‘Nuclear Learning in Pakistan since 1998’

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Abstract

Nuclear learning is a process through which states that acquire nuclear weapons capability learn to manage it through the development of nuclear doctrines, command and control structures, safety and security mechanisms, regulatory regimes and acquire an understanding of both the technological characteristics of these weapons as well as their politico-strategic ramifications. This enables them to achieve a stable strategic balance through a sagacious application of these formidable instruments of power. Pakistan's nuclear programme has always been beset with controversies and viewed with concern by the international community. These concerns have been accentuated by the spill over of the war in Afghanistan and the widespread incidence of terrorism and extremism within the country itself. In the pre-1998 period Pakistan had adopted a policy of ambiguity and denial of a nuclear weapons programme which combined with the secrecy surrounding the programme had stifled any discussion of issues related to management of an operational nuclear capability and it only started coming to grips with these issues after the May 1998 nuclear tests.

This study about Pakistan's learning experience in managing its nuclear capability suggests that a state that is perpetually afflicted by political instability and weak institutional structures could effectively handle its nuclear arsenal like a normal nuclear state provided it expends requisite effort and resources towards this end. The ability of the state and its institutions to learn through their experiences and from others is also very important in this regard. While the literature on 'nuclear learning' is not very exhaustive, the concept is sufficiently well developed to provide an adequate framework for study of Pakistan's evolution as a nuclear power since 1998.The study helps ascertain the nature and the magnitude of learning by Pakistan to manage various facets of its nuclear capability in the past decade and a half. The study has tried to identify the discernible manifestations of nuclear learning and has tried to determine the reasons for disparity in learning amongst the civilian and military institutions in view of the troublesome civil-military balance in Pakistan.

This study brings out Pakistan's difficult progression to a nuclear weapons capable state and how this bitter historical experience has predisposed it to adopt a particular learning path. It also highlights the dynamic nature of Pakistan's evolving nuclear doctrine which has been adjusted and adapted to meet the demands of its ever changing security environment. It establishes that Pakistan's nuclear command and control is a reflection of the existing civil-military balance and is line with the traditional division of labour between the two institutions in the realm of security policy making.

The study finds sufficient evidence to suggest that given its precarious internal and external security situation Pakistan has invested heavily in augmenting its nuclear safety and security and this effort has clearly manifested itself and has also received international recognition. After the embarrassment of the AQ Khan episode as well as the emerging international trends evident in the form of UNSC Resolution 1540, Pakistan has also paid attention to strengthening its export control system and to bring it in conformity with international standards. Discernible learning is also apparent in the field of nuclear regulation which has also been acknowledged by the IAEA.

Declaration

I hereby declare that the thesis submitted for examination is my own original work except where acknowledged in the references.

Student Signature  Date…12 April 2015…….

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LIST OF ACRONYMS

AARs	After-Action Reviews
ACDA	Arms Control and Disarmament Agency
AWC	Air Weapons Complex
BJP	Bharatiya Janata Party
BWC	Biological Weapons Convention
CWC	Chemical Weapons Convention
CIA	Central Intelligence Agency
CJCSC	Chairman Joint Chiefs of Staff Committee
COAS	Chief of Army Staff
CNS	Chief of Naval Staff
CAS	Chief of Air Staff
C4I	Command Control Communications Computers and Intelligence
CCS	Cabinet Committee on Security
CNS	Convention on Nuclear Safety
CoE	Centre of Excellence
CPPNM	Convention on Physical Security of Nuclear Materials
CTBT	Comprehensive Test Ban Treaty
DCC	Development Control Committee
DND	Draft Nuclear Doctrine
DNSRP	Directorate of Nuclear Security and Radiation Protection
DOE	Department of Energy
ECC	Employment Control Committee
ERL	Engineering Research Laboratories
EA&R Cell	Evaluation Analysis & Research Cell

FMCT	Fissile Materials Cut Off Treaty
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
ICBMs	Intercontinental Ballistic Missiles
INFCIRC	Information Circular
ISI	Inter-services Intelligence
KANUPP	Karachi Nuclear Power Plant
KRL	Khan Research Laboratories
LEU	Low Enriched Uranium
LSG	London Suppliers Group
MAD	Mutual Assured Destruction
MPC&A	Material Protection Control & Accounting
MTC	Maritime Technologies Complex
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organisation
NCA	National Command Authority
NDC	National Development Complex
NESCOM	National Commission on Science and Technology
NFU	No-First Use
NNPA	Non-proliferation Prevention Act
NNWS	Non-Nuclear Weapon States
NPR	Nuclear Posture Review
NPT	Non-proliferation Treaty
NRC	Nuclear Regulatory Commission
NRECC	National Radiation Emergency Coordination Centre
NSAB	National Security Advisory Board

