

*Pakistan's Strategic Thinking
and the Role of Nuclear Weapons*

*Major General Mahmud Ali Durrani, Retired
Rawalpindi, Pakistan*

Cooperative Monitoring Center Occasional Paper 37
Sandia Contract No. 95502



Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

The Cooperative Monitoring Center (CMC) at Sandia National Laboratories assists political and technical experts from around the world to acquire the technology-based tools they need to assess, design, analyze, and implement nonproliferation, arms control, and other cooperative security measures. As part of its mission, the CMC sponsors research on cooperative security and the role of technology. Reports of that work are provided through the Occasional Papers series. Research is conducted by Sandia staff, international technical experts, and visiting scholars. (The CMC's Visiting Scholars Program is administered by the Institute for Public Policy at the University of New Mexico.) For additional information on the CMC's programs, visit the CMC home page on the World Wide Web at <http://www.cmc.sandia.gov> or write to:

Cooperative Monitoring Center
Sandia National Laboratories
PO Box 5800
Mail Stop 1373
Albuquerque, NM 87185-1373

For specific information on this report contact:
George Baldwin at the above address.

This report was prepared by Sandia National Laboratories
Albuquerque, NM 87185 and Livermore, CA 94550

Abstract

The introduction of nuclear weapons into the national defense structures of Pakistan and India in 1998 has not brought an era of peace and stability as some had forecast. Full-scale war was only narrowly avoided in 1999 and 2002. The objective of this study is to evaluate the stability of deterrence, particularly the concept of minimum deterrence in South Asia today. Within this context, the study analyzes Pakistan's strategic thinking about the role of nuclear weapons. Interviews with Pakistani and U.S. officials, ex-officials, military officers, and academics were conducted to gain insight into the development of policy. Site visits to civilian nuclear facilities were also conducted. The conclusions outline a path for Pakistan that would help achieve nuclear stability in South Asia, including a possible role for the U.S.

Author's Note

The author of this report directed his research effort based on the concerns of officials and scholars in the U.S. about Pakistan's nuclear weapons program. While the author benefited from the very useful insights and views of scholars and policy influentials in Pakistan, the perspective and explanations offered by the Pakistan establishment, and the military establishment, this assessment is that of the author and the author alone and does not represent the views of any government or any government agency.

This page left intentionally blank.

Contents

Abbreviations & Acronyms	9
Executive Summary	11
1. Introduction	15
1.1 Background.....	15
1.2 Objectives and Methodology of the Project.....	16
2. Pakistan's Strategic Thinking	17
2.1 Historical Perspective	17
2.2 Thinking Nuclear	18
2.3 Developing the Nuclear Weapon	18
2.4 Delivery Systems	20
3. Pakistan's Nuclear Weapon Program – Views from the U.S.	21
3.1 Views of U.S. Officials.....	21
3.2 Views of U.S. Scholars	22
4. Pakistani Perceptions of the Nuclear Program.....	23
4.1 Pakistan's Nuclear Policy	23
4.1.1 Issues Related to Management of Nuclear Policy	24
4.1.2 Operational Issues.....	24
4.1.3 Security Aspects.....	25
4.1.4 Source and Material Accountability	25
4.2 Views of Policy Influentials.....	25
4.2.1 Building a Stable Deterrence	26
4.2.2 Security of Weapons	27
4.2.3 Nuclear Decision Making Process	27
4.2.4 Growing Influence of Religious Fundamentalists	28
4.2.5 Presenting a Doctrine.....	28
4.2.6 Nuclear War by Miscalculation	29
5. The A.Q. Khan Saga	30
6. Net Assessment – Pakistan's Nuclear Program.....	31
6.1 Response to India.....	31
6.2 Nuclear Doctrine.....	31
6.3 Minimum Deterrence	31
6.4 Nuclear Decision Making Process	32
6.5 Deterrence: Stable or Dangerous?	32
6.6 Safety of Nuclear Weapons	33
6.7 Security of Nuclear Weapons and Facilities.....	33
6.8 Security of Nonmilitary Nuclear Installations	34

6.9 Author's Assessment of Nonmilitary Installations	35
7. The Way Forward – Recommendations for Enhancing Stability	37
7.1 Learn from the Cold War	37
7.2 Control Political Pressures	38
7.3 Implement Crisis Management	38
7.4 Prevent Nuclear Proliferation	40
7.5 Strengthen Nuclear Command and Control	42
7.6 Initiate Nuclear Transparency	42
7.7 Avoid Nuclear War by Miscalculation	43
7.8 Improve Security	43
7.9 Enhance Nuclear Stability	44
8. Concluding Thoughts	47
Appendix A: Management Structure of Pakistan's Nuclear Capability	49
Appendix B: Comments on Author's Visit to the Pakistan Institute of Nuclear Science and Technology (PINSTECH) and Chashma Nuclear Power Plant (CHASNUPP), November 2003.....	52
Physical Protection.....	52
Safety, Protection, and Accounting of Nuclear Materials	53
Personnel Security	53
About the Author	55

Figures

Figure 1. Shaheen II missile (Source: Pakistan Strategic Plans Division, file photo)	20
Figure 2. Meeting of the National Command Authority (Source: Pakistan Strategic Plans Division)	25
Figure 3. Nuclear Risk Reduction Center, Washington, DC, May 2003	38
Figure 4. Organization Chart of National Command Authority	49
Figure 5. Organization Chart of Strategic Plans Division	50
Figure 6. PINSTECH Reactor, November 2003.....	54
Figure 7. Author visiting CHASNUPP Control Room, November 2003	54

Table

Table 1. Pakistan Missile Inventory.....	20
--	----

Abbreviations & Acronyms

BJP	Bharatiya Janata Party (India)
C ⁴ I ² SR	Command, Control, Communications, Computer Information, Intelligence, Surveillance and Reconnaissance
CAS	Chief of Air Force Staff
CBM	Confidence-Building Measure
CD	Conference on Disarmament
CHASNUPP	Chashma Nuclear Power Plant
CJCSC	Chairman Joint Chiefs of Staff Committee
CNS	Chief of Navy Staff
COAS	Chief of Army Staff
DG SPD	Director General Strategic Plans Division
DGMO	Director General of Military Operations
IAEA	International Atomic Energy Agency
IB	Intelligence Bureau
ISI	Inter-Services Intelligence
JCSC	Joint Chiefs of Staff Committee
JSHQ	Joint Service Headquarters
LOC	Line of Control
MI	Military Intelligence
MMA	Motahadda Majlis e Amal (United Council for Action)
MOU	Memorandum of Understanding
MW	Megawatt
MWe	Megawatt (electric)
NATO	North Atlantic Treaty Organization
NCA	National Command Authority
NDC	National Defence College
NGO	Nongovernmental Organization
NRRC	Nuclear Risk Reduction Center
NSA	Nuclear Security Agency
PAEC	Pakistan Atomic Energy Commission
PAL	Permissive Action Link
PINSTECH	Pakistan Institute of Science and Technology
PNRA	Pakistan Nuclear Regulatory Authority
PRP	Personnel Reliability Program
PWR	Pressurized Water Reactor
SFCP	Strategic Forces Communication Planning
SOP	Standard Operating Procedure
SPD	Strategic Plans Division
UN	United Nations
U.S.	United States
VCOAS	Vice-Chief of Army Staff
WMD	Weapons of Mass Destruction

This page left intentionally blank.

Executive Summary

Following the May 1998 demonstrations of nuclear capability by India and Pakistan, the countries faced major crises in 1999 and 2002. Given their history of escalation, and the addition of nuclear weapons to the ongoing dispute, this report seeks to:

- Analyze Pakistan's strategic thinking and the role of nuclear weapons, while judging the robustness of the nuclear decision making process, its strengths and its weaknesses;
- Understand and evaluate the stability of the nuclear deterrence in South Asia as it exists today;
- Understand the concept of minimum deterrence as perceived by the political and military leadership of Pakistan;
- Evaluate the physical security of Pakistan's nuclear weapons and nuclear materials; and
- Offer recommendations, mostly for unilateral action by Pakistan and some for bilateral action by India and Pakistan, to improve stability.

To achieve these objectives, the author of the study:

- Interviewed relevant U.S. officials and scholars to understand their apprehensions about Pakistan's nuclear program;
- Interviewed prominent scholars, ex-civil and military officials, and political leaders in Pakistan to enhance understanding of Pakistan's strategic thinking and the role of nuclear weapons;
- Held meetings in Pakistan with relevant military and civil officials of the Government of Pakistan to obtain a deeper understanding of Pakistan's nuclear program, policies, operations, and security of nuclear materials and weapons; and
- Outlines a path for Pakistan to help achieve nuclear stability in South Asia.

The interviews with U.S. officials and scholars revealed a consistent perception of concern for the security of Pakistan's nuclear weapons, apprehensions about the robustness of the decision-making system, the lack of conflict reduction mechanisms in the region, and the potential for proliferation from Pakistan. Although Pakistan has not publicly announced a formal nuclear doctrine, the author was able to determine four national nuclear policy objectives in meetings with Pakistani officials and reviewing public official statements.

1. Deterrence of all forms of external aggression that endanger national security.
2. Deterrence will be achieved through the development and maintenance of an effective combination of conventional and strategic forces, at adequate levels within the country's resource constraints.

3. Deterrence of Pakistan's adversaries from attempting a counter-force strategy against our strategic assets, by effectively securing our strategic assets and threatening nuclear retaliation should such an attempt be made.
4. Stabilization of strategic deterrence in the South Asia region.

Following two visits to civilian nuclear installations in Pakistan, the author concluded that fairly robust systems of physical protection and personnel reliability currently exist. Both the protection security and the personnel reliability programs are currently undergoing revision. The author recommends that the training of military and nonmilitary security forces be brought up to international standards, conducting a realistic threat assessment based on the risk of terrorism, installing modern and sophisticated anti-intrusion devices, and requesting additional training in physical protection from the International Atomic Energy Agency (IAEA) and/or the U.S.

Drawing on the comments of various knowledgeable individuals and scholars within and outside Pakistan, there are a number of measures that Pakistan should consider taking unilaterally to improve nuclear stability and ensure the physical security of its nuclear arsenal, while some measures will need to be undertaken bilaterally by India and Pakistan. These measures include:

- Controlling political pressures by reducing the radical religious influence in both countries and resolving lingering disputes through dialogue.
- Implementing crisis management through a series of political and military confidence-building measures including a crisis management agreement, media management, special emissaries to heads of government, additional hot lines, notification of alert status, separation of nuclear weapons from delivery systems, flag meetings, and implementing cooperative border monitoring.
- Preventing nuclear proliferation by making legislative changes, taking stronger fiscal and technical control of weapons programs, improving operating procedures for weapons security, strengthening the Pakistan Nuclear Regulatory Authority, upgrading security at nuclear facilities, initiating international cooperation for physical protection technologies, upgrading the personnel reliability program, and training and equipping a special security force for nuclear assets.
- Strengthening nuclear command and control through the National Command Authority and implementing dual control of nuclear weapons by the President and Prime Minister. Improving the decision-making process by educating the political leadership and citizens of Pakistan on the role of nuclear weapons.
- Initiating nuclear transparency to promote stability through declaration of the essential elements of nuclear doctrine, nuclear weapons systems capability, and alert levels; and implementing measures to minimize the chances of nuclear accidents.
- Avoiding nuclear war by miscalculation by establishing and practicing confidence-building measures (e.g., reaffirming the Lahore Memorandum of Understanding), resolving outstanding disputes, and initiating reciprocal transparency in nuclear topics.

- Bringing about a change in the security culture of Pakistan by the design and implementation of a centralized security system to oversee the nuclear establishment and by conducting security audits.
- Enhancing nuclear stability by avoiding rash decisions and establishing firewalls to interrupt progression along the path of escalation.
- Learning from the Cold War.

Possessing nuclear weapon systems places serious demands on a nation and its government. The foremost demand is the need for internal political stability and strong institutions. Acknowledging the concerns of the West, the author is also concerned with the possibility of a nuclear war in South Asia by miscalculation. While efforts are needed to address important issues like proliferation, safety, security and stability, avoidance of nuclear war by miscalculation needs immediate attention. Involvement of the U.S. to support and advise Pakistan on improving the safety and security of its nuclear program would be essential.

This page left intentionally blank.

