/and expertise.

Biodefence

India has made substantial efforts to prepare its military force for a biological attack. In December 1998, India began to train its medical personnel to deal with the eventualities of such an attack. Then Director General of Medical Services, Lt. Gen. R. Jayaswal, facilitated the Army Medical Corps' restructuring. This change incorporated a three-tiered training programme for doctors and paramedical personnel[66]. In April 1999, the Indian Army called for the formation of a National Infrastructure Cell to assess threats, implement and monitor countermeasures, and develop ways to rapidly warn potential targets of impending or ongoing attacks. The army further asked for the establishment of a National Commission on Critical Infrastructure Protection, comprising scientists and government and private sector officials, to determine approaches to infrastructure defense and countermeasure formulation. Subsequently, in December 2002, Lieutenant-General B.N. Shahi, the Director-General of the Armed Forces Medical Services, said that the Army had taken precautions against the possibility of the use of biological agents by terrorists, and that India faces threats from smallpox and anthrax[67]. He stated, "We have plans to counter them in the form of antidotes and vaccines." Representatives of the Indian Army Medical Corps have publicly expressed reservations regarding the inadequacy of Indian hospitals for events arising from biological attacks.

In 2001[68], India increased the scope of its countermeasure capability after the Indian Postal Department received 17 "suspicious" letters believed to contain *Bacillus anthracis* spores. A Bio-Safety Level 2 (BSL-2) Laboratory was established at the Institute of Preventive Medicine to provide guidance in preparing the Indian government for a biological attack.

The series of B. anthracis incidents in 2001 is thought to have been a hoax undertaken by unknown perpetrators. However, by 2003, Indian security agencies became concerned that terrorist outfits could make use of ricin to launch biological attacks. These concerns grew after the discovery of al Qaeda training manuals which trained terrorists in the production and use of toxins viz., ricin. In view of the terrorist attack on the Indian Parliament in December 2002, an Indian Parliamentary Committee also considered plans for underground bunkers to protect members of Parliament from a nuclear and biological attack. In an apparent follow-

up to some of these concerns, Indian Home Ministry indicated in August 2004 that Indian scientists were formulating a response to potential biological, chemical, and other non-conventional forms of terrorism. Indian authorities held a meeting in April 2006 to discuss preparation of the Armed Forces to fight in an environment created by nuclear, chemical, or biological war.

The recent initiative by the government to deal with bioterrorism by formulating standard operating procedures (SOPs) to handle the post-attack scenario is a welcome step[69]. According to newspaper reports (*Financial Express*, 28 March 2007), the Government of India has finally approved a model SOP to handle any eventuality arising out of a bio-terror attack. It has been mentioned that this SOP contains the processes to deal with terrorist attacks using biological agents to cause diseases like anthrax, plague, botulism and cholera.

The overall responsibility for addressing these threats lies with the Ministry of Home Affairs (MHA), which is tasked to lay down the command, control and preparedness measures. The Ministry of Health would play a pivotal role in this initiative identifying suitable laboratories and devising a policy for procuring, manufacturing and stockpiling relevant vaccines and drugs. Appropriate protocol for their validation/certification, contamination testing at source of water supply would also be developed and effective Rapid Response Teams (RRTs) established at the district level.

This initiative is likely to be financed by the Intelligence Bureau (IB) and the Research and Analysis Wing (RAW) while a separate team would be constituted to do the groundwork. The agencies involved would be the National Security Coordination Secretariat (NSCS) in consultation with the Defence Research and Development Organization (DRDO), MHA and Ministry of Health. The 'model' developed by this team would be tested in the national capital and subsequently passed on to other states in the country.

This initiative appears to have brought together various other ad hoc schemes undertaken till date. During January 2004 it was reported that the MHA had started a process of deploying an elite force - comprising four battalions of central paramilitary forces - to counter biological, chemical and radioactive attacks. These four battalions are expected to function as a national disaster response force. It has also been mentioned that the primary responsibility for dealing with such situations will lie with the state governments. The Central Industrial Security Force (CISF), is developing the ability to deploy specially-trained first responders to the scene of a nuclear or biological attack[70]. Four companies of CISF have been sanctioned, and specialized training is being imparted to some 400 personnel.

This new elite force is deployed in four locations across the country: Ghaziabad to cater to Delhi and other northern areas, Ranchi to the east, Kota to the west, and Chennai to the south. About 13 officers have already undergone eight weeks of nuclear and biological response training in US, and other trainees will share skills with other CISF members in a train-the-trainer approach.

The Defence Research and Development Establishment (DRDE) at Gwalior is the primary institution for research in toxicology and biochemical pharmacology and development of antibodies against several bacterial and viral agents. India is capable of responding effectively to threats like anthrax, brucellosis, cholera and plague, viral threats like smallpox and fever and biotoxic threats like botulism. Also, biological protective gear like masks and suits are available. In March 2003, Mr. K. Sekhar, the director of the Defense Research and Development Establishment of the Indian Ministry of Defense, said, "In quite a few cases the antidotes to BW agents are well known, but no nation will sell it to you. If we are to protect our armed forces and our citizens, we have to develop our own medical armor. In fact, we have had to develop our own auto injectors loaded with a variety of antidotes for weapons like nerve gas which are supplied to our troops engaged in decontamination tasks." DRDO has perfected possibly the only known prophylactic, code named DRDE-07, for the most common gas warfare chemical, sulphur-mustard[71]

The National Institute of Communicable Diseases (NICD) advises the Government of India on issues related to the prevention and control of communicable diseases in the country[72]. Most of the scientific laboratories in India follow a particular line of investigations which is essentially R&D based. They have succeeded in developing various test kits, vaccines and protective equipment but an area where the country is lacking today, is in integrating these systems so as to be prepared for the worst case scenario.

In 2001, the Central Bureau of Investigation set up a cell to tackle bioterrorism. This core group is expected to work on the basis of a review and assessment of information available on the activities of various terrorist groups. For bio-disaster management, the CBI has constituted a crack team to meet any eventuality in the country. The team would be assisted by the nodal agencies of the state and central government and also by the intelligence bureau and other concerned agencies[73].

In the overall disaster management plan, the Indian Council of Medical Research (ICMR), New Delhi is the nodal agency for biological disasters[74].At the local level, it is proposed that disaster management cells would take care of the

fallout of NBC attacks. The Indian Armed Forces have their own NBC defence programmes.

Biological disasters require a holistic response. This is because 'germs-spread' knows no geographical boundaries. Bio-disasters demand different responses and cannot be treated only as a 'medical' or 'policing' activity. Any confusion or lack of clarity within SOPs will have disastrous impact on the overall health of the country, both physical and economic. It is hoped that these SOPs remove all obscurities and rise above the usual gimmicks of center-state relationships and the turf-wars played out amongst various intelligence agencies.

Bioterrorism Preparedness

The 9/11 attacks galvanized the attention of the US Department of Homeland Security on bioterrorism, but the Indian Home Ministry was not as coordinated despite efforts by the Civil Defence Organisation & Disaster Management cell. In an effort to deal with consequences of actions taken abroad, the US created the Department of Counter-proliferation, whereas India only had to deal with the subcontinent, or the "near abroad." While the Indian Council on Medical Research (ICMR) perhaps had some links to the World Health Organization (WHO) and the International Committee of the Red Cross, the public health industry is yet to grapple with issues relating to bio-defence.

The manner and extent of informing the public requires a balanced approach: on the one hand lies the danger of creating a "nation of psychotics" and, on the other hand, a lack of sufficient public awareness amounts to criminal neglect[75]. Raja Menon[76] opines that both too little and too much information on bioterrorism could create fear. He stresses the need to focus on eliminating the threat and analyzing state support for biological weapons programmes. Most states have the infrastructure and technical expertise to produce and develop biological and chemical weaponry. Menon has proposed several potential actions which can be taken to counter the threat:

(a) Involving the government and legislation

(b) Extending current organizations and their operations

(c) Enhancing technical capability & backup

(d) Focusing the role of lead organizations

The need to instill bio-defence measures in Indian defense policy without creating a fear psychosis is of primary importance. India's vulnerability to such attacks is enormous, especially from terrorists and the underworld. In such a

scenario, there needs to be a coordinated effort on the part of premier nodal agencies like ICMR, NICD, the defence forces as well as the state administration. A "top-down" command structure is imperative to facilitate speedier response to such contingencies[77]. While executive measures like enactment of the WMD bill by the cabinet in June 2005 are already enforced, linkages with international organisations like WHO, ICRC would also add and make easier the state's task at providing security from bio-weapons.

India's Position on the BTWC

India signed the BTWC with some reservations on 15 January 1973 and ratified the treaty on 15 July 1974. India maintains that the norms against biological weapons enshrined in the BTWC must be upheld, particularly at a time of heightened threat of BW proliferation and bioterrorism, and meaningful multilateral efforts should be pursued to strengthen these norms. India is in favour of inclusion of provisions of an adequate and effective monitoring mechanism in the BTWC, while at the same time providing for increased international cooperation in transfers and exchanges of biological materials and technologies for peaceful purposes. It was one of the few countries to have expressed its reservations, viz.:

a) The Government of India would like to reiterate in particular its understanding that the objective of the Convention is to eliminate biological and toxin weapons, thereby excluding completely the possibility of their use.

b) The exemption in regard to biological agents or toxins, which would be permitted for prophylactic, protective or other peaceful purposes would not, in any way, create a loophole in regard to the production or retention of biological and toxin weapons.

c) Any assistance which might be furnished under the terms of the Convention would be of medical or humanitarian nature and in conformity with the Charter of the United Nations.

India at the BTWC Review Conferences

Over the last thirty years, India's position at the Review Conferences has grown from that of a passive observer to an active negotiator. It is since the third Review conference, which coincided with the growth of the domestic biotechnology industry that India began to participate actively. It has taken a proactive position

on many issues that posed possible challenges to the global biological disarmament regime. India's response to various articles of the BTWC during the sixth Review Conference is given in Appendix F.

Preventing Biological Weapons proliferation: Legislative basis

India has in place a regulatory mechanism for the maintenance of security and oversight of pathogens, micro-organisms, genetically modified organisms and toxins in production, import, export, use and research. The Environment (Protection) Act, 1986 provides the mandate to the government to lay down procedures and safeguards as it deems necessary for the handling of hazardous substances.

The Act prohibits handling of such substances except in accordance and compliance with the prescribed procedural safeguards (Section 8). The Act has provisions for entry, inspection and sample analyses by enforcement officials (Sections 10 and 11) and offenses by companies and Government Departments (Sections 16 and 17). Contravention of the provisions of the Act, or the rules, orders, directions issued thereunder are punishable with imprisonment for a term which may extend to five years or with fine or with both (Section 15(1)).

Deriving the necessary mandate from the Environment (Protection) Act, 1986 (Sections 6, 8 and 25), the Government of India in 1989 notified the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms and Genetically Engineered Organisms or Cells. These Rules also apply to new gene technologies.

These Rules *inter alia* are applicable for the sale, offer for sale and storage for the purpose of sale, any kind of handling of hazardous micro-organisms and the export and import of genetically engineered cells organisms. The Rules also provide the government with the authority to regulate micro-organisms which "have not been presently known to exist in the country or have not been discovered so far" (Section 3 (v)). The Rules prohibit unauthorized deliberate release of genetically engineered organisms/ hazardous micro-organisms or cells into the environment or nature (Section 9).

Preventing Bio-weapons proliferation: Countrywide biosafety network

The use of recombinant technologies are well regulated under the Environment Protection Act, 1986, the 1989 Rules and the Recombinant DNA Safety Guidelines issued by the Government in 1990. Any institution, including research institutions, handling micro-organisms/genetically engineered organisms is required by law to have an Institute Bio-Safety Committee to examine and

monitor projects from the point of view of safety and biohazard potential. More than 300 Institutional Bio-safety Committees have been set up all over the country. These Committees, which include a government representative as a member, also assist in training of personnel on biosafety, safe disposal of hazardous wastes, and the adoption of an emergency plan.

Institutionalized advisory and regulatory bodies such as the Review Committee on Genetic Manipulation (RCGM), Genetic Engineering Approval Committee (GEAC), and Recombinant DNA Advisory Committee (RDAC) have been set up, with the scope of their mandate and functions being statutorily defined. Bodies such as the Review Committee on Genetic Manipulation (RCGM) provide for consultations between the relevant agencies of the government and other relevant autonomous/semi-autonomous bodies for monitoring the safety-related aspects of on-going research projects and activities involving hazardous microorganisms. All ongoing projects involving high risk category and controlled field experiments are reviewed by RCGM, which is coordinated by the Department of Bio-technology, to ensure that adequate precautions and containment conditions are followed. Use of pathogenic micro-organism or genetically engineered organisms or cells for research purposes is permitted only in laboratories authorized for the purpose.

Bio-safety: A list-based approach

The 1989 Rules under the Environment Protection Act, 1986 and the 1990 Guidelines list micro-organisms on the basis of differential risk assessment. These lists, which are applicable from the biosafety point of view, are more elaborate than the list of micro-organisms and toxins included in Category 2 of the SCOMET List notified by the government for the purpose of dual-use export controls.

Domestic Dual-Use Export Control Regime

India's commitment to non-proliferation is anchored in a conscious decision to prohibit or control export of materials, equipment and technologies of direct and indirect application to weapons of mass destruction and the means of their delivery. India is committed to an effective and comprehensive system of export controls to deny unlawful access – whether to States or non-State actors. To this end, a rigorous domestic regime has been instituted through the creation of laws, interagency administrative mechanisms, and effective enforcement. These controls are subject to continuous review in consonance with changes in the technology environment and other requirements.

The foregoing paragraphs have very clearly highlighted that prior to 9/11, India was inadequately prepared to deal with various aspects of bioterrorism. In the present day context, the threat of bioterrorism is real, although since 2001, there have been no major events suggestive of attempt at bioterrorism attacks. India is thus, keeping pace with recent developments in the fields of legislation, monitoring, prevention and consequence management of bioterrorism. It is recommended that efforts to ensure that multi-sectoral, co-ordinated efforts be made to ensure adequate biopreparedness.

CHAPTER VIII

CONCLUSION

Biological warfare has shown its utility in causing disease, hysteria and death, and is not limited to military applications or targeting only humans. The multitude of agents available for use and the range of dispersion mechanisms that can be utilized increase the complexity in identifying and treating the intentional use of biological agents as WMD. Furthermore, the relative ease of obtaining and producing biological agents increases the chances that they may be used as a terrorist weapon targeting humans, plants or animals.

Bioterrorism as a full-fledged attack or as a limited tactical strategy by countries or terrorist groups is a possibility. The casualties will include army personnel and civilians. The magnitude of casualties and the complex nature of injuries sustained as a result of a biological attack call for comprehensive management planning, dissemination of information and training to all and planning for protection and management of casualties. Networking, including integration in the existing medical and administrative set-up, must be planned and executed.

In the context of the hypothesis, it has been amply proved that whereas ten years ago, India was ill-prepared for bioterrorism, today, she is keeping pace with the global trends in biodefence and biopreparedness. It is important to be proactive and take some urgent measures such as public awareness, stockpiling vaccines and drugs, contingency plans of action, enhancing research and development and bio-defence and preparedness.

The sensitization of India with the anthrax mail attacks, Osama bin Laden's identification of India as his chief enemy apart from United States and Israel and

growth of newer technologies, specially gene technology are three major developments which have sharpened the awareness of Biowarfare threat within the Indian security establishment. The belief also obtains that India's known adversaries are not likely to use bioweapons and the more realistic threat is believed to emanate from the likelihood of BWs being used by non-state actors.

To conclude, India faces enormous challenges from bioterrorist threats because of high population density and a disaster management infrastructure to handle situations arising out of major bio-terror attacks which is in its infancy. Against this backdrop the current threat assessment demands immediate response. What India needs is the "ability to rapidly design, develop and produce new countermeasures from a standing start - in weeks, if not days[78]."

References

1 Terrorism. (2006). In *Encyclopædia Britannica*. Retrieved October 28, 2006, from Encyclopædia Britannica Online: http://www.britannica.com/eb/article-217761

2 United Nations.

3 Atlas RM. "The Medical Threat of Biological Weapons". *Critical Review Microbiology* 1998; 24(3): pp 157-168.

4 "Bioterrorism Agents/Diseases", The Centers for Disease Control and Prevention. www.bt.cdc.gov/agent/ agentlist-category.asp

5 *Britannica Concise Encyclopedia*. © 2006.

6 http://www.answers.com/topic/biological-warfare?cat=health accessed on 12 June 2007.

7 Katz R. Biological Weapons: A National Security Problem that Requires a Public Health Response, Working Paper 2001-04, Office of Population Research, Princeton University.

8 Carus.W.S (1998). *Bioterrorism and biocrimes: The Illicit Use of Biological Agents in the 20th Century*. Working paper. Center for Counter Proliferation Research. National Defense University.

9 Bellamy, R., ed.Textbook of Military Medicine, *Medical Aspects of Chemical and Biological Warfare.*, Washington DC, Borden Institute, Walter Reed Army Medical Centre, 1997, chapter 2; *History of Chemical and Biological Warfare: an American Perspective.*

10 Garrett, Laurie. *Betrayal of Trust: The Collapse of Global Public Health,* New York : Hyperion, 2005.

11 Inglesby,T. "The Germs of War: how biological weapons could threaten civilian population". *The Washington Post*, Washington DC, 9 December 1999, H1.

12 Christopher G, Cieslak TJ, Pavlin J, Eitzen E., "Biological Warfare; a historical perspective," JAMA, 1997, 278(5); pp 412-417.

13 Osterholm M, Schwatz J. *Living Terrors: What America needs to know to survive the coming bioterrorist catastrophe*. New York : Delacorte Press, 2000.

14 Ramana, B. "Germs of Mass Destruction". *The Telegraph.* Calcutta, India, 11 December 2006.

15 Dando,MR. *Biological Warfare in the 21st Century: Biotechnology and the Proliferation of Biological Weapons*. London : Brassey's, 1994.

16 U.S. Departments of Army and Air Force. *Military Biology and Biological Agents*. Departments of Army and Air Force Technical Manual 3-216/Air Force Manual 355-56, 12 March 1964.

17 Beeching NJ, Dance DA, Miller AR, et. al. Biological warfare and bioterrorism. BMJ 2002; pp 324:336-339.

18 Kenneth Alibek and S. Handelman. *Biohazard: The Chilling True Story of the Largest Covert Biological Weapons Program in the World - Told from Inside by the Man Who Ran it.* 1999. Delta (2000) ISBN 0-385-33496-6 [1].

19 Khan AS, Morse S, Lillibridge S. *Public-health preparedness for biologic terrorism in the USA. :* Lancet 2000; pp 356:1179–82.

20 Finnegan, W. "The Poison Keeper". *The New Yorker*. 15 January 2001.

21 Dennis, C. "The Bugs of War", *Nature*. pp 411: 232-235.

22 Weaver, Gary. Lecture; *Special Issues in Bioterrorism: Emerging and Reemerging Zoonotic Diseases and Agro-Terrorism*. 17 February 2004.

23 http://www.sandia.gov/media/cbwfoam.html accessed on 02 Mar 2007

24 "US Senate Leader Urges 'Manhattan Project' Against Bio-Terror Threat," Agence France Presse, 27 January 2005. It is clear from other statements by Senator Frist roughly at the same time that his reference in January 2005 to "biological" referred to "bioterrorism" and not to any other biological problem or context. Senator Richard Lugar previously had used the phrase that terrorists armed with WMD present an "existential" threat to the United States, and Senator Frist presumably adopted that word to deal with "bioterrorism" alone. Very similar phrasing to Senator Lugar's was also used by President Bush in an address at the National Defense University on 11 February 2004 (except that he expanded the threat from the United States to "humanity"): "The greatest threat before humanity today is the possibility of secret and sudden attack with chemical, or biological, or nuclear weapons."

25 See ibid

26 Stolar Alex. Bioterrorism and US Policy Responses Assessing the Threat of Mass Casualty. Institute of Peace and Conflict Studies, New Delhi, IPCS Special Report 31, October 2006.