NSAP	Nuclear Security Action Plan
NSG	Nuclear Suppliers Group
NTI	Nuclear Threat Initiative
NuSECC	Nuclear Security Emergency Coordination Centre
NWS	Nuclear Weapon States
PAEC	Pakistan Atomic Energy Commission
PARR-1	Pakistan Atomic Research Reactor-1
PIEAS	Pakistan Institute of Engineering and Applied Sciences
PINSTECH	Pakistan Institute of Nuclear Science and Technology
PMO	Project Management Organisation
PNE	Peaceful Nuclear Explosion
PNRA	Pakistan Nuclear Regulatory Authority
PNRB	Pakistan Nuclear Regulatory Board
PNSRP	Pakistan Nuclear Safety and Radiation Protection Ordinance
PRP	Personnel Reliability Programme
PSI	Proliferation Security Initiative
R&D	Research and Development
SDI	Strategic Defence Initiative
SECDIV	Strategic Export Controls Division
SFC	Strategic Forces Command
SLBMs	Submarine Launched Ballistic Missiles
SNIE	Special National Intelligence Estimate
SPD	Strategic Plans Division
SROs	Statutory Regulatory Orders
SUPARCO	Space and Upper Atmosphere Commission
TTP	Tehrik-i-Taliban Pakistan

UNSCR	United Nations Security Council Resolution
WMDs	Weapons of Mass Destruction
WWCCS	Worldwide Command and Control System

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Introduction

Background:

This study explores Pakistan's experience as a nuclear weapons capable state since the demonstration of its nuclear capability in 1998. Pakistan is one of the three de-facto nuclear states besides India and Israel, who opted to stay out of the non-proliferation regime[1], each citing its own peculiar security concerns. The group was later joined by North Korea which had acceded to the Nuclear Non-proliferation Treaty on December 12, 1985[2] but after various disputes with the IAEA over safeguards and inspections announced its intention to withdraw from the treaty on March 12, 1993. It later decided to suspend its decision following talks with the US on 11th June 1993[3], just a day before its withdrawal was due to take effect. It again controversially renounced its membership of the treaty on January 10, 2003[4] without a prior notice of three months and embarked on a secret nuclear weapons programme. Iraq, Libya and Iran are in yet another category. These three states which had signed the NPT as non-nuclear weapon states and had given up their right to develop nuclear weapons were found to be in violation of their treaty obligations by trying to clandestinely develop nuclear weapons. While Iraq and Libya have resumed compliance with the treaty provisions, several unresolved disputes related to Iranian nuclear programme are yet to be settled between the Islamic Republic and the IAEA.

Among the de-facto nuclear weapon states Pakistan's nuclear weapons programme has been viewed with suspicion right from its inception in the early 1970s. Characterisation of Pakistan's nuclear enterprise as 'the Islamic Bomb'[5] created the misperception that its end product would be shared with the Islamic states in the Middle

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[1]The current non-proliferation regime is anchored in the Nuclear Non-proliferation Treaty (NPT) that came into force in 1970 and is implemented through IAEA's safeguards and inspections regime. The text of the treaty can be found at http://www.iaea.org/Publications/Documents/Treaties/npt.html, http://www.un.org/en/conf/npt/2010/npttext.shtml and http://www.un.org/disarmament/WMD/Nuclear/NPT.shtml.

[2] 'North Korea Nuclear Chronology' available at www.nti.org

[3] Article X of the NPT allows states party to the treaty to withdraw on the basis of threats to their supreme national security interests giving a three months' notice of their intention to other member states. www.nti.org

[4] Ibid, www.nti.org

[5] See Steve Weissman and Herbert Krosney, 'The Islamic Bomb – The Nuclear Threat to Israel and the Middle East,' Times Books, New York, 1981. Also see N.K. Palit and P.K.S. Namboodiri, 'Pakistan's Islamic Bomb,' Vikas Publishers, New Delhi, 1979 and 'The Birth of the Islamic Bomb,' *New York Times,* Special Feature, 15 June 1980.