1. Introduction

1.1 Background

On May 11, 1998 as the Balusa Group¹ was concluding its last day of dialogue in Italy, a senior Indian delegate received a telephone call from India, informing him that India had just exploded a nuclear device. Several more followed. While the Balusa Group was struggling to formulate ways to build bridges between the two nations, a new and dramatic event had taken place, radically changing the security landscape of South Asia. When the Pakistani participants returned home, a very emotional debate had gripped the nation—whether or not to respond to the Indian nuclear test? The overwhelming sentiment was to “rise to the challenge,” and the rhetoric coming from India did not help. On May 28, Pakistan did respond by testing several nuclear devices.

With time, the euphoria and offensive rhetoric that followed the nuclear tests diminished, and it seemed that the leadership in both countries realized the implications of going nuclear. A low-key effort began with the objective of bringing stability in the perpetually unstable political-military environment of South Asia. This resulted in the Lahore Summit between the Prime Ministers of India and Pakistan in February 1999.

In May 1999, almost a year after the nuclear tests and at the heels of the Lahore Summit, a serious outbreak of hostility occurred across the Line of Control (LOC)² near Kargil,³ a village in Indian-controlled Kashmir. On July 4, 1999, the Prime Minister of Pakistan met with the U.S. President in Washington, DC. The U.S. brokered de-escalation averted a possible war. In spite of Pakistan's explanations, the global community blamed Pakistan for initiating the Kargil Crisis. Many scholars opined that the Kargil Crisis did not escalate into full-scale war because of the effectiveness of the nuclear deterrence; however, this opinion needs to be reexamined.

Following the terrorist attack on the United States on September 11, 2001, the U.S. sent troops to Afghanistan to engage the perpetrators of the attack. Pakistan and India both supported the U.S. fight against terrorism and the allied operations in Afghanistan. Pakistan, because of its geographic location, became central to operations in Afghanistan. Unfortunately, the negative bilateral agenda between India and Pakistan overshadowed their alliance with the U.S. India blamed Pakistan for sponsoring a terrorist attack on its Parliament in December 2001, a charge Pakistan strongly denied. Pakistan offered to cooperate with India in a joint investigation. India refused and instead launched a massive military build-up against Pakistan. In Pakistan, this Indian action was considered as coercive diplomacy to force a solution of the lingering Kashmir issue to its advantage.

¹ Balusa Group is a small group of Pakistanis and Indians working for peace between their countries. Formed in 1996, the group held its tenth meeting in Lahore, Pakistan in March 2002. The author of this report is a founding member of the Balusa Group. Evidently, Balusa means peace in an ancient Indian language.

² The LOC represents the division of the old state of Jammu and Kashmir into the Indian controlled and the Pakistani controlled portions of that state.

³ Kargil, a small settlement on the Indian side of the LOC in Kashmir, was the centre of the sector where a limited but bloody battle was fought in May/June 1999. While Pakistan underplayed the conflict as an action taken up by Kashmiri freedom fighters, India proclaimed it as a war initiated by the Pakistan establishment.

It is important to note that India and Pakistan were again on the edge of war within two years of becoming nuclear. Through a shuttle diplomatic initiative, the U.S. again saved the two nations from war that could have had nuclear implications.

1.2 Objectives and Methodology of the Project

The objectives of this project are:

- Analyze Pakistan's strategic thinking and the role of nuclear weapons, while judging the robustness of the nuclear decision making process, its strengths, and its weaknesses;
- Understand and evaluate the stability of the nuclear deterrence in South Asia as it exists today;
- Understand the concept of minimum deterrence as perceived by the political and military leadership of Pakistan;
- Evaluate the physical security of Pakistan's nuclear weapons and nuclear materials; and
- Offer recommendations, mostly for unilateral action by Pakistan and some for bilateral action by India and Pakistan, to improve the nuclear environment in South Asia.

To attain these objectives, the author of the study engaged in the following activities:

1. Interviewed relevant U.S. officials and scholars to understand their apprehensions and fears about Pakistan's nuclear program and endeavor to bridge the gap between perception and reality. Interviews were conducted on a not-for-attribution basis.
2. In Pakistan, interviewed prominent scholars, ex-civil and military officials, and political leaders to enhance understanding of Pakistan's strategic thinking and the role of nuclear weapons. Interviews were conducted on a not-for-attribution basis.
3. In Pakistan, held meetings with the relevant senior military and civil officials of the Government of Pakistan to obtain a deeper understanding of Pakistan's nuclear program, its nuclear policy, operational aspects, and the physical security of the nuclear materials and weapons.
4. After the evaluation process, outlined a forward path for Pakistan that would help achieve nuclear stability in South Asia, including the possible role the U.S. would play in assisting the process of nuclear stability in South Asia.

2. Pakistan's Strategic Thinking

2.1 Historical Perspective

The Hindus and the Muslims of the sub-continent have coexisted peacefully with each other over centuries, especially during the rule of some of the Mogul Kings and later under British rule. However, if one could categorize their relationship in a word, it is *mistrust*. This very mistrust was responsible for the partition of British India.

A retired Indian brigadier wrote of the historical and theocratic reasons for the Hindu Muslim divide: "The Hindu finds it hard to forget that because of his military incompetence and unpreparedness and above all because of his philosophy he had to suffer defeats and indignities at the hands of Muslims from 712 AD to nearly 1800 AD. Muslim kings and heroes (in South Asia) like Mahmood Ghaznavi, Mohammad Ghori, Alauddin Khilji, Aurangzeb, Ahmed Shah Abdali, and Nadir Shah are some of the names the Hindu remembers with considerable hate... In his own country the Hindu was reduced to the status of a slave."⁴ This single perspective may not symbolize the overall thinking in India or the views of the urbane intellectual but seems to reflect the views of a sizable segment of Indian society.

A retired colonel of the Pakistan Army told the author: "India never reconciled to the creation of Pakistan. From day one, they have worked to undo partition. India occupied Kashmir by deceit. Indian forces had landed in Srinagar before the Hindu Maharaja signed the accession deed. Pakistan came into being because of the mistrust of Hindus. The Muslim feared that the Hindu if placed in positions of authority would make the life of the Muslims impossible. As events are unfolding in India under the BJP,⁵ the Muslim fear seems to be justified. The mask of secularism has been torn apart. India did not lose the opportunity offered in 1971 and assisted Bengali nationalists to break away from Pakistan. India has hegemonic ambitions in South Asia both in economic and military terms. Today we have an effective nuclear deterrence and now we need to develop our economic strength to counter India's evil designs. We want to live in peace but not at the cost of freedom and honor." This is indeed a common view held by a sizable segment of the Pakistan nation, especially among those who lived through the carnage of partition.

The 1965 and the 1971 wars with India heightened Pakistan's sense of vulnerability. The 1965 war left Pakistan weakened and with a sense of disillusionment toward its traditional ally, the United States. Again, in 1971, Pakistan's traditional allies, the U.S. and China, could not deter India from playing the central role in the breaking away of its Eastern Wing to form Bangladesh. However, the sense of vulnerability strengthened the resolve of Pakistan's strategic planners to look for alternate routes to bolster Pakistan's conventional deterrence. After 1965, a major and sustained effort was launched to increase self-reliance in the production of conventional defense hardware.

Pakistan's strategic thinking is deeply colored by its perception of history. However, the same historical experience as interpreted in India is very different. Brinkmanship and a rhetorical style of leadership in both nations reinforce the existing mistrust. In the mind of Pakistani strategic

⁴ Personal letter addressed to the author.

⁵ BJP: Bharatiya Janata Party.

thinkers, India is a nation that has suffered deep historical scars, is hegemonic, and resents the creation of Pakistan. It is this belief that motivates the Pakistan military planners to never give India an opportunity to “cut Pakistan down to size” by maintaining a potent deterrence both in the conventional and the nuclear field. This simple strategic philosophy is what propels the Pakistan military. Unfortunately, the Indian leadership has not helped to dispel Pakistan’s sense of insecurity.

2.2 Thinking Nuclear

After the 1965 war, there was some fragmented thought in Pakistan about developing a nuclear capability to redress the conventional imbalance, but no serious attention was given to “going nuclear.” It was the 1974 “peaceful nuclear explosion” by India that motivated Pakistan to undertake the creation of a nuclear deterrence. The decision to develop a nuclear capability was to respond to a looming nuclear threat from India, not to correct the conventional imbalance as is popularly believed. The nuclear program was created though a philosophy of “beg, borrow, or steal” and propelled by the resolve to defend the nation of Pakistan from a serious external threat. The sense of nationalism and pride amongst the technical community was no less than what was felt by the “Manhattan Project” team in the U.S.

While Pakistan’s nuclear program was progressing through the various phases of development, no thought was given to the operational management of this new capability, nor was a nuclear doctrine considered seriously. It was only after the May 1998 tit-for-tat nuclear tests by India and Pakistan that serious attention was focused on this vital area. The understandable veil of secrecy that surrounded the Pakistani nuclear program (and the Indian program as well) contributed to the lack of dialogue on a nuclear doctrine.

On many occasions prior to the nuclear tests, Pakistan proposed that South Asia should be a nuclear free zone. Had India not demonstrated its nuclear capability, Pakistan would not have done so unilaterally. Pakistan considers itself a dominant player in the Islamic bloc and even harbors ambitions of being an important member of the world community, but gaining nuclear capability as a means to achieve a prominent global status was never a consideration for its policy makers. Some security analysts in Pakistan now declare that Pakistan’s nuclear program is not India specific, but fulfills regional security concerns.

2.3 Developing the Nuclear Weapon⁶

In response to the U.S. “Atoms for Peace” program and a United Nations (UN) conference on the peaceful uses of atomic energy in 1955, Pakistan established the Atomic Energy Commission (PAEC) in 1957. The PAEC’s first project was the establishment of the Pakistan Institute of Science and Technology (PINSTECH), which included a research reactor, partially funded by the U.S. under the Atoms for Peace program. However, nuclear energy was not given high priority by the government; the Chairman of the PAEC reported to a relatively junior officer in the Ministry of Industries. This very low-key and peaceful program provided Pakistan with the basic knowledge of nuclear energy and helped it develop a small nucleus of nuclear

⁶ This section is based on interviews conducted in Pakistan and “Pakistan’s Bomb: Out of the Closet,” by David Albright and Mark Hibbs, *The Bulletin of the Atomic Scientists*, July/August 1992.

technologists. India at this stage was ahead of Pakistan. In 1957, India was able to build its first nuclear reactor with generous foreign assistance.⁷

After the 1974 Indian nuclear explosion, it is believed that Pakistan initially followed the plutonium route; however, two difficulties were faced at that stage, insufficient spent fuel and the lack of a reprocessing facility, which eventually forced the nuclear establishment to give up this route and adopt the enriched uranium route. Pakistan began trying to enrich uranium in earnest in 1976. Pakistan's enrichment program developed at Kahuta, a rural site on the outskirts of Islamabad. The enrichment cycle was developed under the guidance and supervision of the well-known nuclear engineer Mr. A.Q. Khan.

Concurrent with its uranium enrichment project, Pakistan was struggling to develop a weapon design. Pakistan had to use clandestine means to acquire critical components, materials, equipment, and know-how before it could actually fabricate a bomb. Triggering mechanisms, initiating devices, and other electronics had to be fabricated or acquired. From the perspective of Pakistani policy makers, scientists, and engineers, this clandestine effort was a sacred task for the defense of Pakistan against an Indian nuclear threat. Once nuclear capability was developed and demonstrated, they believed it would be an antidote to the growing conventional military imbalance with India. President Zia-ul-Haq, during a visit to the Kahuta labs, was so impressed by the progress made by Mr. A.Q. Khan that he renamed Kahuta Research Laboratories as the A.Q. Khan Laboratories. Because of the need for secrecy, the A.Q. Khan Laboratories and other nuclear-weapons-related facilities were granted total freedom of action and an unaudited budget. Senior scientists who worked on the Pakistani nuclear program are virtual heroes with the Pakistani public.

According to the study by Albright and Hibbs (see footnote 6), A.Q. Khan announced in 1984 that Kahuta was producing low-enriched uranium, but would not enrich uranium above the five percent level. According to a 1986 memo prepared for Henry Kissinger, then a member of the President's Foreign Intelligence Advisory Board, Kahuta had the nominal capability to produce "enough weapons-grade material to build several nuclear devices per year."⁸ But the memo did not indicate the actual amount produced.

Although Pakistan's nuclear program was clandestine, with the passage of time international media and foreign governments became aware that Pakistan was indeed pursuing a nuclear weapons program. Pakistan's response to foreign concerns and criticism was an outright denial in the early stages of the program, evolving to greater ambiguity in the later years. In the view of the author, ambiguity served Pakistan well, but after the Indian nuclear explosions of 1998, Pakistan decided to end the ambiguity and declare its hand. Ambiguity was no longer an option because of the threatening statements coming out of India after India's nuclear explosions in 1998, and also because of the public outcry in Pakistan to give a befitting reply to the Indian provocation.