27 Gary Ackerman and Moran Kevin. "Bioterrorism and Threat Assessment: Report Prepared for the Weapons of Mass Destruction Commission". Centre for Nonproliferation Studies, 2006, p.8.

28 See n4.

29 Michael J Powers and Jonathan Ban, "Bioterrorism: Threat and Preparedness, *The Bridge*, vol 32, no 1, Spring 2002.

30 Koblentz,G., "Pathogens as Weapons: The International Security Implications of Biological Warfare", *International Security*, vol 28, no 3, Winter 2003/04. p. 87.

31 Zilinskas, R A, Final Report and Commentary: Bioterrorism Threat Assessment and Risk Management Workshop, (June 2003).

32 VenkataRao, T. Bioterrorism-Consequence Management, 1st India Disaster Management Congress, 29-30 November 2006.

33 Parachini, J. Combating Terrorism: Assessing the Threat of Biological Terrorism. CT-183; October 2001.

34 Mark Wheelis, "Biological Sabotage in World War I", in *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945*, eds. E Geissler and J Ellis van Courtland Moon, SIPRI Chemical and Biological Warfare Studies No 18 (Oxford, UK: Oxford University Press), pp 35-61.

35 Carus, S. Testimony before the subcommittee on national security, veteran's affairs and international relations of the house committee on government reform. 26 July 2000.

36 Lauder,John. Unclassified Statement for the Record by Special Assisstant to the DCI for Nonproliferation on the Worldwide WMD Threat. Commission to Assess the organization of the Federal Government to Combat the Proliferation of Weap[ons of Mass Destruction. 29 April 1999.

37 Danzig, R. (2003*) Catastrophic Bioterrorism - What is to be done?* Center for Technology and National Security Policy, Washington, D. C. Paper presented as part of the Nuffield Trust study on the Joint UK Global Health Policy programme.

38 Lele, A. Responding to Bio-Terrorism: India Devises New Norms; IPCS Article No 2249, 2 April 2007.

39 CSIS Report; The Biological Weapons Threat and Nonproliferation Options:

A Survey of Senior US Decision Makers and Policy Shapers; November 2006.

40 Walter Reich,ed, *Origins of Terrorism: Psychologies, Ideologies, Theologies, States of Mind* Washington, DC: Woodrow Wilson Center Press, 1998.

41 On the technical hurdles facing terrorist acquisition and use of biological weapons and statistics of terrorist activities, Amy E. Smithson with Leslie-Anne Levy, chapter 2. Ataxia; *The Chemical and Biological Terrorist Threat and US Response* Washington DC: Henry L. Simson Center, 2000.

42 Franz DR. Defence Against Toxin Weapons, Fort Detrick, Frederick, Md. US Army Medical Research Institute of Infectious Diseases, 1996:6.

43 Zilinskas, R. Assessing The Threat Of Bioterrorism; Monterey Institute of International Studies, 20 October 1999.

44 Pearson, 'The Threat of Deliberate Disease in the 21st Century', *The Threat of Deliberate Disease in the 21st Century,* Henry L.Stimson Centre Report No.24, *Medical Microbiology*.

45 US Congress, Office of Technology Assessment, 'Proliferation of Weapons of Mass Destruction: Assessing the Risks', OTA-ISC-559, August 1993; Report of the Secretary General, 'Chemical and Bacteriological Weapons and the Effects of their Possible Use', A/7575/Rev.1, S/9292/Rev.1, 1969.

46 Barletta M. Biosecurity Measures for preventing Bioterrorism. Centre for Nonproliferation Studies, Monterey Institute of International Studies. 27 November 2002.

47 Ibid, p.382.

48 Mair, M. and Mair JS. "Complementary Approach to Bioterrorism Prevention", *The Nonproliferation Review,* Fall-Winter 2003, p.123.

49 Combs, CC. and Slann, M. *Encyclopedia of Terrorism,* New York: Facts on File, Inc., p.89.

50 Graham P and Brad, R., "Defending against Biological Attack: Importance of Biotechnology in Preparedness", *Defence Science Journal,* vol 51, no 4, October 2001, p. 380.

51 Ostfield, ML. Intersectoral and International Cooperation on Combating Bioterrorism. Remarks at NATO Conference on Elements of Combating WMD Terrorism, Warasaw, Poland, 14 September 2005.

52 Bioterrorism preparedness and the CDC 24 November 2002 – By Edward L. Baker, M.D., M.P.H., Director, Public Health Practice Program Office, Centers for Disease Control and Prevention, Department of HH&S; Testimony by Dr. Edward Baker before the Subcommittee on Technology and Procurement Policy, Committee on Government Reform, United States House of Representatives on 14 December 2001

53 Debashis, S. "Biological Weapons and Bio Terrorism: Bio terrorism is real and is here". Paper No 342, South Asia Analysis Group, 10 October 2001.

54 D.R. Arora & Vikas Gautam, "Bioterrorism: a historical perspective"; *The Tribune,* 16 September 2002.

55 Rao, CK. Are our Defences against Biological Terrorism Adequate. FBAE. http://ww.fbae.org/ Channels/Bioterrorism/prep[aration-to-face-bioterrrorism.htm accessed on 26 Feb 2007.

56 Annan, K., 'Uniting against Terrorism; Recommendations for a global Counterterrorism Strategy', Report of the Secretary General, A/60/825 (27 April 2006)

57 The American David Kay, a critic of inspections before the invasion of Iraq in 2003, learned subsequently as leader of the Iraq Survey Group that "international inspection is even more important now than it ever was…there is really no substitute for effective inspections….if there is effective inspection the need for unilateral pre-emptive action becomes much less critical' (from "Searching the Truth about Iraq's WMD: An interview with David Kay", Arms Control Today 34, 3(April 2004) pp 3-7.

58 The EU, for example, has declared support for the establishment of additional international verification instruments to ensure effective detectability of violations and thereby deter non-compliance with WMD treaty regimes (no. 7, ' Basic Principles for an EU Strategy against Proliferation of Weapons of Mass Destruction', European Council, 16 June 2003.)

59 Tucker, J. B., Preventing terrorist access to dangerous pathogens: The need for international biosecurity standards, Disarmament Diplomacy, No. 66, September 2002, at URL http://www.acronym.org.uk/dd/dd66/ 66op2.htm

60 Barletta, M., A. Sands and J. B. Tucker, "Keeping track of anthrax: The case for a biosecurity convention", *Bulletin of the Atomic Scientists,* pp 57-62,May/ June 2002.

61 How Biotech Improved Agriculture," *The Hindu*, 23 July 1998.

62 "India Not To Make Biological Weapons: President," Press Trust of India, 28 October 2002.

63 "US Sanctions Indian Company for Selling Iraq WMD Materials," *The Washington Times*, 2 February 2003, in Lexis-Nexis Academic Universe, 16 February 2005, <http://www.lexis-nexis.com>. 64 Chandran, S., Looking Beyond Bio-Weapons and Bio-Terrorism in South Asia, IPCS Report No 1750, 25 May 2005.

64 ibid

65 ibid

66 "Army Discounts-N-Attack But Goes Through Drill," *The Times of India Online*, 11 May 2001, available online at http: www.timesofindia.com 110501/11indi15.htm, 12 June 2001.

67 Chowdhury, Srinjoy. "Bio-terror Close to Home," *The Statesman*, Global News Wire, 12 December 2002, in Lexis-Nexis Academic Universe, 6 April 2005, <http://www.lexis-nexis.com>.

68 "People Told to be Alert against Biological Terrorism Threat," Press Trust of India, 15 October 2001.

69 Lele, A., Responding to Bio-Terrorism: India Devises New Norms, IPCS Project Report No 2249, 2 April 2007.

70 Sharma, Jyoti. "An Anti-WMD Force to Reckon With," *The Economic Times of India*, Global News Wire, 4 January 2004, in Lexis-Nexis Academic Universe, 8 April 2005, <http://www.lexis-nexis.com>.

71 "Toxic Technology Challenges and Spin-Offs," *The Hindu*, 26 March 2003, in Lexis-Nexis Academic Universe, 6 April 2005, <http://www.lexis-nexis.com>.

72 Lele, A. "Biological Weapons and Bio-Terrorism : Meeting the Threat". In *Bio-Terrorism and Bio-Defence*. Edited by Chari, P.R. and Chandran S.Institute of Peace and Conflict Studies, 2005.

73 www. Dailyexcelsior.com/01nov14/national.htm accessed on 02 Jul 2007

74 http://w3.whosea.org/gujarat/final report 10.htm accessed on 25 Apr 2007

75 Puri, M., "Bio-Terrorism & Bio-Defence", IPCS Article No 1745, 14 May 2005.

76 ibid.

77 Manjunath, K.S., "India's Security against Bio-weapons Attack: Mission Possible?", IPCS Report No 1740, 12 May 2005.

78 Tara O'Toole, MD, MPH, Hearing on "Project BioShield Reauthorization Issues," Testimony before the Congress of the United States, 6 April 2006.

BIBLIOGRAPHY

PRIMARY SOURCES

Periodicals/Journals

1. Atlas RM. "The Medical Threat of Biological Weapons". *Critical Review Microbiology* 1998; 24(3): 157-168.
2. Banerjee, K., "Bioterrorism in South Asia", *Aakrosh*, vol 8, no 29, October 2005.
3. Barletta, M., A. Sands and J. B. Tucker, "Keeping track of anthrax: The case for a biosecurity convention", *Bulletin of the Atomic Scientists*, pp 57-62, May/June 2002.
4. Beeching NJ, Dance DA, Miller AR, et. al. "Biological warfare and bioterrorism". BMJ 2002; pp324:336-339.
5. Christopher G, Cieslak TJ, Pavlin J, Eitzen E., "Biological Warfare; a historical perspective", *JAMA*, 1997, 278(5); 412-417.
6. Dennis, C. "The Bugs of War", Nature. 411: 232-235 Graham P and Brad, R., "Defending against Biological Attack: Importance of Biotechnology in Preparedness", *Defence Science Journal*, vol 51, no 4, October 2001, p. 380.
7. Khan AS, Morse S, Lillibridge S. "Public-health preparedness for biologic terrorism in the USA". *Lancet* 2000; pp356:1179–82.
8. Koblentz,G., "Pathogens as Weapons: The International Security Implications of Biological Warfare", *International Security*, vol 28, no 3, Winter 2003/04. p. 87.

9. Mair, M. and Mair JS. "Complementary Approach to Bioterrorism Prevention", *The Nonproliferation Review,* Fall-Winter 2003, p.123.

10. Michael J Powers and Jonathan Ban, "Bioterrorism: Threat and Preparedness", *The Bridge,* vol 32, no 1, Spring 2002.

11. Pearson, "The Threat of Deliberate Disease in the 21st Century", *The Threat of Deliberate Disease in the 21st Century,* Henry L.Stimson Centre Report No.24, *Medical Microbiology.*

12. Pilanbangchang, S., "Strategies of Preparedness against the Threat of Biological Warfare and Bioterrorism in South-East Asia", *Asian Biotechnology and Development Review,* vol. 8, no. 1, pp 77-98.

13. Rosenberg, B.H., "A Counter-Bioterrorism Strategy for the New UN Secretary General", *Disarmament Policy,* Issue no. 84, Spring 2007.

14. "Searching the Truth about Iraq's WMD: An interview with David Kay", *Arms Control Today* 34, 3(April 2004) pp 3-7.

15. Tucker, J. B., "Preventing terrorist access to dangerous pathogens: The need for international biosecurity standards", *Disarmament Diplomacy,* no. 66 September 2002.

Conference Proceedings

16. 'Biosecurity and International Proliferation Regimes', Conference Report during Workshop at IPCS, New Delhi on 14-15 September 2006.

17. Merritt, G., Next Generation Threat Reduction: Bioterrorism's challenges and solutions, A report of the third meeting of the New Defence Agenda's Bioterrorism Reporting Group, Brussels, 25 January 2005.

18. Ostfield, ML. Intersectoral and International Cooperation on Combating Bioterrorism. Remarks at NATO Conference on 'Elements of Combating WMD Terrorism', Warsaw, Poland, 14 September 2005.

19. Venkata Rao, T. Bioterrorism-Consequence Management, 1st India Disaster Management Congress, 29-30 November 2006.

20. Weaver, Gary. 2004. Lecture; Special Issues in Bioterrorism: Emerging and Re-emerging Zoonotic Diseases and Agro-Terrorism. 17 February 2004.

21. Zilinskas, R A, Final Report and Commentary: Bioterrorism Threat Assessment and Risk Management Workshop, (June 2003).

22. Barletta M. Biosecurity Measures for preventing Bioterrorism. Centre for Nonproliferation Studies, Monterey Institute of International Studies. 27 November 2002.

23. Carus.W.S (1998). Bioterrorism and biocrimes: The Illicit Use of Biological Agents in the 20th Century. Working paper. Center for Counter Proliferation Research. National Defense University.

24. Chandran, S., Looking Beyond Bio-Weapons and Bio-Terrorism in South Asia, IPCS Report No 1750, 25 May 2005.

25. CSIS Report; The Biological Weapons Threat and Nonproliferation Options: A Survey of Senior US Decision Makers and Policy Shapers; November 2006.

26. Danzig, R. (2003), Catastrophic Bioterrorism - What is to be done? Center for Technology and National Security Policy, Washington, D. C. Paper presented as part of the Nuffield Trust study on the Joint UK Global Health Policy programme.

27. Debashis,S. Biological Weapons and Bio Terrorism: Bio terrorism is real and is here. Paper No 342, South Asia Analysis Group, 10 October 2001.

28. Gary Ackerman and Moran Kevin. "Bioterrorism and Threat Assessment: Report Prepared for the Weapons of Mass Destruction Commission". Centre for Nonproliferation Studies, 2006, p.8.

29. Katz R. Biological Weapons: A national Security Problem that Requires a Public Health Response, Working Paper 2001-04, Office of Population Research, Princeton University.

30. Lele, A. "Responding to Bio-Terrorism: India Devises New Norms"; IPCS Article No 2249, 02 April 2007.

31. Manjunath, K.S., India's Security against Bio-weapons Attack: Mission Possible?, IPCS Report No 1740, 12 May 2005.

32. Parachini, J. Combating Terrorism: Assessing the Threat of Biological Terrorism. CT-183; October 2001.

33. Puri, M., Bio-Terrorism & Bio-Defence, IPCS Article No 1745, 14 May 2005.

34. Stolar Alex. Bioterrorism and US Policy Responses Assessing the Threat of Mass Casualty. Institute of Peace and Conflict Studies, New Delhi, IPCS Special Report 31, October 2006.

35. Zilinskas, R. Assessing The Threat Of Bioterrorism; Monterey Institute of International Studies, Centre for Nonproliferation Studies Report, 20 October 1999.

Newspapers

36. "Army Discounts-N-Attack But Goes Through Drill," *The Times of India* Online, 11 May 2001.

37. Arora D.R. & Vikas Gautam, "Bioterrorism: a historical perspective"; *The Tribune,* 16 September 2002.

38. Chowdhury, Srinjoy. "Bio-terror Close to Home," *The Statesman,* Global News Wire, 12 December 2002.

39. Das, A.K., "White Anthrax, red alert: Delhi powders its knows", *The Times of India,* 17 October 2001.

40. Finnegan, W. "The Poison Keeper". *The New Yorker.* 15 January 2001.

41. "How Biotech Improved Agriculture," *The Hindu,* 23 July 1998.

42. Inglesby,T. "The Germs of War: how biological weapons could threaten civilian population". *The Washington Post,* Washington DC, 9 December 1999, H1.

43. "People Told to be Alert Against Biological Terrorism Threat," *Press Trust of India,* 15 October 2001.

44. Ramana, B. "Germs of Mass Destruction". *The Telegraph*. Calcutta, 11 December 2006.

45. Sharma, Jyoti. "An Anti-WMD Force to Reckon With," *The Economic Times of India,* Global News Wire, 4 January 2004.

46. "Toxic Technology Challenges and Spin-Offs," *The Hindu,* 26 March 2003.

47. "US Sanctions Indian Company for Selling Iraq WMD Materials," *The Washington Times,* 2 February 2003.

Official Publications

48. Annan, K., 'Uniting against Terrorism; Recommendations for a global Counterterrorism Strategy', Report of the Secretary General, A/60/825 (Apr 27, 2006)

49. Carus, S. Testimony before the subcommittee on national security, veteran's affairs and international relations of the house committee on government reform. 26 July 2000.

50. Edward L. Baker, M.D., M.P.H., Director, Public Health Practice Program Office, Centers for Disease Control and Prevention, Department of HH&S; Bioterrorism preparedness and the CDC Nov 24, 2002 –; Testimony by Dr. Edward Baker before the Subcommittee on Technology and Procurement Policy, Committee on Government Reform, United States House of Representatives on 14 December 2001.

51. Franz DR. Defence Against Toxin Weapons, Fort Detrick, Frederick, Md. US Army Medical Research Institute of Infectious Diseases, 1996:6.

52. Lauder,John. Unclassified Statement for the Record by Special Assisstant to the DCI for Nonproliferation on the Worldwide WMD Threat. Commission to Assess the organization of the Federal Government to Combat the Proliferation of Weapons of Mass Destruction. 29 April 1999.

53. No. 7, 'Basic Principles for an EU Strategy against Proliferation of Weapons of Mass Destruction', European Council, 16 June 2003.

54. Prasad,J., Permanent Mission of India to the Conference on Disarmament: 6th Review Conference of States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BTWC), 20 November 2006.

55. Tara O'Toole, MD, MPH, Hearing on "Project BioShield Reauthorization Issues," Testimony before the Congress of the United States, 6 April 2006.

56. US Congress, Office of Technology Assessment, 'Proliferation of Weapons of Mass Destruction: Assessing the Risks', OTA-ISC-559, August 1993; Report of the Secretary General, 'Chemical and Bacteriological Weapons and the Effects of their Possible Use', A/7575/Rev.1, S/9292/Rev.1, 1969.

57. U.S. Departments of Army and Air Force. Military Biology and Biological Agents. Departments of Army and Air Force Technical Manual 3-216/Air Force Manual 355-56, 12 March 1964.

SECONDARY SOURCES

Books

58. Alibek, K and S. Handelman. *Biohazard: The Chilling True Story of the Largest Covert Biological Weapons Program in the World - Told from Inside by the Man Who Ran it.* 1999. Delta (2000) ISBN 0-385-33496-6 [1]

59. Armendariz, Perez, C, Hart, J., *Chemical and Biological Warfare,* USA : Copernicus, 2002.

60. Arya, R., *Bioterrorism,* New Delhi : Deep & Deep Publications, 2006.

61. Bellamy, R., ed. *Textbook of Military Medicine, Medical Aspects of Chemical and Biological Warfare,* Washington DC, Borden Institute, Walter Reed Army Medical Centre, 1997, chapter 2; *History of Chemical and Biological Warfare: an American Perspective.*

62. Bhushan, K. & Katyal, G., *Nuclear, Biological and Chemical Warfare,* APH, 2002.

63. Buck, G., *Preparing For Bioterrorism,* Delmar Publishers, 2002.

64. Chari, P.R. & Chandran, S., ed. *Bio-Terrorism and Bio-Defence,* New Delhi : Manohar Publishers & Distributors, 2005.

65. Chari, P.R. & Rajain, A., ed. *Biological Weapons Issues and Threats,* Singapore: Marshall Cavendish International, 2004.

66. Chauhan, S.S., *Biological Weapons,* Delhi : APH Publishing Corporation, 2004.

67. Croddy, E, et al, *Chemical and Biological Warfare,* USA : Copernicus, 2002.

68. Dando, MR. *Biological Warfare in the 21st Century: Biotechnology and the Proliferation of Biological Weapons*. London : Brassey's, 1994.