East, thereby creating a potential threat to Israel. This perception arrayed the non-proliferationists, the pro-Israeli lobbies within and outside the US Congress and the Western media against Pakistan's nuclear activities. Pakistan has neither been characterised as a rogue nuclear state like North Korea, nor was it amongst states such as Iraq, Iran, Libya and North Korea dubbed as the 'axis of evil' by President Bush. However, since Pakistan's pursuit of a military nuclear capability commenced after the NPT had already entered into force and international norms against further nuclear proliferation were gaining ground, its effort was seen as defiance of the prevailing international norms. Moreover, after the Indian nuclear test in May 1974 international nuclear commerce was severely curtailed through the introduction of an increasingly restrictive export controls regime. Pakistan therefore had to acquire requisite nuclear technology surreptitiously through nuclear black markets and exploitation of loopholes in the export control system itself. Its effort, therefore, acquired a kind of illegitimacy which continues to bedevil it.

Pakistan's record of political instability, economic fragility and institutional weakness has further accentuated the concerns about its ability to safeguard its nuclear weapons and materials and act like a 'normal nuclear state.'[6] In the past decade, the spill over of the 'Global War on Terror' waged by the US and its NATO allies in neighbouring Afghanistan and the widespread incidence of terrorism and extremism within the country have given rise to renewed international concerns about safety and security of Pakistan's nuclear assets. In this backdrop questions have been raised about Pakistan's ability to effectively manage its nuclear weapons, sensitive materials and installations. The Kargil conflict across the Line of Control dividing Indian and Pakistani parts of Kashmir in 1999 and the disclosure of proliferation activities of a clandestine network involving a prominent Pakistani scientist AQ Khan in 2004, have further dented Pakistan's credentials as a responsible nuclear weapons capable state. Pakistan's chaotic political and internal security environment and its weak institutions give rise to questions about its ability to learn to efficiently administer its nuclear programme like any other nuclear weapon state

[6]A 'normal nuclear state' is a state which is part of the mainstream nuclear non-proliferation regime and is entitled to nuclear commerce for peaceful uses of nuclear technology such as nuclear power generation and nuclear medicine etc. In a recent Adelphi Book by IISS, London, Mark Fitzpatrick has recommended that Pakistan should be treated as a normal nuclear state. See Mark Fitzpatrick, 'Overcoming Pakistan's Nuclear Dangers,' Oxford, Routledge, 2014.

and about the existence of any evidence to suggest that it has developed the necessary wherewithal for this purpose and whether there are any manifestations of this effort.

Aim and Scope of the Study:

The study is aimed at evaluating the state of nuclear learning in Pakistan's civilian as well as military institutions since it became an overt nuclear weapons state in May 1998. Given the cognitive nature of learning and the multiplicity of levels at which nuclear learning can be analysed it is imperative to identify the most appropriate level of analysis for the study. Since the study is aimed at estimating nuclear learning amongst the civilian and military institutions in Pakistan, the most appropriate level of analysis was considered to be the 'organisational' level of learning which also allowed the application of relevant concepts from the organisational theory as well as keeping the scope of the study within manageable limits. The study, nevertheless, takes a broader view of nuclear learning in Pakistan while carrying out an in-depth examination of the manifestations of learning in both civilian and military institutions to determine the degree of learning in each of these domains.

Significance of the Study:

Robert Jervis has argued that, "the fact that the nuclear weapons could destroy the world has changed the way people think and the way nations behave. I also believe that a better understanding of their role can make the world safer."[7]This amply highlights the importance of exploring how Pakistan's behaviour as a state has been affected by its nuclearisation. A study about Pakistan's learning experience in managing its nuclear capability is also vital to see whether a state that is perpetually beset with political instability and has chronically weak institutions could effectively handle its nuclear arsenal. It, therefore, provides answers to many of the concerns expressed by the international community about the safety and security of Pakistan's nuclear weapons. While the literature on 'nuclear learning' is not very exhaustive, the concept is sufficiently well developed to provide an adequate framework for study of Pakistan's evolution as a nuclear power since its overt nuclearisation in 1998. Though there are quite a few books and many research articles published about Pakistan's nuclear programme and policy, no

[7] Robert Jervis, 'The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon', Cornell University Press, Ithaca and London, 1989, p. ix.

published study has as yet explored Pakistan's nuclear progression from the perspective of the concept of nuclear learning. This study, therefore, adds not only to the literature on nuclear learning but also adds a new dimension to the literature related to Pakistan's evolution as a nuclear weapons capable state.

It may also be noted that Pakistan provides an interesting case study, since it denied the pursuit of a military nuclear programme until it conducted multiple nuclear tests in May 1998 in response to the Indian tests earlier that month. India also pursued a similarly ambivalent policy though it had already demonstrated its nuclear prowess in 1974. This policy of denial on part of Pakistan helped deflect and mitigate international opprobrium and sanctions to some extent. However, the downside of this policy was that it did not allow any room for public debate on critical issues related to nuclear doctrine, command and control and safety and security. Unfortunately, there was no internal debate on the subject either within the military or the civilian institutions and there was even a dearth of academic discourse on the issue. All these key aspects of nuclear policy have therefore, been effectively addressed only in the post-1998 period. The period covered by this study, has therefore, seen intense activity in terms of institutional/structural and perceptual developments for an effective management of Pakistan's nuclear capability.