⁷ "Nuclearisation of South Asia", Munir Ahmed Khan, Institute of Regional Studies, Islamabad, Pakistan.

⁸ National Archives, U.S. Nuclear Non-Proliferation Policy: 194591, Document No. 0232.

2.4 Delivery Systems

Pakistan possesses two types of delivery systems in its inventory—high-performance aircraft with the Pakistan Air Force and surface-to-surface missiles with the Pakistan Army. Like the nuclear program, Pakistan’s missile program went into full speed following India’s first Prithvi ballistic missile test in 1988. Missiles will likely continue to be the core of Pakistan’s nuclear weapons delivery systems. The mainstay of the Pakistani missile force is the solid fuel Hatf III and Hatf IV. Pakistan will likely continue to carry out qualitative and quantitative improvements to its missile arsenal (Figure 1). Additionally, the possibility of Pakistan developing a ship-launched missile cannot be ruled out.



Figure 1. Shaheen II missile (Source: Pakistan Strategic Plans Division, file photo)

The type and ranges of missiles currently in Pakistan’s inventory are tabulated in Table 1:⁹

Table 1. Pakistan Missile Inventory

Missile	Fuel	Range (km)	Payload (kg)
Hatf-I	Solid	50 – 90	450
Hatf-II (Abdali)	Solid	70 – 200	450
Hatf-III (Ghaznavi)	Solid	100 – 290	800
Hatf-IV (Shaheen)	Solid	200 – 650	850
Hatf-V (Ghauri)	Liquid	300 –1300	680
Hatf-VI (Shaheen II)	Solid	700 – 2,200 ¹⁰	1,100

⁹ The accuracy of this information has been confirmed during an interview with the Strategic Plans Division.

¹⁰ The first Hatf VI test was conducted in March 2004.

3. Pakistan's Nuclear Weapon Program – Views from the U.S.

The author conducted interviews in Washington, DC during a short visit to the U.S. in May/June 2003.¹¹ The overall response of almost all the officials was consistent, yet there was significant difference in the emphasis on specific points. The views of U.S. officials and scholars are summarized in the following sections.

3.1 Views of U.S. Officials

The views of the U.S. establishment were acquired through meetings with senior and mid-level officials of the Department of the State, Department of Defense, Department of Energy and the National Security Council. Through the courtesy of the Department of Energy, an in-depth meeting was held with professional staff members of the Senate Committee on Foreign Relations which provided an important perspective of their basic concerns regarding Pakistan's nuclear weapons program. Officials of the Bureau of Nonproliferation at the State Department provided the most comprehensive perspective of the unofficial views of the U.S. establishment. The important issues and concerns expressed by the U.S. establishment are listed below:

- The security of Pakistan's nuclear assets is probably the biggest concern, and the risk of nuclear weapons or weapons-usable material falling into the wrong hands is a concern that warrants constant attention.
- Pakistan's overall image has not been helped by its past dealings with North Korea and the Taliban, or by loose talk of an "Islamic Bomb."
- The U.S. is very concerned by the prospect of nuclear-armed conflict in South Asia.
- Both Pakistan and India have sufficient capability to destroy the political and economic infrastructure of the other, and to kill countless numbers of people. It is time to put a cap on new weapons creation.
- The Pakistani military is recognized to have an essential role in stability. It is the only institution in Pakistan, unfortunately, that has had a degree of stability. While the nation is establishing new, durable, and responsible democratic institutions, the military can act as a stabilizing force. But, over the long term, the development of viable democratic institutions in Pakistan is essential for greater nuclear stability.
- What is important is (1) that those who are in the decision-making process are cautious, pragmatic, and not prone to rash decisions, (2) that the nuclear assets in Pakistan are fully secured, and (3) that only those people who should have access to the weapons do have access and only when needed.
- The U.S. can help Pakistan develop its Personnel Reliability Program (PRP) if that is what Pakistan wants. Despite the cultural and political differences between our societies, the principles of PRP developed through the U.S. experience apply broadly to the Pakistani situation.

¹¹ The interviews were conducted prior to the A.Q. Khan disclosure in February 2004.

- It is important to understand that a nuclear war cannot be “won” and therefore should never be fought. Thus, the U.S. has urged India and Pakistan not to deploy nuclear weapons or nuclear-capable ballistic missiles, not to develop new types of missiles, to exercise restraint in testing of ballistic missiles, to implement the confidence-building measures (CBMs) already agreed to, and to engage in bilateral dialogue.
- Institutions like the U.S.-Russian Nuclear Risk Reduction Centers could play a valuable role in the region. Such risk reduction centers are useful tools for exchanging information (troop movements, military exercises, implementation of CBMs, etc.) in agreed-upon formats. In fact, the routine, regularized communication in itself acts as a CBM. If and when both sides are amenable, the U.S. could assist in exploring this possibility.

3.2 Views of U.S. Scholars

A number of nongovernmental organizations (NGOs) in the United States contributed views on the Pakistan nuclear weapons program. The NGOs included the Brookings Institution, the Henry L. Stimson Center, and Johns Hopkins University, among others.

- The most important worry is the potential for proliferation emanating from Pakistan.
- To avoid war by miscalculation, the following need to be done: First, create greater transparency—both sides need to develop an accurate assessment of what the other side will do. In a crisis, perception is everything. Second, risk-reduction measures need to be put in place. Third, additional CBMs and arms control measures need to be discussed.
- Pakistan faces many challenges. Pakistan built the bomb, but needs to develop trust. An Islamic bomb is a concept with serious implications. What will increase our confidence in Pakistan?
 - Nuclear weapons are disassembled and not mated.
 - Politically tell the world that you are not on a hair trigger alert.
 - Build verifiable nuclear risk reduction regimes.
- Nuclear risk reduction centers need to be created, and wise people need to get together (maybe with U.S. facilitators) to determine what the needs are (crisis management or merely communications), and how best to serve them. In addition to the current link between the Directors General of Military Operations (DGMOs), hot lines are needed between Army Chiefs, Air Force Chiefs, and Navy Chiefs.
- Associates of A.Q. Khan are disagreeable. This gives your program another dimension and creates difficulty with the U.S.

4. Pakistani Perceptions of the Nuclear Program

While Pakistan has not formally announced any nuclear doctrine, the President, Foreign Minister, and Foreign Secretary have mentioned on various occasions its main elements, such as restraint and responsibility, a minimum deterrent posture, avoidance of an arms race, non-use against non-nuclear states, and participation in universally applicable nondiscriminatory multilateral arms control negotiations.

The unofficial view of the Pakistani establishment was obtained through a series of meetings with senior policy makers within the Pakistan Army, the Ministry of Foreign Affairs, and at the highest level of the Strategic Plans Division (SPD), the military organization that oversees almost all aspects of Pakistan's nuclear weapons program. A summary of important points expressed by the Pakistani establishment is listed below.

4.1 Pakistan's Nuclear Policy¹²

The four objectives of Pakistan's Nuclear Policy are:

1. Deterrence of all forms of external aggression, which can endanger Pakistan's national security.
2. Deterrence will be achieved through the development and maintenance of an effective combination of conventional and strategic forces, at adequate levels within the country's resource constraints.
3. Deterrence of Pakistan's adversaries from attempting a counter-force strategy against its strategic assets by effectively securing the strategic assets and threatening nuclear retaliation should such an attempt be made.
4. Stabilization of strategic deterrence in the South Asia region.

The central theme of Pakistan's nuclear policy is to act in a responsible manner and exercise maximum restraint in the conduct of its deterrence policy. Some of the salient elements are as follows:

- Pakistan's nuclear capability is solely for the purpose of deterrence of aggression and defense of sovereignty.
- Pakistan will not use or threaten to use nuclear weapons against any state which does not possess nuclear weapons.
- Maintenance of Credible Minimum Nuclear Deterrence is the guiding principle of Pakistan's security policy.
- Pakistan will refrain from entering into any arms race.
- Pakistan will not transfer nuclear weapons or weapons-related material or technology to any other entity or state.

¹² The presentation of Pakistan's nuclear policy is based on interviews with officials in the Strategic Command Authority, which is the secretariat of the National Command Authority.

- Pakistan will continue to support international arms control and disarmament initiatives, which are universal and non-discriminatory in character.
- Command and control of nuclear forces will be vested in the President and will be exercised through a National Command Authority assisted by the Strategic Plans Division as its secretariat and Strategic Commands within the Armed Forces.¹³

4.1.1 Issues Related to Management of Nuclear Policy

The major problems associated with the management of the Indo-Pak nuclear equation are:

1. Vulnerability of nuclear assets while the force structures are evolving.
2. Gaps in surveillance, early warning and intelligence assets.
3. Evolving command and control systems.
4. Short flight times of missiles.
5. Deep rooted mistrust and active disputes such as Kashmir.
6. Lack of institutionalized crisis management mechanisms.

Pakistan has determined the size of its minimum deterrent force irrespective of the eventual size of the Indian arsenal. The President has stated on a number of occasions that Pakistan has quantified the size of its minimum nuclear deterrent and has made a conscious decision to eschew a nuclear/missile arms race with India.

Pakistan believes that the best way to avoid nuclear war is to have no war at all. However, a no-first-use policy may be construed by the conventionally stronger side as a license to exploit its conventional superiority.

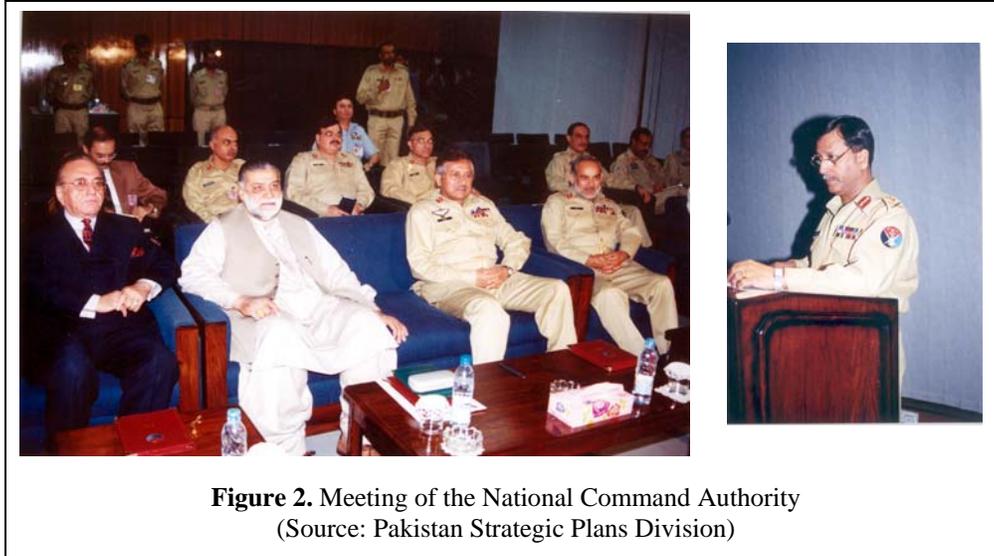
4.1.2 Operational Issues

On February 7, 2000, Pakistan announced the establishment of a comprehensive command and control structure, which has three components: the National Command Authority, the Strategic Plans Division, and the Strategic Forces Commands. For details, see Appendix A.

Pakistan has a well thought out operational doctrine; however, due to reasons of operational security its details cannot be divulged in this paper. The National Command Authority (NCA) is responsible for the employment and deployment aspects of the nuclear force. It coordinates the activities of strategic organizations, deals with arms control and disarmament matters, and oversees the implementation of export controls, and safety and security of nuclear installations and materials. Each of the three services (Army, Air Force and Navy) has its respective strategic force command; however, operational control remains with the NCA. The SPD, which acts as the secretariat for the NCA, performs the coordination functions.

The final authority to launch a nuclear strike is dependent upon consensus within the NCA (Figure 2), with the Chairman casting the final vote. At weapon launch sites the 2-3 man rule, codes, progressive alert status, etc., will be employed. Pakistan does not have a “launch on warning” posture.

¹³ The Army, the Navy and the Air Force will have their respective strategic commands.



4.1.3 Security Aspects

The physical security of Pakistan's nuclear arsenal is a critical issue. Pakistan has multiple layers of security, which are continuously reviewed and upgraded. At every site, there are security personnel from the concerned strategic organizations, and there is an additional security perimeter manned by military personnel.