69. Garrett, Laurie. *Betrayal of Trust: The Collapse of Global Public Health,* New York : Hyperion, 2005.

70. Joseph, M & Bass, E., *Bioterrorism: A Guide for Hospital Preparedness,* CRC Press, 2005.

71. Lele, A. "Biological Weapons and Bio-Terrorism: Meeting the Threat". In *Bio-Terrorism and Bio-Defence*. Edited by Chari, P.R. and Chandran S.Institute of Peace and Conflict Studies, 2005.

72. Lele, A., *Bio-Weapons : The Genie in the Bottle,* New Delhi : Lancer Publishers & Distributors, 2004.

73. Mark Wheelis, "Biological Sabotage in World War I", in *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945,* Edited by E Geissler and J Ellis van Courtland Moon, SIPRI Chemical and Biological Warfare Studies no. 18, Oxford, UK: Oxford University Press, pp 35-61.

74. Mohan, B. Vats, AKL., *Global Armageddon: Emerging Challenges in the New Millenium,* Comcare International Publishers, 1999.

75. Osterholm M, Schwatz J. *Living Terrors: What America needs to know to survive the coming bioterrorist catastrophe.* New York : Delacorte Press, 2000.

76. Patial, M.S. *WMD Terrorism: Strategy for Consequence Management,* New Delhi : Manas Pub., 2006, p.228.

77. Rao, D., Pushplata, D, Harshita, D., *Biological Warfare*, Delhi Publishing House, 2001.

78. Reddy, L R., *Bioterrorism,* New Delhi : SB Nangia, 2002.

79. Satpathy, GC, *Biological Weapons and Terrorism* vol 1 & 2, Kalpaz Publishers, 2002.

80. Smithson Amy E. with Leslie-Anne Levy, chap. 2. Ataxia; *The Chemical and Biological Terrorist Threat and US Response* Washington DC: Henry L. Simson Center, 2000.

81. Ursano, R., *Bioterrorism,* Cambridge University Press, UK, 2004 "US Senate Leader Urges 'Manhattan Project' Against Bio-Terror Threat," Agence France Presse, 27 January 2005.

82. Walter Reich, ed, *Origins of Terrorism: Psychologies, Ideologies, Theologies, States of Mind* Washington, DC: Woodrow Wilson Center Press, 1998.

83. Weintraub, P., *Bioterrorism,* New York : Kensington Publishers, 2002.

84. Wright S., ed., *Biological Warfare and Disarmament*, Vision Books, 2003.

Reference Books

85. *Britannica Concise Encyclopedia*. © 2006.

86. Combs, CC. and Slann, *M. Encyclopedia of Terrorism,* New York: Facts on File, Inc., p.89.

Internet

87. "Bioterrorism Agents/Diseases", The Centers for Disease Control and Prevention. www.bt.cdc.gov/agent/ agentlist-category.asp

88. http://w3.whosea.org/gujarat/final report 10.htm accessed on 25 Apr 2007

89. http://www.answers.com/topic/biological-warfare?cat=health accessed on 12 Jun 2007

90. http://www.sandia.gov/media/cbwfoam.html accessed on 02 Mar 2007

91. Rao, CK. Are our Defences against Biological Terrorism Adequate. FBAE. http://ww.fbae.org/Channels/Bioterrorism/prep[aration-to-face-bioterrrorism.htm accessed on 26 Feb 2007

92. Terrorism. (2006). In *Encyclopædia Britannica*. Retrieved October 28, 2006, from Encyclopædia Britannica Online: http://www.britannica.com /eb/article-217761.

93. www. Dailyexcelsior.com/01nov14/national.htm accessed on 02 Jul 2007

Appendix A
(Refers to Chapter II)

Table1: Characteristics useful in a biological weapons agent

S No	Characteristic
1.	Should produce a certain effect consistently.
2.	Dose needed to produce the effect should be low.
3.	Should be a short and predictable incubation period.
4.	Target population should have little or no immunity.
5.	Treatment for the disease should not be available to target population.
6.	User should have the means to protect troops and civilians.
7.	Should be possible to mass produce the agent.
8.	Should be possible to disseminate the agent effectively.

9. Agent should be stable in storage and transportation in munitions.

Appendix B

(Refers to Chapter II)

Table 2 : Critical List of Biological Agents

Category A	Category B	Category C
Smallpox	Q-fever	Agents identified by the CDC Emerging Infectious Disease Program, including:
Anthrax	Brucellosis	
Plague	Glanders	
Botulism	Melioidosis	
Tularemia	Viral Encephalitis	nipah virus
Hemorrhagic fever	Ricin	hantavirus
- Ebola	Typhus	multidrug-resistant TB
- marburg	*Clostridium* toxin	
- lassa	*Staphylococcus enterotocin* B	
-junin (Argentinean		
.Hemorrhagic Fever)	Foodborne diseases	
	Waterborne diseases	

Source: Khan A, et al. Public health preparedness for biological terrorism in the USA. Lancet 2000; 356:1179

Category A includes the highest priority agents because they are most likely to cause mass casualties, create panic and require a specific public health response. According to intelligence sources, these are the agents that are most likely to be used in a future attack, and are being researched and weaponized by biowarfare programs around the world.

Category B is the second highest priority agents, including those agents that could contaminate food or water, are relatively easy to disseminate, and require enhanced disease surveillance and diagnostic capacity. Many of these agents, such as brucellosis, glanders and ricin, were either weaponized by state-sponsored programs in the past, or utilized successfully in biological warfare or terrorist incidents.

Category C includes emerging pathogens that could be weaponized in the future because of the relative ease of accessing, producing and disseminating the agents, as well as the high levels of morbidity and mortality these agents would cause.

Appendix C

(Refers to Chapter II)

Table 3 : Classification of Bioweapons Based on Lethality

(Numbers of dead from delivery of 1000kgs)

20-90% deaths in 1-10 days	*20-100%deaths in 5-20 days*	*50-100% incapacity for 2 weeks*
Anthrax (b)	Brucellosis (c)	Brill-Zinsser disease
Bolivian haemorrhagic fever	Blastomycosis	Dengue fever
Ebola infection	Congo Crim Hem Fever	Eastern equine encephalitis
Glanders (d)	Monkey Herpes B	Epidemic Typhus (d)
Lassa Infection (d)	Korean Hem Fever (d)	Legionellosis
Marburg Infection	Japanese Encephalitis	Murine Typhus
Plague (bd)	Monkey Pox Infection	Q Fever (c)

Smallpox (abd)	Omsk Hem Fever (d)	Rift Valley Fever
Yellow Fever (b)	Russian S/S Encephalitis	Salmonellosis
Melioidosis	Tularemia (bc)	Scrub Typhus (d)
	Argentine Hem Fever	
	(d) Bolivian Hem Fever	
	(d) Influenza d)	

Code: a – Untreated. Days are number of days after symptoms appear; b – Vaccine available if not genetically altered; c – Known to be weaponised; d- Probably weaponised

Source: Dr Kenneth Alibeck, "Biological Weapons Protection", Hadron Inc., 1 June 2000, and USACHPPM, The Medical NBC Battlebook, USACHPPM Technical Guide 255,pp4-20 to 4-21

Appendix D

(Refers to Chapter II)

Table 4 -Potential Biologic Agents Against Animal Populations

Newcastle Disease Virus

Foot and Mouth Disease Virus

Classical Swine Fever Virus

Highly pathogenic avian influenza virus

African Swine Fever virus

Venezuelan equine encephalitis virus

Rift Valley fever virus

Pseudorabies virus

Bacillus anthracis (anthrax)

Botulinum Toxin

Burkholderia mallei (glanders)

Francisella tularensis (tularemia)

Brucella species

Appendix E

(Refers to Chapter IV)

Table 7: Explanations for an Increasing Biological Weapons Threat

Top Tier Reasons
Increasing availability of dual-use know-how, technology, and equipment 71%
Revolution in the life sciences creating technologies and know-how that makes biological weapons acquisition easier 67%
Technically easier to acquire than nuclear weapons 63%
Terrorist interest in acquisition and use of biological weapons 56%
Second Tier Reasons
Ability to acquire biological weapons covertly 50%
Ability to attack an opponent without firm attribution of the source of the attack 46%
Cheaper than nuclear weapons 46%
Lack of strong, interlocking biological weapons
nonproliferation tools and programs 40%
Third Tier Reasons
Inadequate security at facilities handling biological weapons-grade materials 37%
Ability to tailor the scale of a biological weapons attack by: targeting plants, animals, and/or people; using
diseases that are contagious or non-contagious; using diseases that are lethal or just harmful 31%
Black market purchase of weapons materials and/or knowledge 31%
Ability of biological weapons to offset asymmetrically an opponent's military advantage 25%
Government transfer or sale of biological weapons, weapons materials, or know-how to terrorists 10%

*Survey participants were also given options of "Other," "All of the Above," and "No Opinion." No respondents selected the latter two options. Other reasons proposed for the increasing proliferation threat are described in text.

Appendix F

(Refers to Chapter VII)

India's Position on BTWC At The Sixth Review Conference

1. Export Controls: India advocates the establishment of a fair, transparent and multilateral export regulation mechanism within the future organization for the implementation of the Protocol[1].

2. Visits and Investigations: In the working papers, India has not expressed any stand on the issue.

3. Article X issues: India advocates that by strengthening Article III, transfer of the agents, toxins, weapons, and equipment for non-peaceful uses can be prevented[2].

4. Confidence-Building and Transparency Measures: The CBM form A2 addresses the "national biological defence research and development programmes." Under this clause, India is one among the 23 states that had declared biodefence programmes. India has participated in CBMs in the year 1997 only[3]. As of 1998 India declared that the declared annual level of financing for the programme is 2 million rupees; the declared number of facilities involved in the programme is one. The declared number of personnel involved in the programme (excluding contract staff) was 25[4].

5. Definitions of Terms and Objective Criteria: India has defined the terms that are essential to distinguish between a biological weapon facility or otherwise[5]. Some of the terms that were defined include- Genetic modification or manipulation, Military medical programme, Biological defence facility, etc[6].

6. Technical Co-operation: According to a working paper jointly submitted by India with other countries, some mechanisms have been suggested in case a state party is denied a transfer or transfers for inconsistent reasons. These include bilateral clarifications from the requested State Party or clarifications sought by the Director-General on the behalf of the state party or settlement of a panel for resolving the issue. If none of these measures work then the state party can invoke Article V of the convention as a last resort.

References

1 Working paper submitted by China, Cuba, India, Indonesia, Iran (Islamic Republic of), Libyan Arab Jamahiriya, Mexico, Pakistan and Sri Lanka, BWC/AD HOC GROUP/WP.452, 7 May 2001.

2 Working Paper By India, Measures to Strengthen Implementation of Article X of the BTWC BWC/AD HOC GROUP/WP.131,10 March 1997.

3 Iris Hunger and Nicolas Isla, "Confidence-building needs transparency: an analysis of the BTWC's confidence-building measures".

4 Ibid.

5 Definition of Terms, Working Paper by India BWC/AD HOC GROUP/ WP.106, 18 September 1996.

6 Ibid.

LIST OF ABBREVIATIONS

AIDS	-	Acquired Immuno- Deficiency Syndrome
BC	-	Before Christ
BSL	-	Bio-Safety Laboratory
BTWC	-	Biological and Toxin Weapons Convention
BW	-	Biological Weapons
BWPP	-	Bio Weapons Prevention Project
CBI	-	Central Bureau of Investigation
CBM	-	Confidence Building Measures
CBW	-	Chemical and Biological Warfare

CDC	-	Centres for Disease Control and Prevention
CEP	-	Civil Emergency Protection
CISF	-	Central Industrial Security Force
CSIS	-	Centre for Strategic and International Studies
DRDE	-	Defence Research and Development Establishment
DRDO	-	Defence Research and Development Organisation
FAO	-	Food and Agriculture Organisation
GEAC	-	Genetic Engineering Approval Committee
IAEA	-	International Atomic Energy Agency
IB	-	Intelligence Bureau
ICMR	-	Indian Council of Medical Research
ICRC	-	International Committee of Red Cross
IPCS	-	Institute of Peace and Conflict Studies, New Delhi
MHA	-	Ministry of Home Affairs
NATO	-	North Atlantic Treaty Organisation
NBC	-	Nuclear, Biological and Chemical
NICD	-	National Institute of Communicable Diseases
NPT	-	Non Proliferation Treaty
NSCS	-	National Security Coordination Secretariat
RAW	-	Research and Analysis Wing
RCGM	-	Review Committee on Genetic Manipulation
RDAC	-	Recombinant DNA Advisory Committee
SCOMET	-	Special Chemicals, Organisms, Materials, Equipment and Technologies
SEB	-	Staphylococcus Enterotoxin B
UK	-	United Kingdom

UN	-	United Nations
UNSC	-	United Nations Security Council
UNSCOM	-	United Nations Special Commission
US	-	United States (of America)
UV	-	Ultra Violet
WHO	-	World Health Organisation
WMD	-	Weapons of Mass Destruction

INDO-US NUCLEAR DEAL

BY

COMMODORE DINKAR SHARMA

INTRODUCTION

General

The nuclear relationship between India and the United States has been a major irritant that has soured Indo-US relations for three decades or more. This has formed a large part of the diplomatic discourse, overshadowing much more important matters of concern to the two countries from receiving their due attention. For the most part, the nuclear dialogue between the two countries has been exasperating and at the best of times a stalemate, with the two sides reiterating their basic and unalterable stated positions. In fact, during the Clinton era, India was repeatedly advised to "cap, roll back and eliminate" its nuclear weapon programme. In light of this background, the 18 July 2005 Indo-US Civilian Nuclear Agreement (J18) was most unexpected and took considerable re-defining of long held positions on both sides. This was followed by the signing of the military and civil nuclear facility "Separation Plan", on 2 March 2006, during the visit of President Bush to India.

The Indo-US Nuclear Deal has generated considerable criticism and has come under strident attack, both in Washington and in New Delhi. While the American non-proliferation lobby has termed it as "a step towards breakdown in the international non-proliferation regime", some politicians and analysts have voiced concern with regard to India making major concessions to the US, to the detriment of its strategic and national interests. Even some scientists of the Department of Atomic Energy (DAE) and Bhabha Atomic Research Centre (BARC) have expressed apprehension that the pact could mark the beginning of US domination of the Indian nuclear programme.

Aim

The Indo-US Civil Nuclear Deal is an attempt to create a delicate balance between the policies pursued by India, the US, the Nuclear Suppliers Group(NSG) as well as the nuclear non-proliferation watchdog, the International Atomic Energy Agency (IAEA). The aim of this study is to examine various aspects of the deal and analyse their short and long-term implications on the national security from the Indian perspective.

Hypothesis

The Indo-US Civil Nuclear Deal is in the overall interest of the country as it not only bolsters India's energy security, but also propels the country towards a position of greater strategic advantage in the emerging international geopolitical scenario.

Scope of Study

The study examines the following issues :

(a) Development of Indian Nuclear Programme since late 1950s.

(b) The three-stage nuclear fuel cycle and its relevance in the Indian context.

(c) Testing of nuclear devices in 1974 and 1998 – their importance and implications.

(d) The "Military Civil Nuclear Separation Plan."

(e) Contours of the Indo-US Civil Nuclear deal.

(f) Possible US motives and Indian gains.

(g) Differences between J18, the Hyde Act and the 123 Agreement text and attempts at their reconciliation.

(h) Political, security and strategic implications of the deal.

(i) Analysis of the strengths and weaknesses of the deal, along with the attendant opportunities and threats.

(j) Correlation of the findings with the hypothesis.

Structure of the Thesis

Chapter I: Indian Nuclear Programme-A Historical Perspective

This chapter traces the reasons for the formulation of the three-stage Indian nuclear programme based on thorium and the building of the first nuclear power plant in India, at Tarapur, based on Low Enriched Uranium (LEU) fuel. Thereafter, the evolution of the Nuclear Non-Proliferation Treaty (NPT), reasons for India staying out of it and the effect the nuclear tests of 1974 and 1998 had on the nuclear programme have been deliberated.

Chapter II: Contours of the Indo-US Nuclear Deal

The convergence of interests, particularly in the post-globalised and post-9/11 world, formed the basis for the evolution of the Indo-US relations. The dialogue initiated in 2004 under the Next Steps in Strategic Partnership (NSSP), *inter alia,* covered civil nuclear energy cooperation. The Indo-US Nuclear deal is a natural follow-up of the NSSP. The imperatives for the US to do the deal, along with the gains that accrue to India, have been highlighted in this chapter.

Chapter III: Joint Statement of 18 July (J18), The Hyde Act and 123 Agreement

The J18 laid down the principles, and provided the broad architecture, for nuclear cooperation between India and US. The Hyde Act, enacted by the US Congress, however, contained certain binding and non-binding provisions which were at variance with the agreed framework. US and India agreed to resolve the problems, arising out of this dissonance, while formulating the 123 Agreement, which besides codifying the cooperation, is the operative part of the deal. Areas of divergence, redressal of these in the 123 Agreement text and the implications thereof have been covered in this chapter. The finalised text of the 123 Agreement, released simultaneously in both countries on 3 August 2007, though largely satisfactory for India, left some ambiguities for the opponents of the deal to exploit.

Chapter IV: The Indo-US Civil Nuclear Deal–An Analysis of Strengths, Weaknesses, Opportunities and Threats

The relative strengths and weaknesses of the various clauses of the deal, besides the opportunities and threats which the deal brings into focus for India, have been investigated in this chapter.

Chapter V: Conclusion. The chapter highlights that, on the whole, the advantages that the deal offers outstrip the limitation it imposes on India. It not only shoresup India's energy security but also provides the country with tremendous strategic advantage in the emerging international geopolitical scenario. The available facts clearly highlight the correctness of the hypothesis.

CHAPTER 1

INDIAN NUCLEAR PROGRAMME A HISTORICAL PERSPECTIVE

Background

The decision to build the first nuclear power plant at Tarapur was taken by India in 1959. Dictated by the fact that natural uranium could be produced indigenously, international bids were sought to build two natural uranium power units in the range of 150-200 MW. However, on recommendations of the US nuclear industry leaders, it was agreed to consider their proposal for reactors using enriched-uranium as fuel. The American industry assured India that enriched-uranium fuel could be supplied by the United States Atomic Energy Commission (USAEC) which then operated large enrichment plants, set up during World War II. Agreements were concluded with US on Tarapur (I and II) and with Canada on Rajasthan (I) that included reciprocal obligations to use any material produced in the plants for peaceful purposes only[1]. The two units of Tarapur entered service in October 1969 and operated well but for some problems with station auxiliaries.

Nuclear Non-Proliferation Treaty

Deeply concerned by the first Chinese nuclear test in October 1964, India turned to the international community to address its nuclear insecurity and called for negotiations on non-proliferation. But the Nuclear Non-Proliferation Treaty (NPT) that came out of those negotiations left India stranded. The NPT set 1 January 1967, as the cut-off date, for having tested nuclear device for becoming a member of the nuclear club. It neither met India's security concerns nor provided a framework to effectively manage the threat of nuclear proliferation. Accordingly, despite very strong pressure from USA and the UK, India refused to join the NPT terming it as discriminatory, ineffective and one which did not address its genuine security interests.

Three-Stage Nuclear Programme

With the available uranium reserves (60,000 tons), around 20,000 MW could be generated for 30 years. In order to utilise the abundant availability of thorium (3.6-lakh-tonne) and to generate nuclear power beyond 30 years, India drew up a

three-stage atomic power programme right in the beginning. The first stage involved setting up of Pressurised Heavy Water Reactors (PHWR). India has 12 such reactors and several more are under construction/ being planned. The available natural uranium in India is likely to be committed to these reactors. Besides generating power, PHWRs convert a part of natural uranium into plutonium, which is separated from the spent fuel in Plutonium Reprocessing Plants. In the second stage, the Fast Breeder Reactors (FBR) are to be fuelled by plutonium (obtained from the first stage PHWRs) and U238. The FBRs will fission plutonium for power production and, at the same time, breed more plutonium from the U238. The surplus plutonium from each FBR can be used to set up additional FBRs and grow the nuclear capacity in tune with India's needs. The 500 MWe Prototype FBR at Kalapakkam in Tamil Nadu is expected to be commissioned by 2010 and the reprocessing and remaking facility by 2012. Consolidation and further growth of the nuclear electric base is based on Thorium breeders, in the third stage of the programme, which will take a few decades to fructify. The third stage — use of thorium for power generation — has already begun. A prototype 30 KW thorium based reactor, Kamini, has been commissioned successfully[2] at IGCAR[3].