The existing literature on Pakistan's nuclear programme mostly covers the evolution of Pakistani nuclear weapons programme and to a lesser extent explores the underlying motivations that compelled Pakistan to go down the nuclear path and have only partially covered the post 1998 developments.[8] However, there is no substantive published work that comprehensively covers the post-1998 developments especially from the perspective of 'nuclear learning.' This study is aimed at filling this gap in the existing literature focusing mainly on the post-1998 developments and situating these within the conceptual framework of 'nuclear learning' to ascertain whether and to what degree has Pakistan learnt to manage its nuclear capability in the past decade and a half. The concept of Nuclear Learning has been employed by many prominent scholars such as Joseph S.

[8]Kamal Matinuddin, *The Nuclearization of South Asia*, Oxford University Press, Pakistan, 2002; NaeemSalik, *The Genesis of South Asian Nuclear Deterrence*, Karachi, Oxford University Press, 2009; Zafar Iqbal Cheema, *India's Nuclear Strategy*, Karachi, Oxford University Press, 2010 and Feroz Hassan Khan, *Eating Grass – The Making of the Pakistani Nuclear Bomb*, Stanford University Press, Stanford, 2013.

Nye Jr. in their writings mainly to analyse the strategic dynamics of the US-Soviet security relationship during the Cold War years, no systematic study of nuclear learning using a particular country as a case study exists.[9] A comprehensive study of Pakistan's nuclear learning experience would, therefore, be an addition to the existing literature on the subject. The study will strive to identify the nature and magnitude of the learning, the discernible manifestations of that learning and to determine whether there is uniformity or disparity in learning amongst the civilian and military institutions since civil-military balance in Pakistan has been and continues to be a contentious issue. The study will also try to identify Pakistan's own motivations to learn as well as the extraneous factors that may have pushed the process forward. This will hopefully clarify some of the doubts related to the management of Pakistan's nuclear capability.

Research Questions:

The following questions have been addressed during the course of the study:-

- How deeply has Pakistan's difficult historical experience during the course of its nuclear development affected its world view and predisposed it to adopt certain policy approaches?
- How has Pakistan's nuclear doctrine evolved since 1998?
- What institutional mechanisms in the form of command and control structures have been created to manage the operationalization of the nuclear capability?
- What security architecture has been developed to deal with the existing and potential threats to nuclear assets?
- How have Pakistan's nuclear export control and regulatory regimes evolved since 1998?
- What kind of nuclear learning has taken place in the military and civilian institutions and what are its manifestations?

[9] See Jack S. Levy, 'Learning and Foreign Policy: Sweeping a Conceptual Minefield', International Organization 48, no. 2 (Spring 1994); also see Joseph S. Nye, Jr., 'Nuclear Learning and U.S. – Soviet Security Regimes', International Organizations, Vol. 41, No. 3 (Summer, 1987), p. 378 and Jeffery W. Knopf, 'The Concept of Nuclear Learning', Non-proliferation Review No. 19, Vol. 1, Monterey Institute of International Studies, March 2012.

- Has there been a disparity in the military and civilian learning? If yes. What are the causes of this disparity?

Research Methodology:

The research is primarily based on empirical analysis of the available literature on the subject of nuclear learning, and uses this framework to carry out an appraisal of various facets of nuclear learning in Pakistan. The existing published material on development of Pakistan's nuclear management structures as well as its perceptual growth in the form of books, research articles, and publicly available official documents has been augmented by interviews conducted in Pakistan during July/ August 2012 with current and former policy makers as well as academic experts and analysts who have either been involved in decision making at critical junctures or have seen these developments from a vantage point. This has helped to confirm or call into question certain conclusions drawn from analysis of published material. The interviews also helped provide clarity wherever there was ambiguity in available information. Interviews were especially helpful in drawing comparisons between the levels of learning amongst the military and civilian institutions as was evident from the perceptions and explanations by a representative sample of the Pakistani intelligentsia. Most of the interviews were conducted with the respondents across the table during the author's visit to Pakistan in July-August 2012. However, some respondents provided their inputs through e-mails. Speeches and statements made by key policy makers on different occasions, books written by important leaders,[10] policy documents published by the government in the form of Official Gazette notifications, Legislations, Ordinances and Regulations have also been a valuable source of information.