Regarding the security of nuclear materials, there is a system of internal auditing. In addition, all strategic organizations have integral security elements that are further overseen by the Counter Intelligence assets of the Advisor Security NCA. There is also an elaborate system embodying many elements of the U.S. PRP already in place, and it is being further refined. Any individual assigned to a sensitive task is security cleared by at least three intelligence/security agencies. This clearance includes complete background checks on family, educational career, political affiliations/inclinations, etc. The same procedure is followed for recruitment of personnel for strategic projects. Each strategic organization has its own internal security organization in addition to that set up by the Advisor Security NCA that oversees all components of the NCA and performs counterintelligence functions.

4.1.4 Source and Material Accountability

Pakistan is party to the Nuclear Safety Convention and has already established an autonomous body—the Pakistan Nuclear Regulatory Authority (PRNA)—that oversees all aspects related to the safety and security of all radioactive sources, including those used in X-ray machines. The possibility of radioactive material being pilfered by unauthorized persons is perceived in Pakistan to be very low.

4.2 Views of Policy Influentials

Policy influentials are those Pakistanis who influence Pakistan's strategic thinking through a variety of means. They include those who influenced or guided the development of some aspect of Pakistan's nuclear program or policy while in the government's service. The people

interviewed included retired senior military officers (some of whom had overseen the nuclear weapons program), senior policy makers, retired Foreign Service officials, scientists/engineers who played an active role in the development of the Pakistani nuclear program, and opinion makers in journalism and academia.

The views of the two main political parties (Pakistan Peoples Party and the Muslim League) and the views of the most organized and largest religious party, the Jamaat-e-Islami, were also obtained. In essence, the views of the knowledgeable political elite coincided with the views of the government. But only a handful of the leadership of the political and religious parties had a clear understanding of nuclear weapons; most saw a nuclear weapon as a very large bomb with devastating power. Many religious leaders viewed nuclear weapons as a panacea for military weakness. However, the view of an enlightened religious scholar on one specific aspect is worthy of mention:

From an Islamic point of view, all WMD are bad because they do not differentiate between the belligerent and victim or the military and the civilians. Islam is sensitive to the nuclear weapons. "No First Use" is just a pious phrase, usually voiced when not relevant. There are numerous examples of this in history. We want to have a 'no war pact' with all foreign powers. War takes place when there is a failure of foreign policy. Therefore, there needs to be greater emphasis on diplomacy. The aim should be to make war redundant.

Significant opinions and views expressed by the policy influentials are tabulated in the following sections.

4.2.1 Building a Stable Deterrence

Surprisingly, there was almost unanimity in the broad concept of a stable deterrence. From a Pakistani perspective, it was based on "the possession of sufficient numbers of weapons to convince the Indians of unacceptable damage in spite of a pre-emptive strike by them." Built into this concept is the survivability of a sufficient number of nuclear weapons and their ability to penetrate the Indian defensive shield. Most influentials felt that Pakistan should focus on minimum deterrence and avoid a nuclear arms race with India.

Although Pakistan hoped to never fight a nuclear war, it was felt that its military should train to fight a nuclear war, for only then will its deterrence be effective. In other words, the deterrence has to be demonstrable to be effective.

There are pros and cons in declaring the nuclear doctrine. What India presented is a declaratory doctrine, which is different from an operational doctrine. Pakistan, too, should declare some elements of its nuclear doctrine, which it has already done in bits and pieces; however, an element of ambiguity better serves Pakistan's interests. There is a need to define, in very general terms, when the nuclear option would be considered by Pakistan. However, no one was supportive of making such thresholds public. Most influentials felt that the present level of mistrust between India and Pakistan is an obstacle in the creation of a stable deterrence; therefore, an effort should be made to reduce this mistrust to achieve stability.

4.2.2 Security of Weapons

There exists a clear divide in the opinion on this issue. Retired military officers, especially those who were involved with the nuclear program, were comfortable with the current level of security. However, retired civil servants, scholars and journalists had a divergent view; they displayed a high level of concern on the security of nuclear weapons.

The divergent view was of the opinion that the Pakistani society is increasingly divided. They were worried by the ideological penetration of the military. Others felt that baser considerations like money could motivate the violation of systems and procedures. There is no room for complacency, they commented. Pakistan needs to learn from the West and adapt some of their systems to the local environment.

Another issue in the minds of some was the overall level of incompetence and carelessness that has crept into Pakistani society. One observer commented, "We are unable to efficiently manage simple functions of state, the haphazard traffic on our roads is a reflection of our organization, how then can one expect that the security of our nuclear assets is foolproof?" A scholar recommended that the physical security of all our nuclear assets should be placed under a special security agency of the Army. The Army has the advantage of discipline and an enhanced sense of responsibility.

4.2.3 Nuclear Decision Making Process

Again, the opinion was divided, similar to the division of views on the security of weapons. Those who had been a part of the decision-making system, or those who were involved as senior staffers, were satisfied with the current arrangements. A common view was that the Army will continue to play a large role in the nuclear decision-making process.

One of the scholars made useful recommendations to reform the decision-making process:

- Clear strategic thinking is almost impossible without a stable political system. The first order of business should be to develop political stability. Frequent and direct military interventions cannot develop this stability. A dominant military role in the nuclear decision system is inevitable until the political system matures; however, even with a dominant role of the military, the final decision should rest with the Prime Minister.
- The political leadership and the people of Pakistan need to be educated on the role of nuclear weapons in the overall security of the nation, and how nuclear weapons can be an instrument of strategic policy (with the firm hope that they would never be used). The National Defense College and the handful of think tanks in Pakistan could play a central role in this education process of the masses.
- There should be constant interaction between the military and the political leadership to evolve strategic thought. It should not be the exclusive domain of one or the other. Such an interaction is a learning process for both, not only for technical and strategic issues but the different approaches to problem solving by the military and the political mind. The political mind is developed to think in shades of grey, and compromise is an essential element of political thinking. The military command structure is less flexible and tends to think in black and white.

An interactive process between the military and the civilian leadership on this important issue of nuclear policy and doctrine would benefit both.

4.2.4 Growing Influence of Religious Fundamentalists

Of the policy influentials interviewed, almost every one of them displayed a mild to a serious concern on this account. A senior retired soldier commented that the old personnel reliability program needs review. Religious views have encroached on the military as post-Zia acceptance of religious groups like the Tabliki Jamaat¹⁴ has increased. This is not considered inherently negative, but needs careful monitoring. One scholar believed that there has been penetration of the military rank and file, and influence of religious groups is on the rise. After all, religious zealots, including two to three Generals, were products of this Army. Recently, a Major Qaddus¹⁵ was apprehended by Inter-Services Intelligence (ISI) for involvement with religious extremists. “The security of our nuclear assets may be very good, but there is no need for complacency,” the scholar said.

Another scholar commented that though he was not certain of any extremist influences in the Army, he was uncomfortable. Some people in Pakistan believe that their duty to the Muslim Ummah¹⁶ is more important than their commitment to the Nation. Another scholar commented that he was aware that the entire Army is religious, but it does not mean that they are extremists or fundamentalists. “I have great trust in our soldiers,” he said, “and believe that our soldiers will act in a responsible manner.” Another senior retired soldier commented that the personal reliability program and other security measures constantly need improvement. He also believed there are many sympathizers with political and religious parties in the military, but this does not mean that they will smuggle nuclear weapons or fissile materials. “The possibility of this is almost zero. We should depend on good SOPs¹⁷ rather than worry about ideological leanings.” He commented that he would be more comfortable with some of the religious leaders than some of our political leaders. The bottom line, he said, was to protect the nuclear assets and stop chasing ghosts where none exists.

4.2.5 Presenting a Doctrine

There was almost a consensus that there is no need to present a formal doctrine, as ambiguity suits Pakistan. It was mentioned that the Government of Pakistan, through statements and interviews, has already spelled out certain elements of a nuclear doctrine. Instead of presenting a formal nuclear doctrine, it would be prudent to spell out those elements of the doctrine that are relevant to the requirement at a point in time.

¹⁴ The Tabliki Jamaat is a religious but nonpolitical organization devoted to the teachings of Islam. This organization conducts its activity both within and outside Pakistan. Within Pakistan, the Tabliki Jamaat focuses on improving the understanding of Islam amongst the Muslims. At their annual convention, the Jamaat attracts hundreds of thousand of followers at their Headquarters at Raiwind—a small town near Lahore.

¹⁵ This officer, though belonging to the Pakistan Army, had retired years earlier. It is not uncommon for retired military and nonmilitary personnel to lean toward greater religiosity after retirement.

¹⁶ Ummah roughly translated would mean the followers of the Prophet Mohammad (peace be upon him) or the believers of the Quran. In a very general sense, it means the brotherhood of Muslims throughout the world, irrespective of their national identity.

¹⁷ SOPs: Standard Operating Procedures

Though in the minority, a few scholars extolled the virtue of a declaratory nuclear doctrine. A declared nuclear doctrine, they felt, would enhance the stability of the deterrence through transparency. This doctrine could be refined with the passage of time.

4.2.6 Nuclear War by Miscalculation

To the last person, everyone interviewed felt that there is indeed the possibility of a nuclear war by miscalculation, more-so than during the Cold War. A number of factors were presented that could result in a war by miscalculation; however, the deep mistrust between the people and the military establishments of the two countries was the overarching factor. Additionally, the short time of flight between the two countries did not allow the available systems and procedures to accurately assess the launch of a missile. Lack of dedicated hot lines and good communication would also enhance the possibility of a war by miscalculation.

Another important factor that increases the possibility of a nuclear war by miscalculation is the presence of a major political dispute (Kashmir) between the two nations and a disputed border (the Line of Control dividing Kashmir). The low intensity war in the Siachen Glacier region also contributes to the problem. Combat-ready military forces of India and Pakistan are in eyeball contact with each other along the LOC, adding to the high tension.

A number of suggestions were offered to minimize the chances of a war by miscalculation and are listed below:

- The establishment and the practice of well-considered and verifiable nuclear-related CBMs, in addition to the existing ones (non-attack on nuclear facilities, etc.).
- An agreement to keep the nuclear weapons unmated to delivery systems during peacetime and during periods of heightened tensions. Each side should inform the other side when the weapons are mated.
- The involvement of regional and global powers as honest brokers to help reduce tensions and avoid conflict.
- The resolution of outstanding disputes is the ultimate measure to reduce the risk of conflict.
- Revisiting the Lahore Memorandum of Understanding (MOU) and reaffirming the commitments made therein would be a good starting point.

5. The A.Q. Khan Saga

On February 4, 2004, an event transpired in Pakistan that shattered the myth of security of Pakistan's nuclear program. The father of Pakistan's nuclear program, Mr. Abdul Qadeer Khan, made a statement on national television taking full responsibility for the proliferation of nuclear weapons technology from Pakistan. The Pakistani nation was stunned. Many Pakistanis believed that Mr. Khan had performed yet another act of heroism by taking all the blame, which in the mind of many citizens should have been shared by the establishment, particularly the military. By and large, the Pakistani media shared the views of the people. Emotionally the Pakistani nation has been in a state of denial, unwilling to accept the demolition of one of its few heroes.

The Government of Pakistan conducted its investigation after receiving concrete evidence from the International Atomic Energy Agency (IAEA) and the U.S. Government in October 2003. The Government has strongly denied the involvement of the establishment or that of any senior official of the Pakistan Army in the proliferation scandal. The international media, particularly Bernard-Henri Levy in a story in *The Wall Street Journal* on 17 February 2004, doubts that claim. Levy said, "It is inconceivable that Khan operated alone without orders or cover." The issue is still unfolding, and it would be inappropriate for the author of this study to attempt a judgment. However, from the emerging information, it appears that Mr. Khan was selling nuclear technology for personal monetary gain.

For the last many years, it was common knowledge among well-informed individuals in Pakistan that Mr. Khan had accumulated assets well beyond his known means of income, the common inference being that he had siphoned money from the funds provided to him for the nuclear program. Few, if any suspected that A.Q. Khan might be selling state secrets for baser reasons. That Mr. Khan operated a number of fake companies was in all probability known to the highest in the establishment, for such actions were considered essential to obtain technology for Pakistan's clandestine nuclear program. On coming to power, President Musharraf, probably suspecting Mr. Khan of impropriety, had eased him out of his powerful job of the chief executive of the A.Q. Khan Laboratories into a largely ceremonial position in 2000.