Fallout of Pokhran I & II

When India conducted the Pokhran I test in May 1974 (a *Peaceful Nuclear Explosion*), there were sharp reactions from many countries including the US and Canada. This was so because the plutonium used in the device was separated from the fuel rods irradiated in Canadian supplied CIRUS reactor which in turn used heavy water of US origin. Immediately after Pokhran I test, the US sought additional assurances from India that any US supplied nuclear material, or any material produced at the Tarapur plant, would not be used for any explosive device. During 1974-78, the supply of enriched uranium for Tarapur was subjected to detailed hearing in the US Congress. In the meantime, India informed the US that it would be forced to reprocess the spent fuel from Tarapur so that the un-burnt uranium and plutonium could be recycled. The US, however, refused to consent, and effectively vetoed the reprocessing of fuel supplied by it.

In 1978, at the instance of President Carter, the US Congress passed the Nuclear Non-Proliferation Act (NNPA). Under the Act, the US was prevented from exporting Low Enriched Uranium (LEU) to India. On its part, India argued that the Indo- US Co-operation Agreement was an inter-governmental treaty and could not be overridden by domestic legislations. Despite the strong legal position of India, the US refused to honour its commitments. Following a period of stalemate (1978-79), the US found a way of continuing the supply of LEU to India from France. This arrangement continued till 1993, the life term of the Indo- US Co-operation Agreement.

After the first Pokhran test, the US set up the Nuclear Suppliers Group (NSG) or the London Club, to co-ordinate policies among the industrially advanced countries to put an embargo on sensitive or dual use materials and technology to non-signatories of NPT or those which had not accepted Full Scale Safeguards (FSS). Over the years, these restrictions became increasingly onerous, forcing indigenous design and production.

In May 1998, India conducted the Pokhran II test, once again drawing strong denunciation from the US including a series of restrictions to isolate India in atomic, space and other high technology domains. Many Indian institutions and industries were placed on the Entities List[4] of the US government and were denied access to dual-use technology items.

Broken Energy Promises

In this 'technology denial' regime, India's Department of Atomic Energy (DAE), despite more than 50 years of generous state funding, failed to produce large quantities of nuclear electricity. In 1962, DAE predicted that nuclear energy would constitute up to 25,000 MW by 1987 and 43,500 MW by 2000. Neither of these predictions came true as nuclear power currently (2006) amounts to only 4120 MW – barely three percent of India's installed electricity capacity. Compared to this, the wind energy has added 4000 MW of installed capacity over the last four years. Though the Indian nuclear capacity is expected to rise by more than 50 percent over the next few years, largely because of two 1000 MW reactors being built by the Russians under the 1988 deal, further addition will be limited unless the country has access to nuclear technology internationally[5]. This, quite clearly, was the primary motivation for India to go in for the 'Indo-US Civilian Nuclear Agreement'[6].

The DAE also failed in ensuring sufficient supplies of uranium to fuel its nuclear reactors. Even at just 75 percent efficiency, India's domestically fuelled reactors require nearly 400 tons of uranium every year; the plutonium production reactors, which are earmarked for nuclear weapons purposes, consume another 30-35 tons annually. The estimated current uranium production within India, primarily from Jaduguda mines,[7] is less than 300 tons per year – well short of requirement. The DAE's desperate efforts to open new uranium mines in the country have met with stiff resistance, primarily because of the detrimental health impacts of uranium mining and milling that have been recorded in the communities around existing mines.

The less than satisfactory progress made by India in achieving nuclear energy generation targets over fifty years, despite governmental support, points to the

basic assumptions underlying the NPT, namely, that developing countries would need help to successfully establish large nuclear energy programmes. As such, it calls for a trade-off: providing non-nuclear-weapon states access to international cooperation on nuclear energy, in return for a demonstrated commitment not to develop nuclear weapons. In both refusing to sign the NPT and in developing nuclear weapons, India had sacrificed the benefits of this international support since 1974. Now, through the nuclear deal, the US has promised India all the help it needs for its civilian nuclear programme – all without being forced to sign the treaty, nor accepting any limit on its nuclear arsenal. Most importantly, the Indo-US Deal promises to allow India access to the international uranium market. This will possibly free up its domestic uranium for its nuclear weapons programme and other military uses. [8]

Conclusion

Production of nuclear power was the *raison d'etre* to build the first nuclear power plant at Tarapur in 1959. However, the planned nuclear energy production targets could not be met on account of a number of reasons, namely, the decision to fuel the Tarapur reactors by USAEC supplied enriched uranium, refusal to joint the NPT, the Pokhran I and II tests in May 74 and May 98 respectively etc. Further, the availability of uranium for the domestically fuelled reactors is well short of the present requirement. The less than satisfactory progress made by India, despite liberal budgetary support, in achieving the nuclear generation targets, can now be corrected as the Indo–US Deal provides India access to the international nuclear market.

CHAPTER II

CONTOURS OF INDO-US NUCLEAR DEAL

Background Developments

The Indo-US Nuclear Deal has to be viewed in the wider context of the evolving nature of Indo-US strategic relationship as well as the emerging international security scenario. Undeniably, the deal reached was a landmark one, unprecedented in many ways. It represented a fundamental reversal of many dogmatic precepts of American proliferation policy with US now taking a more realistic position vis-à-vis Indian nuclear weapons.

India's strategic significance was recognized by US in the 1990s much before the present Bush administration came to power. This led to a gradual shift in US, as well as Indian foreign policy, adjusting to the realism of post-Cold War, post-globalised and later post-9/11 world. It acknowledged India as an emerging economic powerhouse, determined by the large size of its market, appetite for energy and information-age aligned youth workforce. Economic reforms embarked upon by India since the early 1990s and progressive shedding of the bind of non-alignment further facilitated engagement of India by US.[9]

The visit of President Bill Clinton to India in March 2000 was an indication of India's enlarged mega pixels in US eyes. The leadership of both countries established a good rapport and military-to-military relationship was initiated. The US described its future relations with India as a strategic one. A dialogue process, called "Next Steps in Strategic Partnership (NSSP)" identified civilian nuclear co-operation, civilian space research and supply of dual-use technology components and equipment, as areas of cooperation confirming permanency of US interest in India.

Alongside the above developments and consequent to the events of September 11, 2001, India offered all possible help to US to fight global terror. However, geography forced the US to seek the cooperation of Pakistan, which could be used as a base for launching attacks to dislodge the Taliban government in Afghanistan. India, on its part, helped the Northern Forces to defeat the Taliban, paving the way for an interim government under Hamid Karzai.

At the commencement of the second term, President Bush promised to strengthen India's economic progress largely owing to its continuing commitment to democracy and shared values. The US Secretary of State, Condoleezza Rice, on her first visit to Delhi in March 2005, elucidated US willingness to assist India in the field of energy, including nuclear energy. Though India was building its own PHWRs and was also erecting a 500 MW Prototype Fast Breeder Reactor (PFBR), it possesses only low grade uranium ore, that too, in rather *limited quantities*, precluding the start of new line of 700 MW PHWRs, the design of which was in fruition[10]. India was unable to import Light Water Reactors (LWRs) because of the restrictive practices of the NSG. Further, in stark contrast to Pakistan, India maintained an impeccable record of non-proliferation of nuclear technologies to other countries. In 2005, an Act was passed by the Indian Parliament to prevent the proliferation of the WMDs, bringing the Indian legislation at par with those of the other advanced countries.

Salients of the Agreement

Prime Minister Manmohan Singh's visit to US in July 2005 coincided with

the completion of the NSSP initiative that provided the "basis for expanding bilateral activities and commerce in space, civil nuclear energy and dual-use technology." Drawing a mutual vision for the US-India relationship, mutual interest in "Economy", "Energy and Environment", "Democracy and Development", "Non-Proliferation and Security" and for co-operation in "High Technology and Space" was expressed. The Joint Statement recognised India as a country with advanced nuclear technology with strong commitment to prevent proliferation of WMDs and should, therefore, acquire the same benefits and advantages as other such states. President Bush assured that he would work towards achieving full civil nuclear energy co-operation with India by seeking to adjust US laws and policies through Congress and by working with friends and allies to tune international regimes which precluded such co-operation.[11]

As a reciprocal measure, India agreed to progressively separate the civilian and strategic nuclear facilities and programmes, and place the civilian facilities and programmes voluntarily under IAEA safeguards. It further agreed to "enter into an additional protocol with the IAEA as done by other nuclear advanced states; continue India's unilateral moratorium on nuclear testing; work with US for the conclusion of multilateral Fissile Material Cut-off Treaty (FMCT); refrain from transfer of enrichment and reprocessing technologies to states that do not have them and supporting international effort to limit their spread; and ensure that necessary steps are taken to secure nuclear material and technology through comprehensive exports control legislation and through harmonization and adherence to Missile Technology Control Regime (MTCR) and NSG guidelines."[12]

Text of the Joint Statement is placed at Appendix 'A'.

Reactions in US and India

Immediately after the announcement of the agreement, several staunch proponents of the US non-proliferation community embarked on the warpath arguing that the Bush administration had frittered away all the gains made in pursuit of non-proliferation over the past decades, even endangering global security. Well-known personalities like Strobe Talbot and Stephen Cohen were in the forefront of "non-proliferation compromised" cacophony. In India the reactions were equally raucous. It was alleged, even by some well-known scientists and analysts, that the deal compromised India's nuclear policy and would result in effectively capping Indian weapon capability. Some argued that the deal was a backdoor method of roping India into NPT type of restriction, thereby curbing its nuclear programme. The Prime Minister of India, in his statement in the

parliament on 27 February 2006, clarified that the objective of pursuing full civil nuclear energy co-operation was to enhance energy security. He emphasised that an acceptable 'Separation Plan', as envisioned in the J18, was being worked out, taking into account India's current and future needs, and ensuring that the strategic nuclear programme was not compromised in any way. The Separation Plan would come into effect "conditional upon, and reciprocal to, the US fulfilling its side of the understanding."

The nuclear deal has incited three broad positions among the political players in India. First, there are the nuclear hawks, who oppose the deal as they view the separation of civilian and military nuclear facilities, as imposing constraints on the creation of a large nuclear arsenal, essential for India to be a 'great power'. The second position is that of those who see the deal as offering recognition of India as a nuclear-weapon state and a way to sustain and expand the nuclear energy programme, while building "minimum" credible nuclear deterrent. A third position comes from India's Left parties who champion global disarmament. Their greatest concern is that the deal ties India too closely to US policies or reduces India to a "junior partner of the US in fulfilling its global ambitions"[13].

Indo-US Civilian Nuclear Deal

After weeks of intense diplomatic activity, India and the US reached the historic Indo-US Civilian Nuclear Deal which was signed by President Bush and Prime Minister Manmohan Singh on 2 March 2006 during the visit of the former to India. The Indian Plan to separate civilian and strategic facilities met the US benchmarks of being credible, verifiable and defensible from the non-proliferation standpoint. The important features of the deal are placed at Appendix 'B'.

The Indo-US Civilian Nuclear Agreement, when implemented, would integrate India into the global non-proliferation regime after having remained outside it ever since the NPT was signed in 1968.

US MOTIVES FOR THE DEAL

Strategic Dimension - Importance of India

In the past, the option before India was to either have its nuclear weapon programme or accept severe constraints with respect to cooperation in civilian nuclear energy. The deal facilitates the country to have both. What are the US objectives behind this munificence? For the US, the search for "strategic stability in Asia" is largely about China. In 2000, Condoleezza Rice, now US Secretary of

State, argued that China's rise posed an important challenge for the US, and that "China's success in controlling the balance of power depends in large part on America's reaction to the challenge … India is an element in China's calculation, and it should be in America's, too. India is not a great power yet, but it has the potential to emerge as one." The first result of the policy was the NSSP. The nuclear deal is but one of the building blocks in this larger arrangement. Ashley Tellis, an adviser to the State Department on the US-India nuclear deal, has further explained that: "If the United States is serious about advancing its geopolitical objectives in Asia, it would almost by definition help New Delhi develop its strategic capabilities such that India's nuclear weaponry and associated delivery systems could deter against the growing and utterly more capable nuclear forces Beijing is likely to possess by 2025."[14]

The US assertion that the deal is aimed at reducing the consumption of hydrocarbons, thereby ensuring cleaner atmosphere, is only part of the explanation. It may, however, be noted that President Bush is genuinely committed to reducing dependence on hydrocarbons as is implicit in US opposing sale of European arms to China but giving assent to sale of uranium by Australia for civilian energy generation.

Economic Motivation

The economic motivation for US engagement of India also needs to be understood. The Asian share of global economy is estimated to be 43 percent by 2025. India is likely to have anything from 8 to 10 percent of this pie. The need to develop economic relations with Asian states by the US, therefore, needs no emphasis. India's economic growth of over 8 percent over the years has been fuelled by trade and investment with the US. Indo-US trade has grown by $ 10 billion or 62.5 percent between 1998 and 2005. India's vast intellectual capital and the ability to project soft power are also impressive. The emerging Indo-US economic engagement is multifaceted and is supported by agricultural technology sharing, science and technology cooperation and a defence relationship. [15]

Notwithstanding the above, some analysts are more forthright in highlighting the predominantly commercial motivation of the nuclear deal, to include aircraft orders secured by Boeing, sale of reactors and other equipment by America's nuclear industry, the lucrative and large size of the Indian market and India's defence purchases. Removal of restrictions on arms exports to India thus appears to be a natural corollary to the agreement.

Nuclear Dimension

The nuclear deal is an instrument to take the relation between the peoples of US and India to the next higher level. The key factors influencing US to pursue the deal, despite stiff opposition from various quarters, including the NSG, are:

(a) Does not assist India's nuclear weapon programme.

(b) Supply of civilian grade fuel or reactors does not free up fissile material for military programme.

(c) India has placed two-thirds of its hitherto un-safeguarded reactors under safeguards. This figure will rise as imported and some indigenous reactors, including FBRs, are put under IAEA inspection.

(d) India, despite being a non-signatory to the NPT, has maintained impeccable proliferation credentials.

(e) China and India are likely to be the two biggest energy consumers in the years to come. The provision of nuclear energy will reduce their dependence on hydrocarbons and on regimes whose policies might undermine regional or global security.[16]

Congruence of Interests

Post-9/11, the US started seeing certain congruence of interests with India, which through most of the preceding decade, has been facing 'jehadi' terrorism. Though Pakistan was still needed as a partner to fight terrorism, inspite of US disillusionment with it for being a major supporter and sustainer of the Taliban, it soon realised that its wider Asian interest demanded much sounder ties with a strong, stable and democratic India. Hence, the Indo-US nuclear deal, pointedly excluding Pakistan, is a long-delayed step towards the de-hyphenation of India and Pakistan.

Technology Cooperation

The National Intelligence Council (NIC) of the US, in its forecast for 2020[17], highlighted that the next revolution in high technology, involving convergence of nano-, bio-, information and materials technologies, could see China and India emerging as major 'knowledge powers'. The US, while still being the front-runner, may have to increasingly compete with Asia to hold on to its technological edge. Since the future currency of power will be knowledge, the US does not want to forgo the knowledge advantage to China. To this end, the US has taken the initiative to collaborate with India in high technology, while enlisting the latter's support in terms of knowledge generation.

Maritime Co-operation

Ever since the March 2006 deal, the two countries have been strengthening cooperation in the Indian Ocean Region (IOR), through the proposed Indo-US Maritime Cooperation Framework (MCF). The MCF can be deemed as another step in bolstering the bilateral engagement. The two share interest in securing the vital sea lanes of the Indian Ocean, in fighting terrorism and creating a stable Asia. For the US, India is a valuable choice as a regional power as it has the largest Navy in the IOR.

GAINS FOR INDIA

The Indo-US Nuclear deal unbinds India from nuclear isolation and technology denial regimes imposed in the aftermath of the Pokhran tests of 1974 and 1998. The deal will end more than thirty years freeze on sale of nuclear fuel and reactors by US to India. The 'nuclear' positives that flow out of the Agreement for India are summarized below:

(a) In exchange for increasing safeguarded nuclear plants from 19 to 65 percent, India gets international cooperation in civil nuclear energy, hitherto denied by virtue of it being a non-signatory to the NPT. It is assured of uninterrupted fuel supply for the safeguarded reactors. India retains 35 percent of its reactors for pursuing her strategic nuclear programme.

(b) In the face of decades of technology embargoes, the three-stage programme of DAE faces an uncertain future. The PHWR programme is constrained due to limited availability of fuel (natural uranium) and advanced technology. Further, the operational and commercial viability of the FBRs and Advanced Heavy Water Reactor (AHWR) programmes is yet to be established.

(c) India faces shortages of natural uranium to fuel even the PHWRs currently under construction. Dr. Anil Kakodkar[18], in an interview to *Indian Express* published on 06 February, 2006 publicly admitted that Indian uranium resources[19] cannot support the projected nuclear pursuit in the first stage of the three-stage plan alongside the strategic needs of India.[20] In the absence of the deal, the scaling up of nuclear energy production both from the point of technology (latest) and fuel, would be doubtful. This in turn may affect India's economic growth.

(d) Though the DAE has been successful on the strategic front, its record in power production has been far from satisfactory. It needs both technology

and finances to rectify this deficit. The Deal is, therefore, essential to invigorate the nuclear power sector into making a genuine contribution to the Indian economy.

(e) In the coming years, the fast growing economies of both China and India would be required to cut back on emission of greenhouse gases and, therefore, on use of coal for power production. Nuclear energy, considered environmentally 'cleaner,' is a good substitute.

(f) The J18 recognises India as a de facto, if not de jure, 'nuclear state'.

(g) India, at the invitation of the US, joined the billion dollar Future Gen Project, on 2 March 2006 aimed at creating the world's first zero emission fossil fuel plant.

(h) India has retained the sovereign right to decide the future facilities/ reactors to be placed under safeguards.

Conclusion

The Indo-US Civil Nuclear Agreement needs to be seen against the larger backdrop of the long-term strategic engagement of India by the US. It places India in the role of a primary power in South as well as Central Asia. It is designed to provide the impetus to greater US-India interaction in the fields of trade, commerce, nuclear energy, agriculture, manufacturing, civil aviation, military hardware, information and bio-technology amongst others. The challenge to Indian foreign policy is to extract the maximum benefits from the cooperation with US, without compromising on strategic independence.

CHAPTER III

JOINT STATEMENT OF 18 JULY (J18), THE HYDE ACT AND 123 AGREEMENT

Prelude to Hyde Act

The J18 and the March 2006 Separation Plan provided a framework, as well as principles, for nuclear cooperation between the US and India. However, from the process of implementation, the US government created an impression that it did not consider these to be sacrosanct. The US House Committee on International Relations and Senate Committee on Foreign Relations, held a series of hearings and consultations with respect to two similar bills, HR 4974 and S2429, introduced in the Congress to authorise the President to waive the application of certain requirements under the Atomic Energy Act of 1954 to India. These Committees, under pressure from different lobby groups, made attempts to substantially change the underlying spirit of nuclear cooperation, by adding new and unilateral strings (additionalities) to the Bills. Though some of these additionalities were eliminated at the pre-legislation stage, some continued to remain in both the binding and non-binding parts of the bills. In fact, the changes in the bills caused so much consternation in India that it forced the Prime Minister, Dr Manmohan Singh, to assert that, "We will not accept any conditions that go beyond the parameters of the July 18, 2005, Joint Statement and the March 2, 2006, Separation Plan, agreed to between India and the United States."[21] These bills, upon being passed by both the chambers of the US Congress and signed by President Bush on 18 December 2006 became public law "The Henry J. Hyde United States-India Peaceful Atomic Energy Cooperation Act". This Act formed the basis for the formulation of the recently finalised text of the 123 Agreement (Appendix 'C'), which codifies the Indo-US Nuclear Deal and is yet to be signed (as on 24 September 2007).