6. Net Assessment – Pakistan's Nuclear Program

6.1 Response to India

Pakistan's nuclear program was initiated to respond to a looming nuclear threat from India. The offensive rhetoric and threats coming from India after the Indian nuclear explosions made Pakistan's decision to develop nuclear capability easier. Pakistani strategic planners believe that only after Pakistan's nuclear explosions did India seriously talk of peace; thus, they feel justified.

It is very likely that had Pakistan not possessed nuclear weapons, India would have started an all-out war during the Kargil Crisis and may have even declared war during the military stand off resulting from the terrorist attack on the Indian Parliament on December 13, 2001. However, it is also true that the Kargil Crisis may not have occurred if Pakistan had not developed confidence because of its nuclear capability. In the author's assessment, Kargil was the result of flawed strategic thinking in Pakistan and not as a result of going nuclear.

Pakistan's nuclear weapons program, in all probability, will grow in capability. Greater attention will continue to be given to weapon systems improvements to match the Indian nuclear program developments. The primary area of development is likely to be in missile-launched weapons with a focus on accuracy, payload, and their ability to penetrate the adversary's defenses.

Pakistan will work toward the development of the triad by giving the Pakistan Navy nuclear capability. The desire for naval nuclear capability will gain urgency if it is felt by the leadership in Pakistan that the ground-based systems do not provide the assured second-strike capability. The primary reason for not developing a naval nuclear option would be an inability to resolve the technical problems.

As Pakistan's nuclear weapons program results from the threat from India, diminishing this threat may encourage Pakistan to curtail further expenditures on its nuclear program.

6.2 Nuclear Doctrine

The strategic thinkers in Pakistan are convinced that while not averse to transparency, Pakistan, a weaker power, benefits from a degree of ambiguity and avoids needless competition with India. More recently, Pakistan has defined the four broad objectives of its nuclear policy and some salient elements of its nuclear policy, as presented in section 4.1. In effect these objectives and elements of policy define Pakistan's broad nuclear doctrine. Occasional policy statements from the senior members of the National Command Authority elaborate the guiding objectives of Pakistan's nuclear strategy and doctrine. Defining a nuclear doctrine is not a critical issue as long as a fairly high level of transparency is achieved between the two rivals in South Asia.

6.3 Minimum Deterrence

There is a basic consensus in Pakistan on what constitutes minimum deterrence, the basic concept being that Pakistan should possess the capability to strike back and inflict unacceptable damage after having absorbed a nuclear strike. Without revealing the exact number of nuclear weapons, the government of Pakistan through various pronouncements has quantified the

number of weapons that constitutes minimum deterrence. If a few can do the job, then “why more?” is the reasoning.

Minimum deterrence as defined by a Senator from the Jamaat-e-Islami seems more realistic: “Minimum deterrence is based on the perception of threat. It is dynamic, both technically and operationally. It is constantly changing along with the threat. It does not mean equality or proportionality. Deterrence is a combination of nuclear and the conventional, and above all, the national will to face a challenge.”

Defining “unacceptable damage to the enemy” is difficult because it requires estimating a punishment threshold that the adversary is not willing to accept. Because of the difficulty in predicting unacceptable damage, overkill would by necessity be built into the response.

6.4 Nuclear Decision Making Process

With the establishment of the National Command Authority (NCA), a fairly balanced system has been developed with institutional checks and balances. The NCA has both civilian and military decision makers. It is possible that the role of the civilian leadership will increase as it develops a better understanding of the nuclear environment.

There is no doubt that the military will continue to play a major role in the nuclear decision making process as it does in the political arena. Irrespective of the role of the military, the presence of the Prime Minister and a few cabinet colleagues will weigh heavily in creating a balance. In the present environment, the final decision will probably rest with three people: the President, the Prime Minister, and the Army Chief. With a civilian President, the role of the political leadership is likely to grow.

6.5 Deterrence: Stable or Dangerous?

Officials in both India and Pakistan feel that the deterrence between the two rivals is stable; this view is also shared by a large number of scholars in both countries. Such confidence may be unwarranted. Nuclear deterrence in South Asia is unstable for the following reasons:

- Territorial disputes. There are serious territorial disputes between India and Pakistan with strong emotional overtones. As the last fifty years of the Indo-Pak relationship has shown, it takes very little to escalate from relative peace to a high level of confrontation.
- Mistrust. Mistrust when combined with brinkmanship and rhetoric, which are common traits of the political leadership in India and Pakistan, can result in rash decisions.
- Lack of institutionalized crisis management mechanisms. Lack of an institutional mechanism for crisis management will certainly move India and Pakistan up the escalation ladder in a short time. This has occurred before, even after both countries became nuclear powers.
- Lack of understanding of the nuclear strategy and deterrence. Nuclear weapons have been developed in great secrecy in India and Pakistan. In Pakistan, only a handful of military leaders and even fewer political decision makers were aware

of the nuclear programs, let alone being educated on the nuclear environments. However, the military in Pakistan has taken a bold step to educate the newly elected members of the parliament on issues of national security, including nuclear issues.

Deterrence that is not designed for use will not deter.¹⁸ Stability will increase if the antagonists believe that the other will use the nuclear weapon after a notional red line is crossed. This may be a military condition, but could also be a politically intolerable situation. As Sir Michael Quinlan aptly describes, "Weapons deter by the possibility of their use and by no other route." He further qualifies, "A structure of deterrence cannot be built upon a state policy of absolute no-use, or without genuine concepts of possible use."¹⁹ The leadership in Pakistan understands this. However, it is doubtful whether both India and Pakistan understand the pain threshold of the other, or what is politically intolerable for the other in absolute terms.

6.6 Safety of Nuclear Weapons

Due to understandable opacity, it was not possible to evaluate directly the safety of Pakistan's nuclear weapons. However, scientists and users are confident that a Pakistani nuclear weapon will not explode due to accidents or mishandling and is unlikely to initiate a chain reaction, even if detonated by conventional explosive. The conventional explosive of a nuclear weapon would at most spread radioactive contamination locally.

6.7 Security of Nuclear Weapons and Facilities

Based on information provided by the officialdom, Pakistan is using a three-man rule, a variant of the two-man rule for security. The code to arm a weapon is divided between three people, rather than two people. For example, at an air force base the code may be divided between the base commander and the unit commander. In the army, the code may be divided between the group commander and the unit commander. This rule also applies to a launch site. The only exception is a single pilot who will receive the full code during flight; however, a single person cannot provide the full code. The Pakistani system is not as sophisticated as the U.S. Permissive Action Link (PAL) system, but it appears that attention is being given to security issues.

For the U.S. and the rest of the West, one of the most troubling aspects of Pakistan's nuclear program is inadequate physical security, which can lead to proliferation. This perception is based on two concerns. First is the belief that Pakistan does not have the systems, procedures and the technical skills to ensure the total security of its nuclear weapons, materials, and technology. The second and the more serious concern is the belief that the nuclear weapons are within reach of the religious extremists within and outside the military.

For many in the Pakistani military, particularly those presently in charge of nuclear weapons, these concerns are not based on fact. It is their opinion that the possibility of nuclear weapons and technology landing in the hands of nonstate actors or some extremists within the military is almost zero. However, knowledgeable scholars and some officials in the U.S. suspect senior

¹⁸ This concept has also been attributed to Henry Kissinger, evidently espoused in relation to the Cold War.

¹⁹ *Thinking about Nuclear Weapons*, Michael Quinlan, RUSI Whitehall Paper Series 1997, page 15.

nuclear scientists and even the state of Pakistan of proliferation. During interviews in May 2003, a U.S. official said, “The security of Pakistan's nuclear assets is probably the biggest concern.”

Visits to two important sites, PINSTECH and CHASNUPP, suggested a different conclusion. The quality of security employed and the nuclear material accounting system of nonmilitary nuclear installations is much higher than before September 11, 2001. However, there is room for improvement. (See Appendix B.)

Religious influence has increased in Pakistan, with a special impetus being given in the late seventies and early eighties during the rule (July 1977 – August 1988) of General Zia-ul-Haq.²⁰ Although a large percentage of people have become practicing Muslims, they remain liberal in the practice of their faith. Nevertheless, a sizable minority of the people in Pakistan, in particular the youth of the poorer sections of society, has been radicalized.

In the most recent elections in Pakistan (October 2002), the MMA,²¹ a group of religious parties, won a large number of seats both in the provincial and the national assemblies, surprising political analysts. Today two of the four provinces of Pakistan are dominated by coalitions formed by the MMA, and they have an effective minority at the federal level. In the foreseeable future (three to five years), the elevation of the religious parties in the political arena will not affect overall nuclear stability or increase proliferation because the military will continue to play the dominant role in managing the nuclear program. Nevertheless, growing extremism is a serious threat to the generally liberal Pakistani society. If this trend is not arrested it will pose a serious challenge to the security of Pakistan and its nuclear weapons.

Two steps could be taken to improve the security of nuclear weapons and facilities:

1. Presently, the primary security apparatus charged with the security of nuclear installations is answerable to the executive head of the protected institution; this method can result in security lapses and needs to change.
2. There is an urgent need to improve the technical skills of personnel charged with the security of nuclear installations and develop an institutional security culture.

6.8 Security of Nonmilitary Nuclear Installations²²

Almost all nonmilitary nuclear installations in Pakistan are under the purview of the IAEA, through the civilian Pakistan Nuclear Regulatory Authority (PNRA). The PNRA oversees all the

²⁰ General Zia, in a genuine endeavor to increase literacy in a short time span, financially supported the religious madrassas (schools), unfortunately without providing adequate direction on the syllabus. In addition, for a variety of other reasons, which include poverty, joblessness, and the inadequacy of educational facilities, the madrassas flourished, churning out countless number of youth filled with religious zeal but no education that would equip them for jobs, except as religious teachers in mosques and madrassas. Thousands of madrassas have now sprung up in Pakistan, guided only by narrow understanding of Islam and with no facility for education in liberal arts or sciences. Most madrassas are nonviolent, but some are focused on militant Jihad.

²¹ MMA stands for “Motahadda Majlis e Amal,” a word in the Pakistani national language Urdu, roughly translated as United Council for Action. The MMA is a coalition of seven religious parties. The Jaamat-e-Islami party is its largest component.

²² Information is based on an in-depth interview with the Chairman of the Pakistan Nuclear Regulatory Authority, discussion with a retired nuclear scientist from the PAEC, and on the author's visits to two nuclear installations.

nonmilitary nuclear activity, from power plants to nuclear medical facilities, for safety and security of all radioactive sources. The PNRA is a relatively new agency in the process of becoming established.

The Chairman of the PNRA mentioned that Pakistan needs to develop higher standards of safety and security, and the PNRA is working toward those goals. The courses offered by the IAEA were very useful and form the foundation of the safety and security SOPs being implemented in Pakistan. He expanded that the PNRA is trying to promote a safety and security culture. Regulations continue to be evolved and standards that were acceptable in the past are not acceptable today, he said. "We need physical protection courses," he expressed.

Although the security of nonmilitary nuclear installations is not yet up to international standards, much emphasis is being laid on this issue, and progress will be made. The Strategic Plans Division is in the process of developing a blueprint for the organization of a new security force trained and equipped to act as a dedicated security agency for all nuclear facilities in Pakistan, military and nonmilitary.

6.9 Author's Assessment of Nonmilitary Installations

Systems for physical protection of nuclear sites as well as a personnel reliability system are functioning. Based on their track record, they seem to be meeting the demands of today, including the threat from radicals. Both protection security and the personnel reliability program are undergoing revision. The author has the following recommendations:

1. The training of the security force meant for both military and nonmilitary installations/sites needs to be brought up to international standards.
2. Pakistan should redefine the threat because of the growth of international terrorism. A realistic threat assessment is vital in drawing up a dynamic security plan to defeat the threat. Today the threat to Pakistan's nuclear installations is both internal and external; additionally, it is multidimensional. All nations have internal and external threats; however, they differ in the type of threat and its intensity.
3. To defeat the multiple threats (internal and external), Pakistan needs to add modern and sophisticated anti-intrusion devices to supplement the existing effort. A site "quick reaction force" is important to meet a serious terrorist threat. Frequent scenario playing will keep the security apparatus alert.
4. Pakistan should request in-country special courses from the IAEA to train a nucleus of 50 to 60 security persons on the physical protection of nuclear assets.
5. The U.S., without being overly intrusive, should consider helping Pakistan improve safety and security training for Pakistan's nonmilitary nuclear assets. To supplement the efforts of IAEA, the U.S. also should consider providing both physical and economic help to Pakistan to make its nuclear program more safe and secure.

This page left intentionally blank

7. The Way Forward – Recommendations for Enhancing Stability

Drawing on the comments and advice of various scholars within and outside Pakistan, there are a number of measures that Pakistan needs to take unilaterally to improve nuclear stability and ensure the physical security of its nuclear arsenal. In all probability, the measures recommended for Pakistan would also be applicable for adoption in India.

7.1 Learn from the Cold War

Evoking history is a common practice; however, studying and learning from history is another matter. Many times political leaders evoke history while drawing the wrong lessons from it. This was true during World War II and the Cuban Missile Crisis.²³ The end of the Cold War has finally provided an opportunity to view events of the Cold War from multiple perspectives. Today an event of the Cold War can be analyzed from the views of both the adversarial parties. The Indo-Pak political security environment is indeed different from the Cold War; therefore, it would be an imprudent exercise to mechanically transplant the lessons of the Cold War to that of South Asia. However, while recognizing the differences, some broad lessons can be learned for bilateral negotiation between India and Pakistan:²⁴

- Negotiators should rely on gradualism and selectivity rather than seek “grand deals.” Partial progress is better than none.
- Progress should be sought separately and simultaneously on a range of issues; each should be pursued regardless of what is happening on other fronts.
- CBMs should be sought even when there are strong differences of views regarding states’ activities and policies.
- Symbolism is important; tone and language should be kept positive and people-to-people contact encouraged at multiple levels.
- A wide range of institutions should be established for continuous dialogue; regular contact should be maintained. To facilitate the change of mindsets, low-level and low-profile contacts must continue.
- Establish “Risk Reduction Centers.” Following the example of Nuclear Risk Reduction Centers (NRRCs) in the Cold War (Figure 3), but going beyond their example, India and Pakistan need to consider establishing such centers to suit the South Asia security environment. Some academic work has already been done to support this concept. Currently, a “Track Two” project undertaken by the Center for Strategic and International Studies in Washington, DC is examining the idea of establishing such centers in India and Pakistan.

²³ “Perception and Misperception: Lessons from the Cuban Missile Crisis.” Paper presented by Len Scott at Conference on Confidence Building Measures between India and Pakistan, 7 April 2003, Centre for Studies in Security and Diplomacy, University of Birmingham.

²⁴ From the Short Report on Wilton Park (UK) Conference WPS 01/12 on the Reshaping of European Security Relations: 1980 – 2000.



Figure 3. Nuclear Risk Reduction Center, Washington, DC, May 2003

- Avoid war. The most important lesson of the Cold War for nuclear stability is to avoid war. The transition from tensions, to heightened tensions, to limited hostility, to an all out conventional war is an escalatory ladder all too familiar to India and Pakistan. Therefore, there is a need to develop a number of firebreaks between the rungs of the escalatory ladder, firebreaks that will prevent a crisis from snowballing into a war. Thus, there is a need for crisis management.

7.2 Control Political Pressures

- Reduce the radical religious influences on bilateral relations. This was a difficult proposition with the BJP controlling the government in New Delhi and the religious right influencing the Government in Islamabad. However, the recent change in government in India may provide opportunities. An agreement between the two countries to reduce hostile propaganda (including a statement that “religion will not be exploited by the establishments of both countries”) and discourage media use of this issue would be largely beneficial.
- Maintain territorial status quo. Drawing on the Simla Agreement between the two countries, a commitment needs to be reaffirmed that violence of any kind will neither be used nor supported for changing the territorial status quo. During the Cold War, in spite of provocations and disputes, both the nuclear groupings (Warsaw Pact and NATO) took great care not to resort to violence to change the status quo in Europe, especially in Berlin.
- Resolve disputes. Lingering disputes, like Kashmir, between the two nations need to be addressed and hopefully resolved in a spirit of mutual accommodation, through a slow, deliberate and sustained process of dialogue.

7.3 Implement Crisis Management

With serious unresolved problems and a high degree of mistrust, India and Pakistan have moved from one crisis to another, only a hair’s breadth away from war and possibly a nuclear war. Having attained nuclear status did not change this pattern—the Kargil Crisis and the recent military standoff of 2001–2002 are two recent examples. Some scholars discern a high degree of

military brinkmanship by Pakistan in the first case and coercive diplomacy by India in the second.

The best method to control the almost automatic escalation of a situation is through crisis management, based on an agreed agenda of deliberate measures. It is recommended that a set of well-considered CBMs, both political and military, be adopted by the two countries to manage crises and arrest escalation. A few recommendations for crisis management are:

- Implement a crisis management agreement. As nuclear rivals, neither country can afford to climb the escalatory ladder. It would therefore be an advantage for India and Pakistan to develop jointly a crisis-management agreement. For this, both countries will need to agree what constitutes a crisis. After defining what constitutes a crisis in the Indo-Pakistan context, the agreement will then need to evolve a methodology for managing crises.
- Appoint special emissaries to the heads of government. If agreed in advance, special emissaries could be appointed as soon as a serious crisis develops. The emissary, for necessary political clout, should have the status of a senior minister. Dialogue can be initiated in a third country.
- Initiate media management. As an element of the crisis-management agreement, both countries could set up a predetermined media-management mechanism at the first indication of a crisis. A media-management mechanism would involve constituting a team comprising three to four senior members representing the independent media and a senior representative of the ministry of information from either side with direct access to the Prime Ministers of their countries. The primary mission of the media management mechanism would be to reduce hostile propaganda and develop harmony between the two nations. This mechanism would control the negative rhetoric, including control of what is released to the media by the representatives of the government.
- Establish hot lines. There is a need to establish dedicated and direct hot lines between the heads of government in addition to the existing DGMO hot line. A third hot line needs to be established between the Joint Staff Headquarters²⁵ of the two countries. Besides the current voice circuit, a text messaging system like a teletype²⁶ link should be added to the three hot lines. Redundancy and greater reliability need to be built into the hot lines. Satellite connections need to be added for greater reliability. The purpose of these communications would be crisis prevention as well as crisis management. For permanence and clarity, a protocol (hot line protocol) between the two countries would be important, not unlike the protocol signed by the U.S. and the Soviet Union in September 1987.
- Notification of alert status. During a serious military crisis, the alert status of the armed forces is progressively enhanced by adversaries. It would be useful if India

²⁵ A Joint Staff Headquarters already exists in Pakistan and a similar headquarters is in the offing in India. It is from this headquarters that future wars would be managed, including the decision to move to the nuclear threshold.

²⁶ Teletype messages have several advantages: they provide leaders with an opportunity to think before replying; a written message takes the emotionalism out of the dialogue; a written format provides less opportunity for misunderstandings; and the written format insures deliberate and well-considered messages.

and Pakistan agree to inform each other of the alert status of the armed forces as soon as a decision is made to change the alert status of one element or the total force. An example of a possible alert status for an army could be:

- Status 1: Six hours notice for combat units to move into dispersal areas close to garrisons.
- Status 2: Actual move of combat units to dispersal areas.
- Status 3: Move of defensive formations to operational areas.
- Status 4: Deployment of defensive formations in their battle locations.
- Status 5: Move of offensive formations into their operational areas.
- Status 6: Issue of operational ammunition to all troops.
- This is a hypothetical example and does not necessarily indicate the possible status of any army. However, agreeing to inform each other of the changing levels of the alert status would be a useful confidence-building measure.
- Keep nuclear weapons unmated from delivery systems. As an element of crisis management and nuclear risk reduction, India and Pakistan need to sign a protocol to keep their nuclear weapons unmated even during a crisis and place their weapons on full alert only after the actual outbreak of a major war. As a part of the protocol, both nations should be required to inform each other when nuclear weapons are placed on full alert.
- Hold flag meetings. As part of the crisis-management agreement one provision could be holding periodic flag meetings between sector/divisional commanders along the international border and also along the LOC with the definite objective of preventing/arresting escalation. This confidence-building measure would come into effect only when regular troops are deployed along the international border. Issues like controlling small arms and artillery firing, and preventing/reversing encroachment across the border/LOC and other such incidents that are considered escalatory could be discussed at the flag meetings. The primary purpose of this CBM would be to humanize the relationship between the deployed troops at the lowest practical level.
- Implement the proposal for cooperative border monitoring.²⁷ This proposal needs to be implemented before the development of a crisis and would be an important instrument in managing a crisis.

7.4 Prevent Nuclear Proliferation

The majority of U.S. officials, members of the U.S. Senate staff and scholars, during interviews in May/June 2003, considered proliferation of nuclear weapons and technology as the most serious threat from Pakistan. A senior U.S. official in the Department of Energy commented, “The biggest worry is your people sharing nuclear knowledge with other states/individuals. This is the greatest concern on a day-to-day basis.”

²⁷ Major General Mahmud Ali Durrani, Enhancing Security Through a Cooperative Border Monitoring Experiment: A Proposal for India and Pakistan, Cooperative Monitoring Center Occasional Paper/21. Also available on the CMC web site at <http://www.cmc.sandia.gov/links/cmc-papers/sand-98-0505-21/sand-98-0505-21.html>.

The author was assured at the highest level in Pakistan that the Korean scandal was a misunderstanding. Pakistan has an official policy against exporting nuclear technology to any other country, which A.Q. Khan violated. The following measures are recommended to prevent proliferation emanating from Pakistan:

- Enact an ordinance and have it passed in Parliament forbidding the Government (present and future), or any individual, from passing nuclear weapon related technology, materials, and actual weapons to any foreign power or person, except such information or technology that will enhance security of weapons and materials or contribute directly to nonproliferation.
- Implement stronger fiscal and technical control. Because of the clandestine nature of Pakistan's nuclear weapons program, extensive liberty was granted by the government to the weapons-related facilities and their leadership. It is now necessary to bring all weapons development facilities under greater fiscal and technical control. The recent Korean scandal and revelations about the activities of Mr. A.Q. Khan need to be addressed immediately.
- Develop and publish SOPs related to security of weapons, materials and related subjects with the help of the U.S. and other allies.
- Strengthen the Pakistan Nuclear Regulatory Authority (PNRA). Providing greater autonomy and enhanced powers for the PNRA would make it the prime institution to ensure nonproliferation. Providing the PNRA with potent intelligence assets would enhance its capability.
- Initiate greater cooperation with the U.S. departments of Energy and Defense. The purpose of this cooperation would not be to open Pakistani military secrets to a foreign power, but for Pakistan to learn from the U.S. the technologies, systems, and procedures for the protection of nuclear assets and the enhancement of non-proliferation regimes.
- Upgrade the security of Pakistan's nuclear military facilities. International physical protection standards for nuclear materials could be the basis for upgrades.
- Utilize the services of the IAEA and the U.S. Government for the training of a maximum number of personnel on nuclear security issues.
- Upgrade the personnel reliability program. Keeping in mind the threat from baser human weaknesses and the growing threat from religious extremists, the PRP needs to be redesigned. Though religious extremists may be fringe elements in the military today, they can pose a greater threat in the future.
- Train and equip a special security force. The government of Pakistan is already designing a dedicated security force structure for its nuclear assets, which will be trained and equipped to ensure the security of nuclear assets. It is recommended the U.S. government consider providing Pakistan technical as well as financial support for the establishment of such a force.

7.5 Strengthen Nuclear Command and Control

The establishment of the National Command Authority, even under a military government, is a step in the right direction. As mentioned earlier, the military will continue to play the dominant role in the nuclear security decision-making process, but does now share some of its powers with the civilian government. However, in the view of the author, the presence of the Prime Minister and at least a minimum of three important cabinet colleagues will positively influence the military hierarchy in the decision-making process. Recommendations made in an interview by a Pakistani scholar to improve the decision-making process (which the author of this report supports) are listed below as recommendations of this report.

- Develop political stability. A dominant military role in the nuclear decision system is inevitable until the political system matures; however, even with a dominant role of the military, the views and recommendations of the political leadership should be decisive.
- Educate the political leadership and the people of Pakistan on the role of the nuclear weapons in the overall security of the nation. The National Defence College (NDC) and the handful of think tanks in Pakistan could play a central role in this education process. The NDC²⁸ has already undertaken a series of workshops to educate newly elected members of the national assembly on national security issues. However, a larger effort to educate the public is needed by the think tanks to discuss and debate nuclear issues, using television channels and the radio.
- Increase interaction between the military and the political leadership to evolve strategic thought. It should not be the exclusive domain of one or the other. Such an interaction means a learning process by both, of not only technical and strategic issues but also the different approaches to problem solving. The political mind is developed to think in shades of gray, and compromise is an essential element of political thinking. The military is less flexible and tends to think in black and white. An interactive process between the military and the civilian leadership on this important issue of nuclear policy and doctrine would benefit both.
- Implement dual control by the President and the Prime Minister for nuclear weapons use. Akin to the two-man control of a nuclear weapon at the operational level, the same principle could apply at the ultimate strategic level. Under this arrangement, there will be two fingers on the nuclear button. Thus irrespective of the consensus of the Nuclear Command Authority, the President and the Prime Minister should exercise joint control on the use of nuclear weapons.