The major areas of concern in the Hyde Act related to cessation of fissile material production, testing, right of return, safeguards, fuel assurances, right to reprocess spent fuel and access to sensitive nuclear technologies (SNT)[22]. However, the US asked India "not to rock the boat" as the "provision of Section 123 of the

Atomic Energy Act of 1954, which formed part of the Hyde Act (Section 103), would be applicable in the form these were worked out in the 123 Agreement (or bilateral) between the US and India and would profile the operative part of the Indo-US civil nuclear cooperation." After signing the Hyde Act, President George W. Bush in reference to some controversial portions of Sections 103, 104 and 109 stated "The executive branch shall construe such policy statement as advisory."[23]

India tried to resolve some of its major apprehensions with respect to the Hyde Act while concluding the text of the 123 Agreements. Some of the prescriptions in the Act, which India sought to negotiate and bring in consonance with the J18 and the Separation Plan, while finalising the "operative" part of the deal, are discussed in the succeeding paragraphs.

AREAS OF DIVERGENCE

Curtailment of Fissile Material Production

The J18 included an assurance that India would work with the US for 'the conclusion of a multilateral Fissile Material Cut-off Treaty' (FMCT). Realising that conclusion of FMCT would take some time, a section of the US non-proliferation community pressurised the Administration to make "cessation of India's fissile material production" as one of the conditions for the agreement. Echoing this sentiment, the House Committee distorted the Indian PM's commitment and explained that in the J18 "... India committed to taking on the 'same responsibilities and practices and acquire the same benefits and advantages as other leading countries with advanced nuclear technology, such as the United States'. It is, therefore, imperative that India take steps soon to halt the production of fissile material for weapons, as four out of the five nuclear weapon states have declared to have done so." Appreciating that India cannot do this alone, the Committee urged the US Government "to pursue a moratorium by Pakistan and China, as well as a multilateral treaty, banning the production of fissile material for nuclear weapons." This non-binding Section of the Act alludes to the US policy to cap and eliminate nuclear weapons in South Asia.

The Hyde Act also provides for conclusion and implementation of a "treaty" banning the production of fissile material for nuclear weapons to which both the United States and India become parties (Section 103(b) 2). This is not in consonance with the J18 which committed to "India working with the US for conclusion of FMCT."[24] This was done to 'allow the possibility of a multi-lateral treaty, distinct from universal FMCT,' chances of which fructifying do not appear to be high.

Right to Reprocess and Transfer of Sensitive Nuclear Technologies

There are two issues relating to 'enrichment and reprocessing technology' – one, relating to the transfer of SNT; and second, relating to India's right to reprocess spent imported fuel. In so far as the first issue of export of SNT is concerned, Section 103 (a) (3) of the Hyde Act, in consonance with the US laws on non-proliferation, directs US policy to restrict its export, including to India. It also enjoins the US to work with the NSG in this regard. However, Section 104 (b) (5) seeks India's cooperation with the US to prevent the spread of SNT, indirectly acknowledging the expertise of the former in the field. Notwithstanding the above, it may be noted that Section 104 (d) (4) (B) allows transfer of SNT under three circumstances. First, if the end user is a multinational facility participating in an IAEA approved programme; second, if appropriate measures are in place against illicit diversion of technology; and the third, if the original 123 Agreement specifies such cooperation.[25]

The United States, as a general policy, does not transfer SNT to any nation, even to its closest allies or other nuclear weapon states. The Hyde Act accordingly precludes such transfer which is reflected in Article 5.2 of the Agreement. The Indian side, appreciating the constraint, agreed for transfer of SNT equipment only after an amendment to the Agreement. India will, however, need to convince the NSG to allow it to source components for its safeguarded reprocessing activities from the member countries. It, however, needs to be remembered that India is an exporter of heavy water and has been reprocessing for four decades.

The second issue involves India's right to reprocess spent fuel irradiated in its reactors. This is most vital for sustenance of the three-stage Indian nuclear programme. The Hyde Act does not provide for waiver of Article 123 (a) (7) of the Atomic Energy Act, 1954, that prohibits this modality, unless separately negotiated, as has been done in the case of Japan and Euratom.[26] Therefore, to resolve the impasse and gain rights to re-process safeguarded spent fuel, India offered to build a new, state-of-the-art reprocessing facility to be placed under IAEA safeguards. This addressed the major concern of the non-proliferation lobby and enabled India to secure "upfront" and "in-principle" crucial right to reprocess spent fuel. The consent to reprocess will kick in only after the dedicated facility is set up and the two sides agree on the arrangements and procedures as required vide Section 131 of the Atomic Energy Act. Section 6 (iii) of the 123 Agreement provides for reprocessing and specifies that consultations will begin within six months of the notice to be given by either side and conclude within twelve months, post-setting up of the dedicated facility. The time frames have been specified to

preclude Tarapur type of a situation from developing. It is, however, relevant to note that US *holds the veto* for future reprocessing as the Agreement is silent on fall back arrangements in a "no agreement" situation.[27] However, agreement on reprocessing of fuel would not only enhance fuel utilisation, but also ameliorate problems relating to waste management-a major concern in the ongoing renaissance in nuclear energy. Grant of right to reprocess would ensure that the future Indian FBRs, in fact, the civilian fuel cycle, comes under safeguards[28] and would, therefore, be in the interest of the US and the international non-proliferation community.

Safeguards in Perpetuity and Fuel Supply Assurances

Section 105(3) of the Hyde Act requires India to sign "Safeguards Agreement" in perpetuity with the IAEA but does not commit US to supply nuclear fuel and equipment in perpetuity, i.e. for the lifespan of nuclear reactors.[29] Infact, the Act requires the US administration to ensure that India does not have more fuel than is necessary for the operation of its safeguarded reactors and that, apart from the US, there is no other source for fuel to India.

The above provisions of the Hyde Act do not conform to either the J18 or the Indo-US Nuclear Deal. It is highlighted that the Separation Plan presented in the Parliament of India on 7 March 2006, and in greater detail on 11 May 2006[30] provide for safeguards in perpetuity but, importantly, link it to the assurance of fuel supply reserve. A fuel supply reserve, in fact, was a bargain for India's acceptance of safeguards in perpetuity, replacing voluntary safeguards agreed to in the J18.

After its bitter experience with Tarapur, India insisted on getting iron-clad guarantees on fuel supplies. It successfully got them written into the 123 Agreement. Sections 2.2 (e), 4.1, 5.6, 14.5, and 14.8 deal with various dimensions of fuel supply guarantees. They fully commit the US to help India develop a "strategic reserve" of nuclear fuel for the entire lifetime of the reactors and "create conditions" for India's "assured and full access" to the international fuel market. It also ensures that the US commitment to facilitate fuel supplies is absolute and is not defined by the circumstances of the termination of the bilateral agreement. Section 5.6 (b) (iv) of the 123 Agreement states: "If despite these arrangements, a disruption of fuel supplies to India occurs, the United States and India would jointly convene a group of friendly supplier countries to include countries such as Russia, France and the United Kingdom to pursue such measures as would restore fuel supply to India." Under an extreme contingency, India will also have the right for "corrective measures" under Article 5.6 (c) if all these fail. Such multi-layered redundancy in a bilateral agreement is unprecedented in many ways.[31]

Further, unlike the non-binding provisions of the Hyde Act, the 123 Agreement (Articles 5.6 and 14.8) does not place any restrictions on India sourcing fuel for US reactors from other countries.

Nuclear Testing

The most contentious stipulation in the Atomic Energy Act of 1954 and the Hyde Act is regarding the 'termination of the agreement in case India conducts a nuclear test after the date of enactment of this act.' The officials of the Administration also repeated this idea during their testimonies before the Congressional Committees. In India, analysts find a gap between a unilateral Indian commitment for a test moratorium and the legal obligations under the Act. In an unstable neighbourhood and an uncertain strategic environment, it is unrealistic to expect India to continue its nuclear moratorium where other nuclear weapon countries conduct tests.[32]

The US is bound to the above requirement by law. However, the genuine Indian concern regarding testing has been addressed under the 123 Agreement wherein India implicitly retains its right to test. In the eventuality of an Indian test, the US law demands a suspension of nuclear cooperation. Article 14.2 of the 123 Agreement precludes such cessation from being 'immediate or automatic'. It provides for bilateral consultations and commits the two sides "to take into account whether the circumstances that may lead to termination or cessation resulted from a party's serious concern about a changed security environment or as a response to similar actions by other states which could impact its national security".[33] Put in another way, India reserves the right to test if other countries do the same.

Presidential Reporting to Congress

The Hyde Act, Section 104 (g) (2), requires the President to submit to Congress an annual report with respect to India's nuclear activities. Though non-binding, such reporting has the potential of being intrusive as it requires the President determining and keeping "the appropriate congressional committees fully and currently informed of the fact and implications of any significant nuclear activities of India", including the fissile material produced and the production of nuclear weapons by India. It also demands annual estimates about the amount of uranium mined and milled in India, the amount of uranium used or allocated for the production of nuclear explosive devices, and the rate of production of both fissile material and nuclear explosive devices.[34] As India has not made its weapon or fissile materials stockpile public, this requirement could lead to increased US espionage – an apprehension which appears quite valid. This may adversely affect

not only the nuclear cooperation but also the overall relationship which both the countries proclaim is being taken to new heights.[35]

The US President is also required to report on a variety of issues which have a bearing on India's policy such as participation and formal declaration of support for Proliferation Security Initiative (PSI) including the policy of interdiction of vessels in international waters [Section 104g (2) K], even though this is not in consonance with extant international laws.

Foreign Policy Autonomy

Specifically on Iran, the Indian policy is based on three principles: opposition to the emergence of any more nuclear weapon states, especially in India's neighbourhood; opposition to acquisition of nuclear weapons capability through clandestine means; and the need for transparency in compliance to international treaties and instruments. The non-binding Section 3 (b) (4) of the Hyde Act, however, demands securing "India's full and active participation… to dissuade, isolate, and if necessary, sanction and contain Iran for its efforts to acquire weapons of mass destruction, including a nuclear weapon capability (including the capability to enrich or process nuclear materials) and the means to deliver weapons of mass destruction." This clearly amounts to imposing a condition, not contained in J18, on India.[36]

Transparent and Defensible Separation Plan

Amplifying the Indian position on 'Separation Plan', based on J18, Prime Minister Manmohan Singh reiterated on the floor of Parliament, "The Joint Statement refers to our identifying, and separating civilian and military nuclear facilities in a phased manner and taking a decision to place voluntarily civilian nuclear facilities under IAEA safeguards. India will never accept discrimination." However, the US administration attached conditions: the separation must be "credible and defensibl from a non-proliferation standpoint to us and to our international friends and partners".[37] In his statement to Senate Foreign Relations Committee, Robert Joseph said, "…we would not view a voluntary offer arrangement as defensible from a non-proliferation standpoint or consistent with the joint statement, and therefore do not believe that it would constitute an acceptable safeguards arrangement."[38]

A 'comprehensive enough' split was the early modification. This seemed to echo the concerns of the non-proliferation lobbyists, who had demanded the maximum number of the Indian nuclear facilities, including upstream and downstream facilities, under safeguards. The US Administration thus made official

the desire of the non-proliferation analysts. Rice informed Congressmen, "in the negotiating process, we sought a credible, transparent and defensible separation plan as well as safeguards in perpetuity on its present and future civil nuclear facilities."[39]

Global Nuclear Energy Partnership

In the J18, the US had committed that it would consult its partners to allow India's participation in 'International Thermonuclear Experimental Reactor (ITER).' However, in April 2006, to a question raised during a Congressional hearing, Secretary Rice rationalised the denial of India's full participation in the Global Nuclear Energy Partnership (GNEP): "US negotiators told India that India's decision not to designate its fast breeder reactors and associated fuel cycle research and development facilities as civil and place those facilities under IAEA safeguards would preclude our ability to collaborate on issues related to the fast burner reactors contemplated under GNEP at this time."[40] The US ambassador to India reiterated the position and informed that India would have to put at least one reactor to become a full-fledged member.[41] This is a departure from the J18.

INDIAN RESPONSE AND THE US APPROACH

India demonstrated a mixed approach of firmness, combined with flexibility, on the deviations from J18. Apart from the Iranian issue, it demonstrated flexibility on reciprocity, and submitted its plan of separation before the US government acted. The Indian government clearly mentioned that 'credible' approach was one of the factors for separation. Demonstrating its flexibility, it placed a large number of reactors under safeguards, seemingly fulfilling the demand of the US Administration. The Indian government also accepted safeguards in perpetuity, but only after getting adequate 'assurance' from the US Administration for 'full access to the international fuel market, including reliable, uninterrupted and continual access to fuel supplies from firms in several nations.' Also, in the US, the non-proliferation groups, opposing the deal, had dragged CIRUS and the FBRs to the centre of the debate. Curiously, the Indian government decided to shut down the CIRUS reactor in 2010. The Indian government took the decision even though scientists and analysts had provided incontrovertible arguments against the allegation of the US non-proliferation lobby. India also took the decision to move the fuel core of the Apsara reactor out of the current pool situated in BARC and place it under safeguards in 2010. Although the Indian government chose to safeguard all future civilian thermal power reactors and civilian breeder reactors, it still kept the right to decide any reactor as civilian with itself. Similarly, the Indian government did show firmness on current PFBR and placed it outside the inspection regime. The Indian Prime Minister indicated that the dismantling of restrictive

regimes required 'complex and sensitive' negotiations resulting from 'contradictory pulls and pressures'. He stated that even a deviant non-binding provision violated the letter and the spirit of J18 and may bring in an element of uncertainty; therefore, it will not be acceptable to India. He was emphatic on the Presidential annual report and certification when he said, "…the effect of such certification will be to diminish a permanent waiver authority into an annual one." The Indian Prime Minister rejected a moratorium on the production of fissile material. [42]

CHAPTER IV

INDO-US CIVIL NUCLEAR DEAL – ANALYSIS OF STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

"*No other country, other than US, can bring about a change in the international regime to accommodate India*".

Ronen Sen, Ambassador of India to US

Preamble

The Indo-US Civil Nuclear deal is seen as the most significant development giving implicit recognition to India's nuclear weapon status and a possible opening up of opportunities for it to become a global player in the field of nuclear energy. It underscores the fact that in a world facing severe energy crisis, with escalating oil prices and rampant environmental pollution, it is illogical to deny clean fuel to India, which though a non-signatory to the NPT, has not violated any of its legal commitment. However, some view this deal as an attempt by US to create a new global balance of power in order to counter rising China. Others feel that the deal is a discrimination in favour of India which would set an indefensible precedent to curb the nuclear programmes of countries like Iran and North Korea. In India, there are apprehensions that the country would have to surrender some of its sovereign rights in order to receive nuclear reactors and fuel from abroad. Some of

the reservations are not essentially true. To understand what the deal means to India, an analysis with respect to its 'strengths and weaknesses', alongside the 'opportunities and threats', may not be out of place. An examination, from an Indian perspective, of the various issues involved is covered in the succeeding paragraphs.

STRENGTHS

Right to Test and Right of Return

India has not given up its 'right to test'. There is no explicit reference to nuclear testing in the 123 Agreement. Under Secretary of State, Nicholas Burns confirmed that "while India retains her sovereign right to test, the US retains its legal rights (right to return) as well".[43] US law demands suspension of nuclear cooperation in the event of an Indian test. To minimise the impact of this law, the 123 Agreement (Article 14.2), in the event of an Indian test, provides for bilateral consultations wherein 'changed security environment due to similar actions by other states' would be taken into account. The US legal 'right to return' is closely linked to Indian testing. However, clauses such as prompt compensation "for the fair market value of the items and materials it takes back", "importance of uninterrupted operation of nuclear reactors", "potential consequences on the on-going contracts and projects (Article 14.5)", "full safety, radiological and physical protection measures" prior removal (Article 14.6), India's right for assured fuel supplies from the international community (Article 14.8) etc. make exercising of the 'right to return' difficult.

Fuel Supply Assurances

Secure fuel supply guarantees have been built into the 123 Agreement. Sections 2.2 (e), 4.1, 5.6, 14.5, and 14.8 of the agreement commit the US to the development of a "nuclear fuel strategic reserve" for the entire lifetime of the reactors. The US has given a firm undertaking with respect to assured and uninterrupted fuel supplies, with many layers of redundancy.

Right to Reprocess Spent-Fuel

Article 6 of the Agreement affords the right to reprocess Spent-Fuel — a key element of India's three-stage civilian nuclear programme. This right comes into effect after India builds a state-of-the-art reprocessing facility and places it under IAEA safeguards. Once ready, the two sides will begin consultations on the 'arrangements and procedures' for reprocessing within six months and complete them in one year. Obtaining consent to reprocess and defining credible procedures

upfront, is an important breakthrough, as it is crucial for the operation of future FBRs to be placed under safeguards.

India's Strategic and Three-Stage Nuclear Programme

For the first time, the international community, led by the US has accepted India having its cake and eating it too. India stays out of the NPT, keeps its weapons, refuses FSS, and yet gets to conduct nuclear commerce, in a system that is dead against such a formulation. That's the bottom-line of the deal.

Article 2.4 specifically commits that 123 Agreement "will be implemented in a manner so as not to hinder or otherwise interfere with any other activities" involving material and technology, for either military or civilian use, which have been acquired "independent of this agreement". By securing reprocessing rights upfront, drawing up a judicious Separation Plan and keeping the PFBR out of safeguards, dilution to the three-stage Indian nuclear programme has been precluded. The Agreement, in the short run i.e. till FMCT is ratified, allows India to produce fissile material as required for its current and future strategic needs.

Foreign Policy Autonomy

The Prime Minister, in a *suo motu* statement on the floor of the parliament on 13 August 2007, stated that "There is no question that we will ever compromise, in any manner, our independent foreign policy. We shall retain our strategic autonomy and the agreement does not in any way impact on India's ability to produce and utilise fissile material for its current and future strategic use." It may be noted that other than the non-binding provisions of the Hyde Act, there is no reference to Iran or other foreign policy issues in the 123 Agreement. India post-independence followed an independent foreign policy, even though it was economically and militarily weak. This is unlikely to change given the present standing of the country.

The Principle of Reciprocity

The Prime Minister in his statement in the Parliament on 13 August 2007 stated "The principle of reciprocity, which was integral to the July 2005 Statement, has been fully safeguarded in this Agreement. …… Further acceptance would commence only when all international restrictions on nuclear trade with India have been lifted. India will not take any irreversible steps with the IAEA prior to this." This ensures that Indian commitments and nuclear cooperation come into effect concurrently.

Objectionable Portions of Hyde Act

Along with the Hyde Act, President Bush also signed the "Presidential Signing Statement". In this, he stated, "Section 103 of the (Hyde) Act purports to establish US policy with respect to various international affairs matters. My approval of the Act does not constitute my adoption of the statements of policy as US foreign policy… The executive branch shall construe such policy statements as advisory. Also … the executive branch shall construe Section 104(d)(2) of the Act as advisory … (and) shall construe provisions of the Act such as Sections 104 and 109 in a manner consistent with the President's Constitutional authority to protect and control information that could impair foreign relations." [44] The prescriptions in Sections 103 and 104 of the Hyde Act are called "Statements of Policy". These are not binding in the Act and are regarded as 'advisory'. They are not applicable to any Act that is signed into a law in the US.[45]

WEAKNESSES

Test Ban

Section 106 of Hyde Act bans Indian testing. Though the 123 Agreement does not legally bind India to a test ban, it reinforces this through applicability of national laws and incorporation of the US' "right of return".[46] However, the 'right to return' would be difficult to implement.