7.6 Initiate Nuclear Transparency

For stability, the overwhelming recommendation of officials and scholars in the West has been to develop a higher level of transparency, while the majority of the Pakistani scholars lean toward opacity. Historically, transparency is against the very grain of conventional military thinking.

²⁸ Each workshop has about sixty MNA attendees on a voluntary basis. The NDC plans to hold two or three workshops a year.

However, in view of the devastating effects of a single nuclear weapon, a higher level of transparency is a must. The recommended transparency will add to nuclear stability and not decrease the effectiveness of the deterrence. Some of the areas where transparency could be useful are:

- Nuclear doctrine and deterrence. Essential elements of a declaratory political doctrine that will help avoid dangerous misinterpretation of intentions need to be spelled out. A stable deterrence will require a high level of clarity; for example, there is no need to lay down red lines, but a doctrine must spell out what is not acceptable or the broad circumstances under which a nuclear weapon will be used.
- The overall capability of nuclear weapon systems (weapon and launcher).
- The level of alert of nuclear weapons at various stages of the escalatory ladder. Avoidance of hair trigger alert.
- Effectiveness of deterrence exists only if the adversary believes that the deterrence will be used under certain conditions. Demonstration of the capability and the will to use nuclear weapons are therefore essential.
- Measures designed to minimize the chances of nuclear accidents and accidental launch of a weapon, plus safety and security measures.

7.7 Avoid Nuclear War by Miscalculation

A number of useful suggestions were offered by the policy influentials to minimize a war by miscalculation.

- Agree to establish and practice verifiable nuclear-related CBMs in addition to the existing few. Some recommendations already offered would help, such as: the establishment of a reliable hot line between the heads of government, the establishment of nuclear risk reduction center, and the holding of regular meetings between the senior levels in the armed forces to discuss risk reduction measures.
- Resolve outstanding disputes to reduce the risk of conflict.
- Revisit the Lahore MOU and reaffirm the commitments made therein.
- Initiate reciprocal and gradual transparency in nuclear-related matters. Transparency generates confidence and opacity breeds suspicion.

7.8 Improve Security

The author has been assured by the highest level of the establishment that a major security upgrade for Pakistan's nuclear establishments is underway since the establishment of the SPD. As previously mentioned, a centralized security system to oversee all nuclear establishments is on the drawing board and will hopefully overcome the weaknesses in the old security system. The following recommendations are offered to improve the security of Pakistan's nuclear assets:

- Nuclear Security Agency. Establishment of an independent security agency directly under the National Command Authority to oversee the security of

Pakistan's nuclear assets. The Nuclear Security Agency (NSA) should be outside and independent of the command structure of the nuclear establishment/facility/forces. Such a step will ensure that there are no "sacred cows" like A.Q. Khan, other senior scientists, or military commanders out of the security net. Such a security force would benefit from support and advice of the U.S. departments of Energy and Defense.

- Security Audit. Pakistan's intelligence agencies, like the ISI, Intelligence Bureau (IB), or the Military Intelligence (MI), who have multiple other tasks, should not be involved in the security of the nuclear assets, except in a secondary role for background checks of personnel employed (military/nonmilitary) by the nuclear installations. A trained section of the ISI or IB could, however, be tasked to conduct a periodic security audit of the nuclear security agency.
- Security Culture. In Pakistan, because of the traditional respect for elders, trust for people in authority, and awe of VIPs, security checks for important individuals are implemented with laxity or waived. There is a need to develop a sound security culture; this can best be done through personal example at the highest levels of authority.
- Threat Assessment. There is a need to conduct a fresh assessment of the threat to Pakistan's nuclear assets that will assist the security agency in designing security to meet all possible threats. Two threats that need special focus are the threat from religious extremists and the threat from potential proliferators.
- U.S. Support. More than ever before there is a need for the U.S. to help Pakistan establish foolproof nonproliferation standards, including reliable security and safety practices. Pakistan will also need to show greater transparency and work with international experts.

7.9 Enhance Nuclear Stability

The ultimate aim of most of the recommendations made above is the development of nuclear stability—a level of stability at which rash decisions are avoided, war by miscalculation is minimized, the road to escalation is interrupted by a number of firewalls, and a healthy respect is developed for each other's pain threshold. Because of the deep mistrust, a high level of verifiability needs to be developed in some of the recommendations. The intrusiveness of verification procedures can be increased progressively.

Almost all of the criticism in the West about the Pakistan nuclear program is based on speculation and inadequate information or intelligence. In the opinion of the author, it will be in the interest of Pakistan to show willingness to learn and display greater transparency in areas of concern, without compromising national security. Some of these areas are:

- Personal Reliability Program (PRP). Greater transparency in this important area would remove the misgivings in the West about the inadequacy of Pakistan's PRP system.

- Providing adequate details about SOPs on security of nuclear weapons and nuclear materials would help. Today most SOPs used in the U.S. in this important area are available on the Internet at appropriate sites.
- Making available essential details about command, control, communication, surveillance and reconnaissance systems, without compromising national security. Merely saying that “systems are robust and sophisticated” does not convince many.
- Convince the world that Pakistan’s nuclear weapons are out of reach of the “wild eyed fundamentalists” and in the hands of mature, disciplined and patriotic Pakistanis.

This page left intentionally blank.

8. Concluding Thoughts

While traveling in the West, the author was regularly asked by policy makers and scholars: “Where is Pakistan heading? Does Pakistan have a formula for a stable trajectory?”

As the author was working on a draft of this report at his home in Rawalpindi, around 7:20 p.m. on December 14, the peace of the evening was shattered by a massive explosion. This was a nearly successful attempt on President Musharraf’s life as he drove home from Islamabad. The remote device, planted under a bridge, exploded seconds after the last vehicle of the President’s cavalcade crossed the bridge. Two weeks later (December 25, 2003), they made a second attempt, this time using suicide bombers, striking the President’s cavalcade literally seconds after it had crossed the previous attack site. Musharraf was lucky the second time. In an interview with a TV news channel on May 27, 2004, President Musharraf mentioned that some junior officials of the Pakistan Army and the Pakistan Air Force were involved in the assassination attempt.²⁹ He also hinted at the involvement of Al Qaeda, confirming the worst fears of domestic and foreign scholars that the armed forces have been infiltrated by religious extremists. In the opinion of the author, Musharraf was paying a price for joining the international fight against terrorism.

The issue of Pakistan’s direction is relevant and needs addressing by the Pakistani society and government. The author believes that radicalism is not what the vast majority of the Pakistani nation wants, but a well-organized radical minority is capable of dragging the silent majority in a direction it does not want to go. The long-term goal of enlightened moderation for the Islamic world is a sound strategy, but events in Pakistan are moving fast and demand immediate and possible surgical procedures by the establishment. Therein lies Pakistan’s salvation. A senior U.S. policy person and a well-wisher of Pakistan commented, “The big question is about Pakistan’s future, are you moving towards becoming a radicalized nation? Unfortunately problems are not like French wine; procrastination does not help.”

Possessing weapon systems that have devastating power places serious demands on a nation and its government. The foremost demand is the need for internal political stability and strong institutions. Politically unstable countries tend to be unpredictable and irresponsible, especially those nations with theocratic overtones. An Islamic Pakistan at peace with itself and the world causes no concerns, but a Pakistan perceived as moving toward radicalism is a source of genuine anxiety, especially after the experience of 9/11. The Pakistan military, a strong institution, has partially filled the stability and institutional gap. For the short term (three to five years), effective military control over Pakistan’s nuclear weapons is reassuring, but for the long term, the answer is greater political stability by moving toward genuine democracy and building important institutions of state.

The rank and file of the Pakistani military continues to be professional, disciplined, and nationalistic. It is however now evident that a penetration by radicals has occurred, which will need to be monitored, contained, and removed. On the broader canvas, it would help Pakistan to focus greater attention on social, cultural, and religious modernity. Religious intolerance and

²⁹ “Musharraf says military men tried to kill him,” *The Daily Dawn* (www.dawn.com), May 28, 2004.

radicalism that unfortunately exist in Pakistan are best fought through liberal education, economic prosperity, and democratic institutions.

Acknowledging the concerns of the West, the author is seriously concerned with the possibility of a nuclear war in South Asia by miscalculation. While efforts need to be made to address important issues like proliferation, safety, security and stability, avoidance of nuclear war by miscalculation needs immediate attention. The highest priority should be accorded to minimizing chances of a conflict through the normalization of relations and the resolution of the Kashmir issue. The Lahore MOU is a good starting point for a dialogue on nuclear CBMs. Involvement of the U.S. to support and advise Pakistan on improving the safety and security of its nuclear program would also be essential.

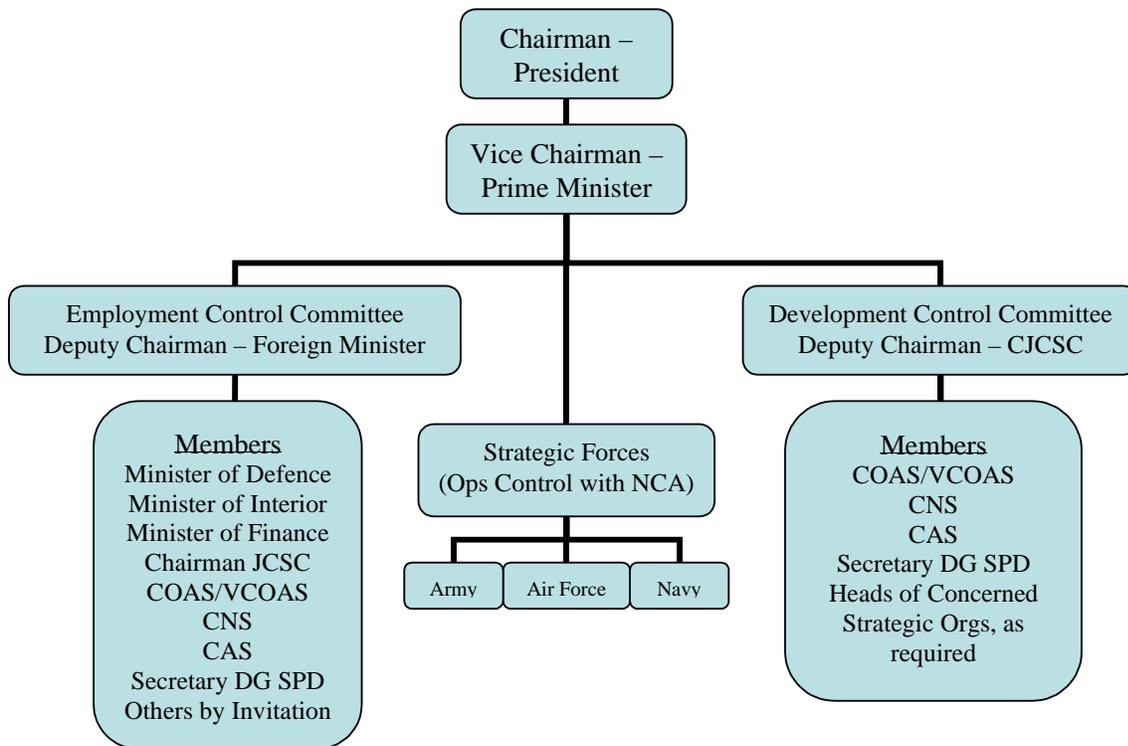
Appendix A: Management Structure of Pakistan's Nuclear Capability

Strategic Command Organization. In the post-nuclear environment, the establishment of an effective Command and Control Organization was a strategic imperative, not only to establish a harmonized command and control mechanism, operational policy, and development strategy, but also to provide credible stability to strategic deterrence. This command and control structure was announced on 7 February 2000 and was well received by all quarters. The Strategic Command Organization is structurally grouped under three constituents:

- Constituent 1 – National Command Authority
- Constituent 2 – Strategic Plans Division
- Constituent 3 – Strategic Forces Commands

National Command Authority (NCA). The NCA's responsibilities include policy formulation and the employment and development of strategic systems. It is the chief decision-making body under the chairmanship of the President, and the Prime Minister is the Vice Chairman. The two NCA committees, which are the Employment Control Committee, and the Development Control Committee, function separately for policy formulation, employment and development aspects respectively (Figure 4).