Termination

US, under the 123 Agreement, has the right to cease cooperation, not only in response to an Indian test, but also if India falls short of the "full compliance" of the Hyde Act. The termination of the agreement is to be effective at the end of one-year notice and requires the "party giving notice of termination" to provide reasons for the same. However, in light of the one-sided dependency, the agreement has the potential to bind India to certain non-proliferation conditions in the Hyde Act which, presently, are considered "non-binding". [47] Should cooperation end, India only loses something it never had.

Non–enforceable Obligations

Obligations such as "concerned party would undertake consultations with the other party" are not effective. Consultations may not lead to mutually satisfactory solution, and in essence are toothless and, in any event, subsidiary to US laws, as India has no law governing nuclear cooperation. The agreement, therefore, gives India little say. However, inclusion of "consultation" and "one year notice period" are aimed at ameliorating the situation.

Permanent Safeguards and Fuel Supplies

India's obligation with respect to international inspections of its nuclear facilities under safeguards is permanent while the US can terminate cooperation and withdraw from all liabilities. The assurances of uninterrupted fuel supply appear to cover only disruption due to market failure, or technical, or logistical difficulties, but not sanctions arising from India's non-compliance with non-proliferation conditions. However, the requirement of ensuring uninterrupted operation of reactors implies that the US can take back the fuel, supplied by it, only after India has made alternate arrangements to replace it.[48]

Reprocessing Rights

US, under the 123 Agreement, has the right to unilaterally suspend reprocessing-related "arrangements and procedures" it intends to work out with India, once the new reprocessing facility under IAEA safeguards is ready. National Security Adviser, M.K. Narayanan, has already warned that "spoilers" may nit-pick on the facility's design and cause delays.[49] *Asian Age*, 4 August 2007. Therefore, though granted upfront, the right to reprocess is only "in principle" and US retains the right to veto Indian reprocessing.

Full Civil Nuclear Technology

SNT facilities and critical components of such facilities, can only be transferred pursuant to an amendment to the Agreement. Transfer of related dual-use items remains subject to laws, regulations and license policies of the respective countries. India has accepted this restrictive cooperation as it itself reprocesses spent fuel and is an exporter of heavy water which is produced at six plants.

Fall-back Safeguards

In addition to ensuring IAEA inspections on all aspects of India's civilian nuclear programme, the US had staked an unparalleled double prerogative: the right to statutorily establish its own end-use monitoring, as called for in the Hyde Act Section 104(d)(5)(B)(i); and the right to institute "fallback safeguards". Article 10(4) of the agreement reads, "If the IAEA decides that the application of IAEA safeguards is no longer possible, the supplier and recipient should consult and agree on appropriate verification measures." This provision does not rule out the spectre of US inspectors visiting safeguarded Indian nuclear sites for monitoring. The NSA indicated that this constraint could be addressed, including by providing funding to IAEA to undertake inspections.[50]

Foreign Policy

The Hyde Act requires the US to secure India's full and active participation in US efforts to sanction and contain Iran. Nicholas Burns clarified that the 123 Agreement was a technical document and, therefore, contained no reference to Iran. He, however, added that the US expected India to follow its policy on Iran and that he was hopeful that India would not enter into any long-term gas and energy arrangements with Iran[51]. As already highlighted above, this provision of the Hyde Act is advisory in nature. In any case, India has always followed an independent foreign policy, and continuation of the same has repeatedly been affirmed by the Prime Minister in the parliament.

Fissile Material Production

The Hyde Act calls for China, India and Pakistan to cease production of all fissile material and work with US for early conclusion and implementation of FMCT. The act also requires the US President to "encourage India" to identify a date by which it would stop production of fissile material for nuclear weapons. These aspects have been covered by the "Presidential Signing Statement", which has termed the relevant Sections of the Hyde Act as advisories.

Applicability of Domestic Laws

Unlike America's 123 Agreements with other states, this 123 Agreement does not uphold the core principle of international law, namely, that failure to perform a treaty or agreement cannot be justified by invoking provisions of a domestic law. Rather, this agreement is unambiguously anchored in the supremacy of national laws and regulations. That is why even Article 15 of the Agreement, "Settlement of Disputes", is toothless, making no reference to the applicability of the principles of international law.

OPPORTUNITIES

Ending Nuclear Apartheid

The 123 Agreement with the US is the key to opening the door for India's civil nuclear interaction with Russia, France, Germany and other nations and to liberate India from the global technology apartheid.[52] These countries are keen on India completing the process of integration and becoming part of the wider non-proliferation regime and playing the role of the balancer of power in Asia. Since US was the originator, and has laws to enforce the apartheid, it alone can take steps to dismantle the 'nuclear apartheid'. The first step in this direction is the 123 Agreement.

Economic Benefits to India

There is an urgent need for capital in India for development of infrastructure and manufacturing base. The only source to get it is from the US, Japan and Europe. US and Europe, at this moment are investing in China, and receiving consumer goods, in return. The high-end capital goods manufacturing technologies[53], together with auto-parts, pharmaceuticals and computer hardware could herald India into the big league within the next ten years. Manufacture of commercial aircraft, ships, giant power plants, steel plant components etc. could ultimately be shared with India, which will have a workforce sufficiently skilled to undertake all the foregoing. It will be beneficial to US as labour costs in India will always remain a third of US and European costs.

Opportunity of the KPO (Knowledge Process Off-shoring) is knocking at India's door. Indian graduates of Science and Engineering could play a major role in dominating this emerging field to the benefit of the country.

Political Benefits to India

With western economies in the future, tied more and more with that of India, the latter's clout will increase. There would be frequent inter-government exchanges on matters of mutual interest. India could become a full member of the influential select groups, like the G8. The deal signals the arrival of India in the global grid of relevant powers. It, in fact, dumps the past and unlocks the hidden potential of the future.

Technological Leapfrog

The immediate benefit of the deal would be in getting the latest technology for nuclear power generation. Current progress in India on building its own nuclear power plants is less than satisfactory. Most of the nuclear power plants in India are of design and capacities long discarded by advanced countries. The Indian DAE clings to the view that FBRs, whose technology is yet to be proven on commercial scale, will allow India to bridge the nuclear gap in the future. That future, difficult as it seems, may also be too distant under the technology denial regimes. This will hold economic development as hostage.

The deal not only opens up trade in nuclear technology and materials with India, but more importantly, in a wide range of high-technology areas that are potentially dual-use — from IT to defence to space to biotech. The deal would lift restrictions on supply of dual-use technology items to India from all nations.

Natural Uranium Availability

The quantity of natural uranium in India is inadequate to support even the PHWRs, currently under construction. Dr. Anil Kakodkar, Chairman, AECI, admitted to this constraint in an interview to *Indian Express* in early February 2006. Similar sentiments were expressed by Kirit Parikh, Member Planning Commission, while speaking at the "power seminar" in Kolkata to observe Rajiv Gandhi Akshay Urja Diwas. He observed that "The current nuclear power capacity in India is restricted. Unless a source of uranium supply is opened up for India, by 2032 installed capacity will grow to only 48,000 MW from the current 4,000 MW. We need uranium to develop more nuclear-based power plants and the 123 Agreement will help".[54] Without the deal it will be difficult to source uranium from abroad. Therefore, the deal is vital for scaling up the production of nuclear energy and maintaining the high growth.

Increased Nuclear Weapons Material

A report by the International Panel on Fissile Materials (an independent group of nuclear experts from 15 countries) has concluded that the US-India deal will increase availability of uranium to India thereby allowing it to significantly increase its stock of nuclear weapons materials. Pakistan has already expressed its fears about the deal and warned of increasing its own stock of nuclear weapons material.[55]

Strategic Gains

Strategically, India benefits immensely from this deal. First and foremost, is the de facto recognition of India as a nuclear power. Second, is the implicit strength it imparts to the claim of India to permanent membership of the UN Security Council, as and when such reforms are undertaken.

Further, India has to take note of the emergence of China as an economic, technological and military power in Asia. China has already created a surrogate threat to India through its proliferation of nuclear and missile technologies to Pakistan to keep India fully deterred. This may have unacceptable consequences on India's foreign policy. The deal will enable India to emerge as a regional power in South Asia and pursue independent policies, as dictated by its national interests.

Military Benefits to India

India has been sourcing its military hardware from Russia, which has proved to be a very reliable source over the past 40 years. In light of the Russian technology lagging behind that of the West, and to preclude putting "all eggs in the same

basket", the sourcing has to be diversified. Though indigenous production of military hardware remains a long-term goal, in the short-term the way ahead for India is to buy immediate needs and import technologies to develop weapon systems in-house. It may be expensive upfront, but would eventually pay rich dividends as India joins the select group of exporters of military hardware.

Energy

India is on the high trajectory growth path. Energy deficiency and infrastructure are the only factors which have the potential to dampen this growth rate. The clearest implication of the deal is in India's energy sector, which has lagged behind all other infrastructure areas, and is about the dirtiest. At present, the total electric power generation in India is 124 GW. By 2020, if India adds 20GW of new nuclear capacity, it would save 145 million tons of CO_2 per year. Put simply, it means enhanced availability of clean energy.

The enhanced availability of uranium, and increase in population of PHWRs and imported LWRs, under safeguards, as a result of the deal, will improve availability of plutonium. This will hasten India's advance towards the second and third-stages of its nuclear programme, which has tremendous potential to meet India's emerging energy requirements.

US-India Relationship

There is growing closeness between Russia and China. Russia's oil-and-gas revenue based resurgence, and China's export-driven rise, are important events that need to be watched carefully. Russia is not as warm towards India as in the past, while China has expressed reservations about the increased cooperation between US, Japan, Australia and India. The nuclear deal and better ties with US will, under the circumstances, stand India in good stead. However, the improvement in relations with US should be managed without affecting the improving relations with China, which along with the US, is India's largest trading partner.[56]

THREATS

Right to Reprocess

There is some apprehension that the 'right to reprocess', granted upfront, may not actually fructify. This will severely affect the three-stage fuel cycle. However, it is well known that the thorium fuel cycle is actually inefficient and

expensive, and exists simply because India does not have sufficient uranium. Therefore, even a guaranteed uranium fuel, may actually enable India to generate power more economically.[57]

Early Conclusion of FMCT

India reportedly does not have adequate fissile material for its strategic programme based on "minimum credible deterrent". Actively working with US on FMCT is one of the conditions of J18. Four of the five nuclear states have already stopped production of fissile material, China being the lone exception. A general consensus appears to be building towards commencing negotiations on FMCT. Early conclusion will severely affect the strategic programme of India. Experts, however, opine that FMCT is unlikely to be concluded in the near future.

Presidential Signing Statement

Sections 103, 104 and 109 of the Hyde Act have been construed 'advisory'. Hypothetically, if a future President were to consider otherwise, there could be serious implications for India with respect to foreign policy, strategic nuclear programme etc.

NSG Exemption

The 123 Agreement does not change the requirement of the Hyde Act that the NSG exemption for India be "made by consensus" and be consistent with the rules framed by the US. The legislation requires the administration to ensure that the NSG exemption for India is no less stringent than the US exemption. Certain provision such as 'right to return', if insisted upon by NSG, could jeopardise the deal.

Political Opposition in India

All non-UPA[58] political outfits and parties are opposed to the deal for various reasons. In case the deals falls through, the image of India will be seriously impacted. Some of the immediate fall-outs are summarized below:

(a) Credibility of the country will be severely affected.

(b) It will be a diplomatic disaster with long-term implications especially with respect to UN Security Council ambitions, leadership in WTO, standing in global enterprise, providing solutions in Africa etc.

(c) India's hopes of becoming a significant power will crash. Dishonouring a deal of this size will put a serious question mark against India's desire to be part of the big league.

(d) China has started taking Indian moves seriously only since the deal was born. It is no secret that Beijing wants this deal killed.

(e) Technology denial regime, spread across many sectors of knowledge economy, from IT to defence, space, pharmaceuticals, clean energy, biotech will continue to stymie India's growth.

(f) Building nuclear plants for power generation will be harder. This will become crucial as India is called upon to meet deadlines for cutting emissions.

(g) Faith of investors may affect inflow of FDI into India.

(h) India's efforts towards increasing energy production would suffer a setback.

Summing Up

An analysis of the pros and cons of the deal clearly point towards the overwhelming advantages that accrue from operationalising the nuclear deal. Most negatives of the deal, such as the Presidential Assessment, cessation of production of fissile material in South Asia, effect on Indian foreign policy etc. emanate from 'advisories' contained in the Hyde Act and are unlikely to be brought into effect. Some others like denial of SNTs and Fall-back Safeguards are negotiable and, in any case, not crucial. "Right to reprocess" has been agreed to upfront, and given its importance in waste management and for securing safeguards for future Indian reactors, should normally be acceded to, as and when the Indian facility for reprocessing is ready. "Permanent Safeguards" is the quid pro quo for fuel supply guarantees.

The deal will result in massive flows of FDI in nuclear reactors, high-end technologies relating to space, IT, bio-technology etc. which in turn would generate close interdependence between India and advanced countries. This, along with diplomacy, will play an important role to limit the impact of some of the grey provisions in the agreement.

From the above it can be surmised that the Indo-US nuclear deal announces the arrival of India in the big league and is overwhelmingly in its interest. There are immense gains from the deal: energy security, clean energy, access to high-end technologies, sharing of the high table with the nuclear powers and acquiring enhanced standing in the world, and many more.

CHAPTER V

CONCLUSION

"The Indo-US Nuclear Deal has turned an area characterised by decades of discord into an area that can be showcased as the new cooperative phase of bilateral relations. It has become a powerful symbol of what we can do although in actual terms it forms a tiny part of the multifaceted engagement the two countries share."

Geoffery Pyatt, Deputy Chief of Mission, US Embassy in India *(Hindustan Times*, 20 July 2007)

General

The landmark Indo-US Nuclear Deal is a defining feature of the evolving Indo-US relations. President Bush and Prime Minister Manmohan Singh set the vision for the normalisation of the civil-nuclear relations between US and India in July 2005 and reaffirmed the way forward when the US President visited India in March 2006. Constructive engagement of India in the civil nuclear field is an acknowledgement of it as a rising economic power with substantial energy requirements, and as a "responsible state with advanced nuclear technology." An India-born American analyst has compared the Bush initiative with the 1971 Nixon visit to China while an Indian journalist thinks the deal is the best India could have ever got. Long-term civil nuclear cooperation is the principal basis for growth of cooperation between the two countries in other fields.

Nuclear Benefits

In the past, the option before India was to either have its nuclear weapon programme or accept severe constraints with respect to cooperation in civilian nuclear energy. The deal permits the country to have both. It facilitates India to import technologically superior reactors, as well as uranium for these reactors, which the country needs to meet the growing energy requirements. The enhanced pace of nuclear energy production would also enable the country to advance to the second and third stage of the thorium-based nuclear programme, earlier than planned. Another advantage that accrues from the deal is the recognition of India as a *de facto* nuclear state. The freeing up of domestic uranium, as a result of import, for the strategic programme also stands to the advantage of India. The US interest in the deal lies in the placement of imported and future FBRs under

IAEA inspections, whereby majority of the Indian civil nuclear programme will come under safeguards, meeting US non-proliferation aims.

Economic Advantages

Over the next decade, corporate America is poised to gain nearly US $ 100 billion through sale of nuclear power plants and hitherto embargoed technologies and products to India. On the other hand, the spin-offs for India would include huge FDI inflow and increased trade and transfer of frontier manufacturing technologies, which the local workforce can use as a force multiplier to improve global industrial competitiveness. Cooperation with US will also help India to develop and gain economically from the emerging KPO industry.

Strategic/Military Gains

The deal has the potential, not only to upscale India's credentials as a nuclear state, but also strengthen its claim for permanent membership of the UN Security Council. Strategic partnership with US needs to be viewed in the context of what a US official (Zelikow) noted, "goal is to help India become a major world power in the 21st century," and "we understand fully the implications, including military implications, of that statement." Further, the partnership will enable India to create a space for itself and play its legitimate role in South Asia and beyond. It also provides India access to state-of-the-art weapon systems, enabling it to diversify the sourcing of weapons.

Energy Security

The civil nuclear cooperation has the potential to increase the share of nuclear energy from a mere 4120 MW at present to about 20,000 MW by 2020[59]. This increase will contribute significantly towards India sustaining the growth path, while also contributing toward strengthening of the global effort against climate change.

Drawbacks

Provision for intrusive 'presidential assessment' such as ending production of fissile material in South Asia, dictating Indian foreign policy on Iran, etc., though 'advisories', are irritants with growth potential if not handled skillfully. Denial of SNTs and Fall-back Safeguards appear to be benign provisions at this stage. Though the "right to reprocess" has been granted upfront, US still holds the veto on this issue. Its criticality to the three-stage Indian nuclear programme cannot be overstressed. "Permanent Safeguards" is the price India has to pay for fuel supply guarantees.

China and India 123 Agreements – Comparison

A comparison between the 123 Agreements entered by China and India with US reveals that the Chinese have accepted much tougher conditions than the Indians. The main differences are that while India got fuel supply assurances, China did not; "in principle" reprocessing rights have been granted only to India; China has accepted bilateral inspections by US and Australian inspectors whereas India has not; US has linked extraneous provisions like China's relations with Pakistan, its non-proliferation record and its record on Tibet to the agreement while India has successfully resisted such linkages; but in China's case, US domestic laws do not triumph over international obligations, but they do so in the case of India.[60]

Final Analysis

The Indo-US Civil Nuclear deal offers both gains and disadvantages, as any agreement based on quid pro quo would. The truth is that the deal offers India substantial benefits which outweigh the negatives. This is also underscored by the highly favourable terms, vis-à-vis China, which India has been able to secure from US. The associated losses are in the future, and the extent of those losses will depend on choices India makes in the future. Because of the tangible nuclear and other benefits, the scale is heavily tilted in favour of the deal. On the policy front India is yet to realise the benefits from the deal, such as recognition as a nuclear weapons state. India must, however, take steps to limit foreign policy losses, as some believe happened in the vote on Iran at the IAEA.

Hypothesis

The above comprehensively proves the hypothesis that the "The Indo-US Civil Nuclear Deal is in the overall interest of the country as it not only bolsters India's energy security but also propels the country towards a position of greater strategic advantage in the emerging international geo-political scenario."

References

1 MR Srinivas, "The Indo-US Nuclear Deal" in Nuclear Policy Stewardship Project, Delhi Policy Group ed., The Debate on Indo-US Nuclear Co-operation , Bibliofile South Asia, New Delhi, 2006, pp. 6-7.

2 *The Hindu,* Chennai, 21 September 2006.

3 Indira Gandhi Centre for Atomic Research at Kalapakkam near Chennai.

4 List of organisations to which high/dual-use technology export is barred by law.

5 http://www.wagingpeace.org/articles/2006/11/17_mian_indiadeal.htm, on 28 March, 2007; Zia Mian and M V Ramana, Essay on "The Price Of Power".

6 *India Today,* New Delhi, 27 August 2007.

7 C Raja Mohan, *Impossible Allies - Nuclear India, United States and the Global Order,* New Delhi : India Research Press, 2006, p.140.

8 Zia Mian and M V Ramana, n.5.

9 Rahul Bhonsale "US Strategic Engagement of India: Underlying Theme of the Indo-US Nuclear Agreement" New Delhi : in Rahul Bhonsale, Ved Prakash, KR Gupta eds. *Indo US Civil Nuclear Deal,* New Delhi : Atlantic Publishers & Distributors (P) Ltd, 2007, vol.1, p. 15.

10 MR Srinivas , n.1, pp. 6-7.

11 UN Gupta "US-India 2005 Nuclear Accord" in Rahul Bhonsale, Ved Prakash, KR Gupta eds. *Indo US Civil Nuclear Deal,* New Delhi : Atlantic Publishers & Distributors (P) Ltd, 2007, pp. 4-5.

12 C Raja Mohan, n.7, p. 158.

13 Zia Mian and M V Ramana , n.5.

14 Rahul Bhonsale, n.9, p.19.

15 http://www.state.gov/p/sca/rls/rm/2006/66374.htm, on 04 April, 2007; Richard A. Boucher, The United States and South Asia: An Expanding Agenda *Statement before the House International Relations Committee Subcommittee on Asia and the Pacific*, 17 May 2006.

16 KR Gupta "Indo-US Civil Nuclear Cooperation" in Rahul Bhonsale, Ved Prakash, KR Gupta eds. *Indo US Civil Nuclear Deal,* New Delhi : Atlantic

Publishers & Distributors (P) Ltd, 2007, p.15.

17 http://www.dni.gov/nic/NIC_2020_project.html, on 31 July 2007; Mapping the Global Future (US Government Publication; GPO stock number 041-015-00240-6)

18 Chairman, Indian Atomic Energy Commission

19 Uranium resources in Jaduguda mines are depleting fast whereas DAE is unable to commence mining in Domiasiat in the North-East and Nalgonda in Andhra Pradesh due to local opposition.

20 www.countercurrents.com, on 13 March 2007; Buddhi Kota Subbarao, Indo-US Nuclear Deal – Some Unexplored Angles.

21 Rajiv Nayan, "Indo-US Nuclear Deal: The Bill and Apprehensions" IDSA Occasional Paper Series No 1, November 2006, p. 2.

22 Interview of Dr. Anil Kakodkar which includes enrichment of uranium, reprocessing of spent fuel and production of heavy water.

23 http://www.centralchronicle.com/20070613/1306301.htm, on 23 July 2007; Prof Christopher S Raj, N-Deal: Are Differences Narrowing? (Central Chronicle, Bhopal, 13 June 2007)

24 Rajiv Nayan, n.21, p. 5.

25 http://ipcs.org/IPCS-IssueBrief-No47.pdf., on 04 July, 2007; Manpreet Sethi, Indo-US Civilian Nuclear Cooperation: Reprocessing Issue Reconstructed, Institute of Peace and Conflict Studies, New Delhi, p. 5.

26 ibid

27 *Asian Age*, New Delhi, 4 August 2007.

28 Manpreet Sethi , n.25, p. 5.

29 *The Organiser,* New Delhi, 22 July 2007.

30 Alluded to in the Hyde Act.

31 *Indian Express*, 4 August 2007.

32 US itself is planning to test its new generation nuclear devices for safety and reliability.

33 *Indian Express*, 4 August 2007.

34 *Asian Age*, 7 August 2007.

35 *Hindustan Times,* 18 July 2006.

36 Rajiv Nayan, n.21, p.13-14.

37 www.foreignaffairs.house.gov/archives/109/23323.pdf., on 09 July, 2007; The U.S. and India: An EmergingEntente?, The Committee on International Relations Hearing, Serial No 109-117, p. 24.

38 nucnews.net/nucnews/2005nn/0511nn/051103nn.txt, on 12 July 2007; Robert G Joseph, Remarks in the Hearing on US-India Civil Nuclear Cooperation Initiative, Senate Foreign Relation Committee, 2 November 2005.

39 Committee on International Relations, n.37, p. 55.

40 Rajiv Nayan, n.21, p. 16.

41 *The Hindu,* 30 September 2006.

42 Rajiv Nayan, n.21, p. 19.

43 *The Hindu,* 5 August 2007.

44 *The Organiser*, 22 July 2007.

45 *Times of India*, 19 August 2007.

46 *Asian Age*, 4 August 2007.

47 *Asian Age,* 4 August 2007.

48 *Times of India*, 30 July 2007.

49 *Asian Age,* 4 August 2007.

50 In an interview on 31 July 2007, reported widely in the press.

51 In an interview on 4 August 2007, in Washington reported widely in Indian press.

52 *Times of India*, 19 August 2007.

53 In a clarification by Nicolas Burns with reference to Iranian gas and oil which were not exported to China.

54 *Times of India*, 20 August 2007.

55 http://cnic.jp/english/topics/plutonium/proliferation/usindiafiles/ auso p28jun07.html, on 25 July 2007; Abolition 2000: US-India Working Group, Letter *to Australian opposition on 28 June 2007.*

56 *Times of India*, 19 August 2007.

57 http://www.planetd.org/2006/12/18/the-indo-us-nuclear-deal-a-post-henry-hyde-act-analysis/, on 26 May 2007; The Indo-US Nuclear Deal: A Post-Henry Hyde Act Analysis.

58 United Progressive Alliance, with outside support of Left parties, is currently in power.

59 *Times Of India*, 29 September 2006.

60 *Times of India*, 19 August 2007.

BIBLIOGRAPHY

Books

1. Bhonsale, Rahul. "US Strategic Engagement of India: Underlying Theme of the Indo-US Nuclear Agreement" New Delhi : in Rahul Bhonsale, Ved Prakash, KR Gupta eds. *Indo US Civil Nuclear Deal*, New Delhi : Atlantic Publishers & Distributors (P) Ltd, 2007, p. 15.
2. Gupta, K R. "Indo-US Civil Nuclear Cooperation" in Rahul Bhonsale, Ved Prakash, KR Gupta eds. *Indo US Civil Nuclear Deal*, New Delhi : Atlantic Publishers & Distributors (P) Ltd, 2007, p.15.
3. Gupta, U N. "US-India 2005 Nuclear Accord" in Rahul Bhonsale, Ved Prakash, KR Gupta eds. *Indo US Civil Nuclear Deal*, New Delhi : Atlantic Publishers & Distributors (P) Ltd, 2007, pp 4-5.
4. Mohan, Raja C. *Impossible Allies Nuclear India United States and the Global Order*, New Delhi : India Research Press, 2006, p. 36.
5. Srinivas, M R. "The Indo-US Nuclear Deal" in Nuclear Policy Stewardship Project, Delhi Policy Group ed. *The Debate on Indo-US Nuclear Co-operation*, New Delhi : Bibliofile South Asia, pp. 6-7.

Articles

6. Nayan, Rajiv. "Indo-US Nuclear Deal: The Bill and Apprehensions" IDSA Occasional Paper Series No 1, November 2006, p. 2.

Newspapers

7. Bagchi, Indrani. "End of Nuclear Apartheid Against India " *Times of India,* 4 August 2007, p.12.

8. Bagchi, Indrani. "Left Objections are to Hyde's 'prescriptions" *Times of India*, 19 August 2007, p.15.

9. Bagchi, Indrani. "123 Pact: India Got Better Deal than China" *Times of India*, 19 August 2007, p.17.

10. Bhaskar, C Uday. "Two Cheers to 123 Agreement" *Economic Times*, 24 July 2007.

11. Chaudhuri, Pramit Pal. "Bush kept his promise to India" *Hindustan Times*, 4 August 2007, p.9.

12. Chellaney, Brahma. "Trick and Treat" *Hindustan Times*, 18 July 2006 (http://www.hindustantimes.com/news/181_1746584,00120001.htm) .

13. Chellaney, Brahma. "123: Text and Context" *Asian Age*, 4 August 2007, p.1-2.

14. Iyer, Shekhar and Anand, Anil. "No compromise on foreign policy: PM" *Hindustan Times*, 14 August 2007, p. 9.

15. Gopalkrishanna, A. "Kakodkar, Chidambaram are misrepresenting facts" *Asian Age*, 14 August 2007, p.7.

16. Gupta, O P. " Hyde Act is a Charter of Slavery: Drop it or Hold it on the Back Burner" *The Organiser,* New Delhi, 22 July 2007, p. 5.

17. Kakodkar, A R. "India Makes Breakthrough in Nukes Agenda" *Times Of India* 29 September 2006.

18. Mahajan, Arvind and Kumar, Arun. "Nuclear Energy In India: Not only is it economically viable, it is necessary part of the power mix" *Financial Express*, p. 6.

19. Mohan, C Raja. "India Gains, US Doesn't Lose" *Indian Express*, 4 August 2007, p. 13.

20. Mustafa, Seema. "95% units to be under safeguards in 25 years" *Asian Age*, 4 August 2007, p.1-2.

21. Mustafa, Seema. "Some clauses disturbing: Ex-MEA official" *Asian Age*, 4 August 2007, p.3.

22. Raj, Prof Christopher S. "N-deal: Are differences narrowing?" *Central Chronicle,* Bhopal, 13 June 2007. (http://www.centralchronicle.com/20070613/1306301.htm).

23. Rajghatta, Chidanand. "It's a win-win deal for both countries: Officials" *Times of India,* 4 August 2007, p.12.

24. Sikri, Rajiv. "Will Iran Spoil the Indo-US Party?" *Asian Age*, 4 August 2007, p.7.

25. Subramanian, T S. "India insisted on Refuel for Reactors Lifetime" *The Hindu*, 23 July 2007.

26. Subramanian, T S, and Menon Kesava.. "The Goalpost haven't been shifted and they will not be shifted: David C Mulford" *The Hindu,* 30 September 2006.

27. Subrahmanyam, K. "Calling off Deal will isolate India Globally" *Times of India,* 19 August 2007, p. 17.

28. Subrahmanyam, K. "There is nothing to Fear" *Times of India,* 23 July 2007.

29. Varadrajan, Siddharth. "Fissile Material ban talks inch towards consensus" *The Hindu,* 2 July 2007, p.12.

30. Varadrajan, Siddharth. "Insulating India's Reactors from Fuel disruption" *The Hindu* 8 August 2007.

31. *Asian Age*, 7 August 2007, p.2.

32. *India Today,* New Delhi, 27 August 2007, p. 25 "We had the Courage to Change Policy", Manmohan Singh on the Deal.

33. *The Hindu,* 5 August 2007, p. 1.

34. *The Hindu,* 14 August 2007, p. 9.

35. *Times of India*, 20 August 2007 p.19.

Websites

36. Abolition 2000 US-India Working Group "Letter to Australian Opposition" on 28 June 2007 (http://cnic.jp/english/topics/plutonium/proliferation/usindiafiles/ausop28jun07.html.

37. Boucher, Richard A. States and South Asia: An Expanding Agenda Statement before the House International Relations Committee Subcommittee on Asia and the Pacific 17 May 2006. (http://www.state.gov/p/sca/rls/rm/2006/66374.htmThe United).

38. Committee on International Relations, Hearing, Serial No 109-179, pp. 24 & 55. (www.foreignaffairs.house.gov/archives/109/23323.pdf)

39. Indo-US Nuclear Deal: A Post-Henry Hyde Act Analysis http://www.planetd.org/2006/12/18/the-indo-us-nuclear-deal-a-post-henry-hyde-act-analysis/

40. Joseph, Robert G. "Hearing on US-India Civil Nuclear Cooperation Initiative, Senate Foreign Relation Committee – 02 November, 2005". (nucnews.net/nucnews/2005nn/0511nn/051103nn.txt)

41. Mian, Zia, and Ramana, M V. "The Price of Power" (http://www.wagingpeace.org/articles/2006/11/17_mian_indiadeal.htm)

42. Sethi, Manpreet. "Indo-US Civilian Nuclear Cooperation: Reprocessing Issue Reconstructed," Institute of Peace and Conflict Studies, New Delhi. p.5 (http://ipcs.org/IPCS-IssueBrief-No47.pdf.)

43. Subbarao, Buddhi Kota. Indo-US Nuclear Deal – Some Unexplored Angles (www.countercurrents.com)

44. US. National Intelligence Council. 2020 Project Report, Mapping the Global Future (Asia). May, 2004 (http://www.dni.gov/nic/NIC_2020_project.html)

Appendix A

(Refers to Chapter II)

Joint Statement of 18 July 2005, between President George W. Bush and Prime Minister Manmohan Singh

Prime Minister Manmohan Singh and President Bush today declare their resolve to transform the relationship between their countries and establish a global partnership. As leaders of nations committed to the values of human freedom, democracy and rule of law, the new relationship between India and the United States will promote stability, democracy, prosperity and peace throughout the world. It will enhance our ability to work together to provide global leadership in areas of mutual concern and interest.

Building on their common values and interests, the two leaders resolve:

To create an international environment conducive to promotion of democratic values, and to strengthen democratic practices in societies which wish to become more open and pluralistic.

To combat terrorism relentlessly. They applaud the active and vigorous counterterrorism cooperation between the two countries and support more international efforts in this direction. Terrorism is a global scourge and the one we will fight everywhere. The two leaders strongly affirm their commitment to the conclusion by September of a UN comprehensive convention against international terrorism.

The Prime Minister's visit coincides with the completion of the Next Steps in Strategic Partnership (NSSP) initiative, launched in January 2004. The two leaders agree that this provides the basis for expanding bilateral activities and commerce in space, civil nuclear energy and dual-use technology.

Drawing on their mutual vision for the U.S.-India relationship, and our joint objectives as strong long-standing democracies, the two leaders agree on the following:

For the Economy

Revitalize the U.S.-India Economic Dialogue and launch a CEO Forum to harness private sector energy and ideas to deepen the bilateral economic relationship.

Support and accelerate economic growth in both countries through greater trade, investment, and technology collaboration.

Promote modernization of India's infrastructure as a prerequisite for the continued growth of the Indian economy. As India enhances its investment climate, opportunities for investment will increase.

Launch a U.S.-India Knowledge Initiative on Agriculture focused on promoting teaching, research, service and commercial linkages.

For Energy and the Environment

Strengthen energy security and promote the development of stable and efficient energy markets in India with a view to ensuring adequate, affordable energy supplies and consciousness of the need for sustainable development. These issues will be addressed through the U.S.-India Energy Dialogue.

Agree on the need to promote the imperatives of development and safeguarding the environment, commit to developing and deploying cleaner, more efficient, affordable, and diversified energy technologies.

For Democracy and Development

Develop and support, through the new U.S.-India Global Democracy Initiative in countries that seek such assistance, institutions and resources that strengthen the foundations that make democracies credible and effective. India and the U.S. will work together to strengthen democratic practices and capacities and contribute to the new U.N. Democracy Fund.

Commit to strengthen cooperation and combat HIV/AIDs at a global level through an initiative that mobilizes private sector and government resources, knowledge, and expertise.

For Non-Proliferation and Security

Express satisfaction at the New Framework for the U.S.-India Defense Relationship as a basis for future cooperation, including in the field of defense technology.

Commit to play a leading role in international efforts to prevent the proliferation of Weapons of Mass Destruction. The U.S. welcomed the adoption by India of legislation on WMD (Prevention of Unlawful Activities Bill).

Launch a new U.S.-India Disaster Relief Initiative that builds on the experience of the Tsunami Core Group, to strengthen cooperation to prepare for and conduct disaster relief operations.

For High-Technology and Space

Sign a Science and Technology Framework Agreement, building on the U.S.-India High-Technology Cooperation Group (HTCG), to provide for joint research and training, and the establishment of public-private partnerships.

Build closer ties in space exploration, satellite navigation and launch, and in the commercial space arena through mechanisms such as the U.S.-India Working Group on Civil Space Cooperation.

Building on the strengthened nonproliferation commitments undertaken in the NSSP, to remove certain Indian organizations from the Department of Commerce's Entity List.

Recognizing the significance of civilian nuclear energy for meeting growing global energy demands in a cleaner and more efficient manner, the two leaders discussed India's plans to develop its civilian nuclear energy programme.

President Bush conveyed his appreciation to the Prime Minister over India's strong commitment to preventing WMD proliferation and stated that as a responsible state with advanced nuclear technology, India should acquire the same benefits and advantages as other such states. The President told the Prime Minister that he will work to achieve full civil nuclear energy cooperation with India as it realizes its goals of promoting nuclear power and achieving energy security. The President would also seek agreement from Congress to adjust U.S. laws and policies, and the United States will work with friends and allies to adjust international regimes to enable full civil nuclear energy cooperation and trade with India, including, but not limited to expeditious consideration of fuel supplies for safeguarded nuclear reactors at Tarapur. In the meantime, the United States will encourage its partners to also consider this request expeditiously. India has expressed its interest in ITER and a willingness to contribute. The United States will consult with its partners considering India's participation. The United States will consult with the other participants in the Generation IV International Forum with a view toward India's inclusion.

The Prime Minister conveyed that for his part, India would reciprocally agree that it would be ready to assume the same responsibilities and practices and acquire the same benefits and advantages as other leading countries with advanced nuclear technology, such as the United States. These responsibilities and practices consist of identifying and separating civilian and military nuclear facilities and programmes in a phased manner and filing a declaration regarding its civilians facilities with the International Atomic Energy Agency (IAEA); taking a decision to place voluntarily

its civilian nuclear facilities under IAEA safeguards; signing and adhering to an Additional Protocol with respect to civilian nuclear facilities; continuing India's unilateral moratorium on nuclear testing; working with the United States for the conclusion of a multilateral Fissile Material Cut Off Treaty; refraining from transfer of enrichment and reprocessing technologies to states that do not have them and supporting international efforts to limit their spread; and ensuring that the necessary steps have been taken to secure nuclear materials and technology through comprehensive export control legislation and through harmonization and adherence to Missile Technology Control Regime (MTCR) and Nuclear Suppliers Group (NSG) guidelines.

The President welcomed the Prime Minister's assurance. The two leaders agreed to establish a working group to undertake on a phased basis in the months ahead the necessary actions mentioned above to fulfill these commitments. The President and Prime Minister also agreed that they would review this progress when the President visits India in 2006.

The two leaders also reiterated their commitment that their countries would play a leading role in international efforts to prevent the proliferation of weapons of mass destruction, including nuclear, chemical, biological and radiological weapons.

In light of this closer relationship, and the recognition of India's growing role in enhancing regional and global security, the Prime Minister and the President agree that international institutions must fully reflect changes in the global scenario that have taken place since 1945. The President reiterated his view that international institutions are going to have to adapt to reflect India's central and growing role. The two leaders state their expectations that India and the United States will strengthen their cooperation in global forums.

Prime Minister Manmohan Singh thanks President Bush for the warmth of his reception and the generosity of his hospitality. He extends an invitation to President Bush to visit India at his convenience and the President accepts that invitation.

Appendix B

(Refers to Chapter II)

EXCERPTS OF THE 02 MARCH 2006 SEPARATION PLAN

1. The salient features of the Indo-US Civil Nuclear Deal signed on 2 March 2006 are summarized below :

(a) Fourteen of India's twenty two reactors were designated as "civilian" and proposed to be placed under safeguards. The US conceded to keep the FBR outside safeguards till India decides otherwise (Details at Annexure).

(b) The reactors once safeguarded will remain so permanently. India secures the right to take "corrective action" if the fuel supply to reactors under safeguards is cut off.

(c) India will decide whether it wishes to safeguard future reactors.

(d) Enrichment and reprocessing plants can switch back and forth from safeguards, depending upon whether they handled safeguarded material or not.

(e) The nuclear Separation Plan will be effected in phases but will be concluded by 2014.

(f) CIRUS reactor at BARC, Trombay, is proposed to be shut down in 2010 while shifting the Apsara reactor (only the French supplied fuel core) out of BARC has been agreed to.

2. To further guard against any disruption of fuel supplies, the United States is prepared to take the following additional steps:

(a) Willing to incorporate assurances regarding fuel supply in the 123 Agreement, which would be submitted to the U.S. Congress for final approval.

(b) The US will join India in negotiating with the IAEA an India-specific fuel supply agreement.

(c) The US will support the Indian effort to develop a strategic reserve of

nuclear fuel to guard against any disruption of supply over the lifetime of India's reactors.

(d) Despite these arrangements, if disruption of fuel supplies to India occurs, the US and India would jointly convene a group of friendly supplier countries to include countries such as Russia, France and the United Kingdom to pursue such measures so as to restore fuel supply to India.

3. In light of the above understandings with the United States, an India-specific safeguards agreement will be negotiated between India and the IAEA providing for safeguards to guard against withdrawal of safeguarded nuclear material from civilian use at any time as well as providing for "corrective measures" that India may take to ensure uninterrupted operation of its civilian nuclear reactors in the event of disruption of foreign fuel supplies. Taking this into account, India will place its civilian nuclear facilities under India-specific safeguards in perpetuity and negotiate an appropriate safeguards agreement to this end with the IAEA.