Figure 4. Organization Chart of National Command Authority



Main Functions of the Employment Control Committee

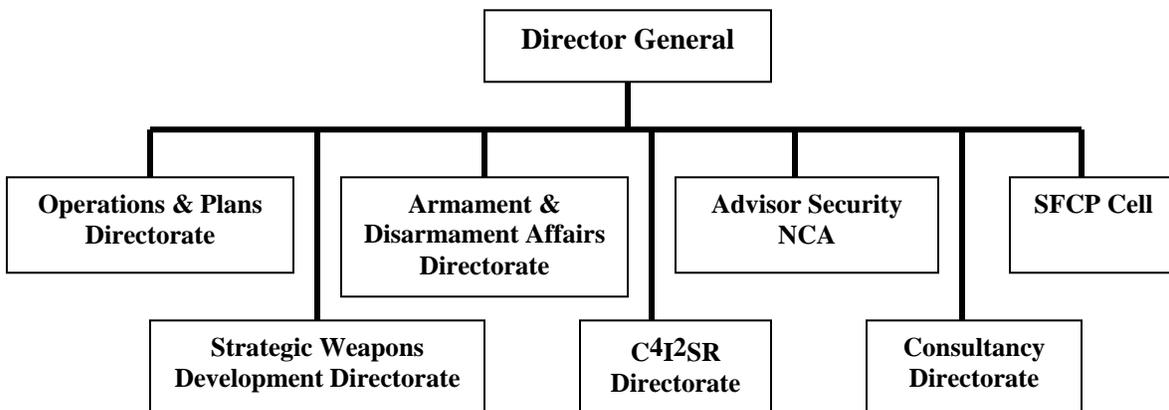
1. Review the latest information on the threat to the strategic weapons program and weapons deployment.
2. Policy direction during peacetime and the authority to order, control, and direct use/deployment of tri-services strategic forces during war.
3. Give policy direction and guidance for the evolution of doctrines and employment policy based on technical capability and threat assessment.
4. Establish hierarchy of command and policy for delegation of authority for employment of nuclear weapons.
5. Establish guidelines for an effective command and control system to safeguard against accidental or unauthorized use, or strategic decisions based on inaccurate information.

Main Functions of the Development Control Committee

1. Exercise technical, financial and essential administrative control over the strategic organizations.
2. Oversee the systematic development of strategic weapons programs as per approved Development Strategy.
3. Empowered to raise facilities/organization and integrate existing ones within established objectives.

Strategic Plans Division (SPD). The SPD provides secretarial support to the NCA and handles all issues related to the nation’s nuclear capability. The SPD functions directly under the President, PM and Chairman Joint Chiefs of Staff Committee. It is headed by a Director General from the Army and comprises officers from the three services (Figure 5).

Figure 5. Organization Chart of Strategic Plans Division



Main Functions of SPD

While handling comprehensively all aspects of the strategic program, Strategic Plans Division performs the following specific functions on behalf of National Command Authority and makes recommendations for its approval:

1. Formulation of the country's nuclear policy, nuclear strategy and nuclear doctrine.
2. Formulation of short- and long-term development strategy and force goals for tri-services strategic forces, within the ambit of national power potential, nuclear doctrine, and arms control regimes, and overseeing its systematic implementation.
3. Formulation of strategic/operational plans at the tri-services level for movement, deployment, and employment of strategic forces.
4. Formulation of the chain of command/authority and pre-delegation.
5. Measures for the safety and security of strategic assets in the short and long term.
6. Assists President, Prime Minister, and Chairman Joint Chiefs of Staff Committee in exercising control over strategic organizations and coordinates their financial, technical, developmental, and essential administrative aspects.
7. Provides military inputs to the Foreign Office and the Conference on Disarmament (CD) in Geneva on international/regional arms control regimes, disarmament and related strategic issues.
8. Coordinates and ensures the establishment of Strategic C⁴I²SR system for National Command Authority for command and control of strategic assets with real-time linkages to the Services C⁴I²SR networks and Strategic Forces.³⁰

Strategic Forces Command at Each Service Level. Separate Strategic Forces Commands are being raised in all three services. The services retain training, technical and administrative control over their Strategic Forces. However, operational planning and control rests with the NCA under the overall military direction of the Chairman of the Joint Chiefs of Staff Committee (CJCS). SPD coordinates all related aspects with services headquarters.

Operational Policy. Strategic operational policy framework and guidelines for employment of nuclear weapon systems are established by the NCA through the SPD. Based on these guidelines, the three services formulate their operational policies, which are meshed and harmonized at the tri-service level by the SPD in coordination with Director General Plans of the Joint Service Headquarters (JSHQ).

³⁰ C⁴I²SR: Command, Control, Communications, Computer Information, Intelligence, Surveillance and Reconnaissance

Appendix B: Comments on Author's Visit to the Pakistan Institute of Nuclear Science and Technology (PINSTECH) and Chashma Nuclear Power Plant (CHASNUPP), November 2003

Physical Protection

Through the courtesy of the Pakistan Atomic Energy Commission, the author was able to visit two important nuclear facilities of Pakistan, PINSTECH (Figure 6) and CHASNUPP (Figure 7). PINSTECH is located 20 minutes from Islamabad, while CHASNUPP is located 280 km south of Islamabad, a four hour drive, on the left bank of river Indus. The two facilities are totally different from each other: one has a 10 MW research reactor,³¹ and the other a much larger 300 MWe Pressurized Water Reactor (PWR).³² The purpose of the visits was to develop some understanding of the physical protection and related matters employed at these facilities. A secondary purpose was to understand the operation of a nuclear facility and the general safety measures adopted. It needs to be clarified at the outset that this section will not present a complete picture of the physical protection measures, but presents those elements of protection of which the author became aware through observation or information provided.³³

The broad concept of security employed by the facility is a layered approach. The first layer is the site perimeter, followed by the second layer of security for the "protected areas." The third is the security of the "vital areas." Access control and security increases progressively from the outer to the inner sanctums. All three levels of security are designed to defeat the assessed threat. The author was informed that the threat assessment of all nuclear installations (military and non-military) are presently under review, and the present physical protection measures will be modified to meet the new threat assessment.

The outer perimeter of a plant or site is manned by a different type of security force than the force deployed to man the "protected" and the "vital areas." The overall security is under the command of a site/plant security officer, who does not come under the plant management team leader, but rather a higher security headquarters.

The outer perimeter resembles the design used for sensitive nonnuclear military installations, with barbed wire fences, walls, watchtowers, security lights, communication (line plus radio), and armed sentries at the points of likely access or ingress. Access through the outer perimeter is allowed through designated entry points with the presentation of appropriate entry passes.

At the next level, the "protected areas," there is a more intrusive and more aggressive level of control. Authorized personnel are allowed access to a smaller area within the protected area. This

³¹ The open nuclear research reactor at PINSTECH was initially rated at 5 MW, but was later upgraded to 10 MW. The PINSTECH reactor was established in the late fifties, as a part of the "Atoms for Peace" initiative of the U.S.

³² CHASNUPP, Pakistan's second power reactor, was constructed with the help of the People's Republic of China and inaugurated in March 2001, 30 years after the first nuclear power plant was established in Karachi. From the investigation of the proposed site to the pre-operation audit, the IAEA has been involved. This was in addition to the independent reviews and surveillance during the phases of construction, equipment manufacture, equipment installation and commissioning by Pakistan's nuclear regulatory authority.

³³ Not wanting to compromise the security of the sites visited, the author has kept his observations general and to principles of security with no details on the actual deployment of security assets.

area is monitored by security cameras, utilizes access controls, and requires sign-in procedures. The highest level of security is in the “vital area” where access is limited only to the specified components of the vital area where an individual works. Here entry is controlled by magnetic cards, keypad-operated door locks, signing in, etc. The vital area is constantly monitored by closed circuit TV cameras and through the physical presence of security personal. The broader concept as the author was informed is “defense in depth,” with multiple checks and procedures, to defeat a determined threat.

In a nuclear power plant the typical “vital areas,” as the author noted, are the reactor area, the main control room and the fuel storage areas. Intrusion alarms are installed both in the “protected” and the “vital areas.” In areas where nuclear material handling is part of the task, radiation dosimeters are used that assess any radioactive dose received, electronically record a person’s personal details, and his time of entry and exit.

Safety, Protection, and Accounting of Nuclear Materials

Both of the sites conform to international safety standards. Safety and quality, the author was informed, were the most important considerations in the design of the plant. CHASNUPP is in accordance with the latest codes and standards, verified through reviews by national and international experts. A visit to the plant by the author, especially a visit to the central control room, gave some idea of the multiple redundancies built into the plant design to assure total safety. Predetermined SOPs add to the safety culture practiced at Pakistan’s nuclear installations and sites.

Both of the installations are under IAEA safeguards and are therefore subject to stringent checks and controls. The IAEA physically controls fresh fuel, its usage, and spent fuel and its disposal. It monitors fuel locations, movement, and usage through surveillance equipment and seals. Movement of fuel for the reactor from within country or from abroad is also monitored by the IAEA.³⁴

In addition to the physical checks and monitoring, an elaborate system of documentation for fresh and spent fuel down to a milligram exists. Movement of radioisotopes used in nuclear medicine, shipped from PINSTECH to various hospitals in Pakistan, is controlled with great accountability. The author was able to review some of the accounting documents at CHASNUPP.

Contract persons and outside visitors undergo a detailed review by the security system before and during their visit to the nuclear power plant. No contract person or visitor is allowed independent access even within the outer perimeter.

Personnel Security

Personnel security is taken seriously. All personnel, technical, nontechnical or those connected with security, go through a series of background checks on induction. Those seconded from other

³⁴ The fuel used in the CHASNUPP reactor is UO₂ (Uranium Dioxide), enriched to between 2.4 to 3.4 % Uranium-235. The spent fuel contains about 1% Plutonium-239.

departments like the Army to a nuclear project like CHASNUPP undergo a fresh background security check and are subjected to an annual review. In addition, managers routinely monitor the behavior of subordinates for any unusual conduct. If any unusual behavior is observed, both the management and security get involved to resolve the anomaly.

The officer in charge of security informed the author that studies are underway for the creation of a dedicated force that will be responsible for the security of both the military and nonmilitary installations. He also informed the author that technology, like motion sensors, day/night video cameras with motion detection, infrared sensors, and the like are being considered for installation.

Figure 6. PINSTECH Reactor, November 2003



Figure 7. Author visiting CHASNUPP Control Room, November 2003

About the Author

Major General Mahmud Ali Durrani (Retired) was commissioned in the Pakistan Army in 1961 and retired in 1998. He held a variety of command and staff assignments, including the command of an armored division. While serving in an armored regiment, he fought in the 1965 Indo-Pakistan war and again saw action on the western front in the 1971 war. He served as Pakistan's Defense and Military Attaché in Washington, DC, from 1977 to 1982, and as President Zia-ul-Haq's Military Secretary from 1982 to 1986. He also served as chairman and chief executive of the Pakistan Ordnance Factories Board, the largest defense industrial complex of Pakistan, during 1992 to 1998. Presently, as part of a group of Indians and Pakistanis, he is working toward peace in South Asia. Before 9/11 he was involved with a UN-sponsored initiative to develop a peaceful solution of the Afghanistan conflict.

He specializes in military strategy, defense production, and international security issues. He is the author of the book *India and Pakistan – The Cost of Conflict and the Benefits of Peace*, published in 2000 by Johns Hopkins University and reprinted by the Oxford University Press in 2001. In 2000, he undertook a study for the Pakistan Army titled "Pakistan's Security Imperatives Year 2000 and Beyond." He has spoken in a variety of international forums on defense, security, and foreign policy. From November 1999 to January 2000, General Durrani was concurrently a visiting scholar at the School of Advanced International Studies (SAIS), Johns Hopkins University in Washington, DC and a visiting fellow at the Foreign Policy Research Institute in Philadelphia, Pennsylvania. Presently he is a Council Member of the International Institute for Strategic Studies, London.

He was educated at Burn Hall School, Government College Abbottabad, and the Pakistan Military Academy in Kakul.

Distribution

350	MS 1371	CMC Library, 6929
1	MS 9018	Central Technical Files, 8945-1
2	MS 0899	Technical Library, 9616