Annexure

Reactors Not Under Safeguards

SNo	Name/Location of Facility	Capacity (MWe)	Date of Completion
1.	MAPS-1 Kalpakkam	220	1984
2.	MAPS-2 Kalpakkam	220	1986
3.	TAPS-3 Tarapur	540	2007
4.	TAPS-4 Tarapur	540	2006
5 & 6	Kaiga 1 and 2	220 each	2000
7 & 8	Kaiga 3 and 4	220 each	2007

Reactors Not Under Safeguards

S.No	Name/Location of Facility	Capacity(MWe) Completion	Date of By	Safeguard
1 & 2	TAPS 1 & 2	150 each	1969	2006
3	RAPS – 1 Kota	90	1973	2006
4	RAPS – 2 Kota	187	1981	2006
5	Kudankulam - 1	917	2007	2006
6	Kudankulam - 2	917	2008	2006
7	RAPS - 5	202	2007	2007
8	RAPS - 6	202	2008	2008
9 & 10	RAPS – 3 & 4	202 each	2000	2010
11	Kakrapar - 1	202	1993	2012
12	Kakrapar - 2	202	1995	2012
13	NAPS – 1 Narora	202	1991	2014
14	NAPS – 2 Narora	202	1992	2014

Appendix C

(Refers to Chapter III)

EXTRACTS OF THE TEXT OF 123 AGREEMENT BETWEEN THE US AND INDIA FOR PEACEFUL USE OF NUCLEAR ENERGY

Article 1 - Definitions

Article 2 - Scope of Cooperation

1. The Parties shall cooperate in the use of nuclear energy for peaceful purposes in accordance with the provisions of this Agreement. Each Party shall implement this Agreement in accordance with its respective applicable treaties, national laws, regulations, and license requirements concerning the use of nuclear energy for peaceful purposes.

2. The purpose of the Agreement being to enable full civil nuclear energy cooperation between the Parties, the Parties may pursue cooperation in all relevant areas to include, but not limited to, the following:

(a) Advanced nuclear energy research and development in such areas as may be agreed between the Parties;

(b) Nuclear safety matters of mutual interest and competence, as set out in Article 3;

(c) Facilitation of exchange of scientists for visits, meetings, symposia and collaborative research;

(d) Full civil nuclear cooperation activities covering nuclear reactors and aspects of the associated nuclear fuel cycle including technology transfer on an industrial or commercial scale between the Parties or authorized persons;

(e) Development of a strategic reserve of nuclear fuel to guard against any disruption of supply over the lifetime of India's reactors;

(f) Advanced research and development in nuclear sciences including but not limited to biological research, medicine, agriculture and industry, environment and climate change;

(g) Supply between the Parties, whether for use by or for the benefit of the Parties or third countries, of nuclear material;

(h) Alteration in form or content of nuclear material as provided for in Article 6;

(j) Supply between the Parties of equipment, whether for use by or for the benefit of the Parties or third countries;

(k) Controlled thermonuclear fusion including in multilateral projects; and

(l) Other areas of mutual interest as may be agreed by the Parties.

3. Transfer of nuclear material, non-nuclear material, equipment, components and information under this Agreement may be undertaken directly between the Parties or through authorized persons. Such transfers shall be subject to this Agreement and to such additional terms and conditions as may be agreed by the Parties. Nuclear material, non-nuclear material, equipment, components and information transferred from the territory of one Party to the territory of the other Party, whether directly or through a third country, will be regarded as having been transferred pursuant to this Agreement only upon confirmation, by the appropriate authority of the recipient Party to the appropriate authority of the supplier Party that such items both will be subject to the Agreement and have been received by the recipient Party.

4. The Parties affirm that the purpose of this Agreement is to provide for peaceful nuclear cooperation and not to affect the unsafeguarded nuclear activities of either Party. Accordingly, nothing in this Agreement shall be interpreted as affecting the rights of the Parties to use for their own purposes nuclear material, non-nuclear material, equipment, components, information or technology produced, acquired or the use of nuclear material, non-nuclear material, equipment, components, information or technology and military nuclear facilities produced, acquired or developed by them independent of this Agreement for their own purposes.

Article 3 - Transfer of Information

1. Information concerning the use of nuclear energy for peaceful purposes may be transferred between the Parties. Transfers of information may be accomplished

through reports, data banks and computer programmes and any other means mutually agreed to by the Parties. Fields that may be covered include, but shall not be limited to, the following:

(a) Research, development, design, construction, operation, maintenance and use of reactors, reactor experiments, and decommissioning;

(b) The use of nuclear material in physical, chemical, radiological and biological research, medicine, agriculture and industry;

(c) Fuel cycle activities to meet future worldwide civil nuclear energy needs, including multilateral approaches to which they are parties for ensuring nuclear fuel supply and appropriate techniques for management of nuclear wastes;

(d) Advanced research and development in nuclear science and technology;

(e) Health, safety, and environmental considerations related to the foregoing;

(f) Assessments of the role nuclear power may play in national energy plans;

(g) Codes, regulations and standards for the nuclear industry;

(h) Research on controlled thermonuclear fusion including bilateral activities and contributions toward multilateral projects such as the International Thermonuclear Experimental Reactor (ITER); and

(j) Any other field mutually agreed to by the Parties.

2. Cooperation pursuant to this Article may include, but is not limited to, training, exchange of personnel, meetings, exchange of samples, materials and instruments for experimental purposes and a balanced participation in joint studies and projects.

3. This Agreement does not require the transfer of any information regarding matters outside the scope of this Agreement, or information that the Parties are not permitted under their respective treaties, national laws, or regulations to transfer.

4. Restricted Data, as defined by each Party, shall not be transferred under this Agreement.

Article 4 - Nuclear Trade

1. The Parties shall facilitate nuclear trade between themselves in the mutual interests of their respective industry, utilities and consumers and also, where appropriate, trade between third countries and either Party of items obligated to the other Party. The Parties recognize that reliability of supplies is essential to ensure smooth and uninterrupted operation of nuclear facilities and that industry in both the Parties needs continuing reassurance that deliveries can be made on time in order to plan for the efficient operation of nuclear installations.

2. Authorizations, including export and import licenses as well as authorizations or consents to third parties, relating to trade, industrial operations or nuclear material movement should be consistent with the sound and efficient administration of this Agreement and should not be used to restrict trade. It is further agreed that if the relevant authority of the concerned Party considers that an application cannot be processed within a two-months period it shall immediately, upon request, provide reasoned information to the submitting Party. In the event of a refusal to authorize an application or a delay exceeding four months from the date of the first application the Party of the submitting persons or undertakings may call for urgent consultations under Article 13 of this Agreement, which shall take place at the earliest opportunity and in any case not later than 30 days after such a request.

Article 5 - Transfer of Nuclear Material, Non-Nuclear Material, Equipment, Components and Related Technology

1. Nuclear material, non-nuclear material, equipment and components may be transferred for applications consistent with this Agreement. Any special fissionable material transferred under this Agreement shall be low enriched uranium, except as provided in paragraph 5.

2. Sensitive nuclear technology, heavy water production technology, sensitive nuclear facilities, heavy water production facilities and major critical components of such facilities may be transferred under this Agreement pursuant to an amendment to this Agreement. Transfers of dual-use items that could be used in enrichment, reprocessing or heavy water production facilities will be subject to the Parties' respective applicable laws, regulations and license policies.

3. Natural or low enriched uranium may be transferred for use as fuel in reactor experiments and in reactors, for conversion or fabrication, or for such other purposes as may be agreed to by the Parties.

4. The quantity of nuclear material transferred under this Agreement shall be

consistent with any of the following purposes: use in reactor experiments or the loading of reactors, the efficient and continuous conduct of such reactor experiments or operation of reactors for their lifetime, use as samples, standards, detectors, and targets, and the accomplishment of other purposes as may be agreed by the Parties.

5. Small quantities of special fissionable material may be transferred for use as samples, standards, detectors, and targets, and for such other purposes as the Parties may agree.

6. (a) The United States has conveyed its commitment to the reliable supply of fuel to India. Consistent with the 18 July 2005, Joint Statement, the United States has also reaffirmed its assurance to create the necessary conditions for India to have assured and full access to fuel for its reactors. As part of its implementation of the 18 July 2005, Joint Statement the United States is committed to seeking agreement from the U.S. Congress to amend its domestic laws and to work with friends and allies to adjust the practices of the Nuclear Suppliers Group to create the necessary conditions for India to obtain full access to the international fuel market, including reliable, uninterrupted and continual access to fuel supplies from firms in several nations.

(b) To further guard against any disruption of fuel supplies, the United States is prepared to take the following additional steps:

(i) The United States is willing to incorporate assurances regarding fuel supply in the bilateral U.S.-India agreement on peaceful uses of nuclear energy under Section 123 of the U.S. Atomic Energy Act, which would be submitted to the U.S. Congress.

(ii) The United States will join India in seeking to negotiate with the IAEA an India-specific fuel supply agreement.

(iii) The United States will support an Indian effort to develop a strategic reserve of nuclear fuel to guard against any disruption of supply over the lifetime of India's reactors.

(iv) If despite these arrangements, a disruption of fuel supplies to India occurs, the United States and India would jointly convene a group of friendly supplier countries to include countries such as Russia, France and the United Kingdom to pursue such measures as would restore fuel supply to India.

(c) In light of the above understandings with the United States, an India-

specific safeguards agreement will be negotiated between India and the IAEA providing for safeguards to guard against withdrawal of safeguarded nuclear material from civilian use at any time as well as providing for corrective measures that India may take to ensure uninterrupted operation of its civilian nuclear reactors in the event of disruption of foreign fuel supplies. Taking this into account, India will place its civilian nuclear facilities under India-specific safeguards in perpetuity and negotiate an appropriate safeguards agreement to this end with the IAEA.

Article 6 - Nuclear Fuel Cycle Activities

In keeping with their commitment to full civil nuclear cooperation, both Parties, as they do with other states with advanced nuclear technology, may carry out the following nuclear fuel cycle activities:

(i) Within the territorial jurisdiction of either Party, enrichment up to twenty percent in the isotope 235 of uranium transferred pursuant to this Agreement, as well as of uranium used in or produced through the use of equipment so transferred, may be carried out.

(ii) Irradiation within the territorial jurisdiction of either Party of plutonium, uranium-233, high enriched uranium and irradiated nuclear material transferred pursuant to this Agreement or used in or produced through the use of non-nuclear material, nuclear material or equipment so transferred may be carried out.

(iii) With a view to implementing full civil nuclear cooperation as envisioned in the Joint Statement of the Parties of July 18, 2005, the Parties grant each other consent to reprocess or otherwise alter in form or content nuclear material transferred pursuant to this Agreement and nuclear material and by-product material used in or produced through the use of nuclear material, non-nuclear material, or equipment so transferred. To bring these rights into effect, India will establish a new national reprocessing facility dedicated to reprocessing safeguarded nuclear material under IAEA safeguards and the Parties will agree on arrangements and procedures under which such reprocessing or other alteration in form or content will take place in this new facility. Consultations on arrangements and procedures will begin within six months of a request by either Party and will be concluded within one year. The Parties agree on the application of IAEA safeguards to all facilities concerned with the above activities. These arrangements and procedures shall include provisions with respect to physical protection standards set out in Article 8, storage standards set out

in Article 7, and environmental protections set forth in Article 11 of this Agreement, and such other provisions as may be agreed by the Parties. Any special fissionable material that may be separated may only be utilized in national facilities under IAEA safeguards.

(iv) Post-irradiation examination involving chemical dissolution or separation of irradiated nuclear material transferred pursuant to this Agreement or irradiated nuclear material used in or produced through the use of non-nuclear material, nuclear material or equipment so transferred may be carried out.

Article 7 - Storage and Retransfers

Article 8 - Physical Protection

Article 9 - Peaceful Use

Article 10 - IAEA Safeguards

1. Safeguards will be maintained with respect to all nuclear materials and equipment transferred pursuant to this Agreement, and with respect to all special fissionable material used in or produced through the use of such nuclear materials and equipment, so long as the material or equipment remains under the jurisdiction or control of the cooperating Party.

2. Taking into account Article 5.6 of this Agreement, India agrees that nuclear material and equipment transferred to India by the United States of America pursuant to this Agreement and any nuclear material used in or produced through the use of nuclear material, non-nuclear material, equipment or components so transferred shall be subject to safeguards in perpetuity in accordance with the India-specific Safeguards Agreement between India and the IAEA [identifying data] and an Additional Protocol, when in force.

3. Nuclear material and equipment transferred to the United States of America pursuant to this Agreement and any nuclear material used in or produced through the use of any nuclear material, non-nuclear material, equipment, or components so transferred shall be subject to the Agreement between the United States of America and the IAEA for the application of safeguards in the United States of America, done at Vienna 18 November 1977, which entered into force on 9 December 1980, and an Additional Protocol, when in force.

4. If the IAEA decides that the application of IAEA safeguards is no longer possible, the supplier and recipient should consult and agree on appropriate verification measures.

5. Each Party shall take such measures as are necessary to maintain and facilitate the application of IAEA safeguards in its respective territory provided for under this Article.

6. Each Party shall establish and maintain a system of accounting for and control of nuclear material transferred pursuant to this Agreement and nuclear material used in or produced through the use of any material, equipment, or components so transferred. The procedures applicable to India shall be those set forth in the India-specific Safeguards Agreement referred to in Paragraph 2 of this Article.

7. Upon the request of either Party, the other Party shall report or permit the IAEA to report to the requesting Party on the status of all inventories of material subject to this Agreement.

8. The provisions of this Article shall be implemented in such a manner as to avoid hampering, delay, or undue interference in the Parties' peaceful nuclear activities and so as to be consistent with prudent management practices required for the safe and economic conduct of their peaceful nuclear programmes.

Article 11 - Environmental Protection

Article 12 - Implementation of Agreement

1. This Agreement shall be implemented in a manner designed:

(a) to avoid hampering or delaying the nuclear activities in the territory of either Party;

(b) to avoid interference in such activities;

(c) to be consistent with prudent management practices required for the safe conduct of such activities; and

(d) to take full account of the long term-requirements of the nuclear energy programmes of the Parties.

2. The provisions of this Agreement shall not be used to:

(a) secure unfair commercial or industrial advantages or to restrict trade to the disadvantage of persons and undertakings of either Party or hamper their commercial or industrial interests, whether international or domestic;

(b) interfere with the nuclear policy or programmes for the promotion of the peaceful uses of nuclear energy including research and development; or

(c) impede the free movement of nuclear material, non-nuclear material and equipment supplied under this Agreement within the territory of the Parties.

3. When execution of an agreement or contract pursuant to this Agreement between Indian and United States organizations requires exchanges of experts, the Parties shall facilitate entry of the experts to their territories and their stay therein consistent with national laws, regulations and practices. When other cooperation pursuant to this Agreement requires visits of experts, the Parties shall facilitate entry of the experts to their territory and their stay therein consistent with national laws, regulations and practices.

Article 13 - Consultations

1. The Parties undertake to consult at the request of either Party regarding the implementation of this Agreement and the development of further cooperation in the field of peaceful uses of nuclear energy on a stable, reliable and predictable basis. The Parties recognize that such consultations are between two States with advanced nuclear technology, which have agreed to assume the same responsibilities and practices and acquire the same benefits and advantages as other leading countries with advanced nuclear technology.

2. Each Party shall endeavor to avoid taking any action that adversely affects cooperation envisaged under Article 2 of this Agreement. If either Party at any time following the entry into force of this Agreement does not comply with the provisions of this Agreement, the Parties shall promptly hold consultations with a view to resolving the matter in a way that protects the legitimate interests of both Parties, it being understood that rights of either Party under Article 16.2 remain unaffected.

3. Consultations under this Article may be carried out by a Joint Committee specifically established for this purpose. A Joint Technical Working Group reporting to the Joint Committee will be set up to ensure the fulfillment of the requirements of the Administrative Arrangements referred to in Article 17.

Article 14 - Termination and Cessation of Cooperation

1. Either Party shall have the right to terminate this Agreement prior to its expiration on one year's written notice to the other Party. A Party giving notice of termination shall provide the reasons for seeking such termination. The Agreement shall terminate one year from the date of the written notice, unless the notice has been withdrawn by the providing Party in writing prior to the date of termination.

2. Before this Agreement is terminated pursuant to paragraph 1 of this Article, the Parties shall consider the relevant circumstances and promptly hold consultations, as provided in Article 13, to address the reasons cited by the Party seeking termination. The Party seeking termination has the right to cease further cooperation under this Agreement if it determines that a mutually acceptable resolution of outstanding issues has not been possible or cannot be achieved through consultations. The Parties agree to consider carefully the circumstances that may lead to termination or cessation of cooperation. They further agree to take into account whether the circumstances that may lead to termination or cessation resulted from a Party's serious concern about a changed security environment or as a response to similar actions by other States which could impact national security.

3. If a Party seeking termination cites a violation of this Agreement as the reason for notice for seeking termination, the Parties shall consider whether the action was caused inadvertently or otherwise and whether the violation could be considered as material. No violation may be considered as being material unless corresponding to the definition of material violation or breach in the Vienna Convention on the Law of Treaties. If a Party seeking termination cites a violation of an IAEA Safeguards Agreement as the reason for notice for seeking termination, a crucial factor will be whether the IAEA Board of Governors has made a finding of non-compliance.

4. Following the cessation of cooperation under this Agreement, either Party shall have the right to require the return by the other Party of any nuclear material, equipment, non-nuclear material or components transferred under this Agreement and any special fissionable material produced through their use. A notice by a Party that is invoking the right of return shall be delivered to the other Party on or before the date of termination of this Agreement. The notice shall contain a statement of the items subject to this Agreement as to which the Party is requesting return. Except as provided in provisions of Article 16.3, all other legal obligations pertaining to this Agreement shall cease to apply with respect to the nuclear items remaining on the territory of the Party concerned upon termination of this Agreement.

5. The two Parties recognize that exercising the right of return would have profound implications for their relations. If either Party seeks to exercise its right pursuant to paragraph 4 of this Article, it shall, prior to the removal from the territory or from the control of the other Party of any nuclear items mentioned in paragraph 4, undertake consultations with the other Party. Such consultations shall give special consideration to the importance of uninterrupted operation of nuclear reactors of the Party concerned with respect to the availability of nuclear

energy for peaceful purposes as a means of achieving energy security. Both Parties shall take into account the potential negative consequences of such termination on the on-going contracts and projects initiated under this Agreement of significance for the respective nuclear programmes of either Party.

6. If either Party exercises its right of return pursuant to paragraph 4 of this Article, it shall, prior to the removal from the territory or from the control of the other Party, compensate promptly that Party for the fair market value thereof and for the costs incurred as a consequence of such removal. If the return of nuclear items is required, the Parties shall agree on methods and arrangements for the return of the items, the relevant quantity of the items to be returned, and the amount of compensation that would have to be paid by the Party exercising the right to the other Party.

7. Prior to return of nuclear items, the Parties shall satisfy themselves that full safety, radiological and physical protection measures have been ensured in accordance with their existing national regulations and that the transfers pose no unreasonable risk to either Party, countries through which the nuclear items may transit and to the global environment and are in accordance with existing international regulations.

8. The Party seeking the return of nuclear items shall ensure that the timing, methods and arrangements for return of nuclear items are in accordance with paragraphs 5, 6 and 7. Accordingly, the consultations between the Parties shall address mutual commitments as contained in Article 5.6. It is not the purpose of the provisions of this Article regarding cessation of cooperation and right of return to derogate from the rights of the Parties under Article 5.6.

9. The arrangements and procedures concluded pursuant to Article 6(iii) shall be subject to suspension by either Party in exceptional circumstances, as defined by the Parties, after consultations have been held between the Parties aimed at reaching mutually acceptable resolution of outstanding issues, while taking into account the effects of such suspension on other aspects of cooperation under this Agreement.

Article 15 - Settlement of Disputes

Any dispute concerning the interpretation or implementation of the provisions of this Agreement shall be promptly negotiated by the Parties with a view to resolving that dispute.

Article 16 - Entry into Force and Duration

Article 17 - Administrative Arrangement

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