An appropriate criterion had also to be devised to have some measure of the amount of learning within various institutions given the cognitive nature of the learning process and various types of learning. The perceptual development and maturity in thinking is obviously difficult to estimate by any means other than a comparison of public statements made by responsible officials in the early post-nuclearisation days with those made a decade and a half later. To serve as a basis for evaluation of learning a typology of learning has been developed and a nuclear learning matrix has been designed using key

[10] Former President Musharraf's memoirs, 'In the Line of Fire' and former Foreign Minister Abdul-Sattar's, 'Pakistan's Foreign Policy' are useful references in this regard.

players and important aspects of nuclear policy. The matrix also helped in formulating the questionnaires for the interviews. See Annexures-A and B respectively.

Constraints on Research:

The research was constrained to some extent by the proximity of the events and therefore lack of access to declassified official documents, and the dynamic nature and sensitivity of the subject. In any case, there is no tradition of declassification of official documents in Pakistan. Sufficient published material is however, available in the form of books and research articles, official pronouncements and publicly available official documents such as Gazette Notifications, Ordinances and pieces of Parliamentary Legislation. The bulk of the research is, therefore, based on published material. Interviews have been used to verify or disprove the outcome of the empirical analysis carried out in chapters 2 to 7. An important factor which restricted the number of respondents who could be interviewed for the purpose of this study, was the technical nature of the subject, which made it difficult to find many people in the intelligentsia or even within the military, who have adequate grasp of the subject to be able to provide any meaningful insights.

Research Design/ Broad Outline of the Study:

The study is divided into eight chapters besides introduction and conclusion. The details are as follows:

- **Chapter-1: Literature Review** – This chapter provides a theoretical/conceptual framework for understanding Pakistan's journey along the nuclear learning curve since 1998. It provides an overview of the scholarly discussions related to the broader concept of 'learning' in general, and 'nuclear learning' in particular, highlighting the commonalities and differences in perceptions of scholars representing different schools of thought on the subject. It also looks at various dimensions and levels of learning that helped determine that the most appropriate level of learning for the purpose of this study was the institutional/organisational level. The chapter provides a theoretical foundation for the subsequent chapters that mainly employ the empirical evidence related to evolving doctrinal thinking, force configurations and postures, establishment of command and control structures and

safety and security systems, nuclear specific legislation and Pakistan's crisis behaviour after the demonstration of its nuclear capability in May 1998.

- **Chapter 2: A Brief History of Development of Pakistan's Nuclear Programme:** This chapter covers the historical evolution of Pakistan's nuclear programme. It also looks at the decision making and control arrangements or lack thereof, to manage and control the nuclear programme during the covert phase of Pakistan's nuclear programme between 1972 and 1998. The chapter highlights Pakistan's unconventional approach to acquisition of nuclear weapons capability necessitated by ever tightening international controls on the export of relevant materials and technologies as well as political, diplomatic and economic pressure exerted especially by the US in the form of sanctions under the Symington, Glenn and Pressler Laws as well as the Missile Technology Control Regime. Moreover, there were intermittent threats of preventive strikes by the US, India and Israel at key Pakistani nuclear facilities especially during the 1980s. This peculiar historical experience has created a deep seated perception in Pakistan of being unjustly and unfairly singled out for penalties while India and Israel remained largely immune from such treatment. The incessant threat of attacks on its military nuclear facilities especially at the uranium enrichment plant at Kahuta, has also caused what can be termed as the 'Kahuta Syndrome.' This historical legacy has shaped Pakistan's approach towards international nuclear order and continues to cast a long shadow on its current and future policies thereby impacting upon the trajectory of its nuclear learning.
- **Chapter 3: Pakistan's Evolving Nuclear Doctrine**: Nuclear doctrines are dynamic in nature and are susceptible to change with the changing security environment and technological advancements. The United States' experience is a testament to that reality and Pakistan's case is no different. This chapter discusses the theoretical aspects of nuclear doctrinal thinking. It also surveys the doctrinal development in the major nuclear powers US, Russia, Britain, France and China. It looks at the evolving doctrinal thinking in India and its impact on Pakistani doctrinal thinking due to the close dyadic security relationship between the two countries. It traces the progression in Pakistani nuclear doctrinal thinking from its inception and the changes it has undergone during the last decade and half due to

internal technological developments as well as changing nature of the external threats.

- **Chapter 4: Pakistan's Nuclear Command and Control**: This chapter looks at the nature, complexity and exacting demands of a nuclear command and control system. It then reviews the establishment and growth of Pakistan's nuclear command and control system, its organisational structure and representation and roles of civilian and military leadership in the nuclear command hierarchy. It describes the organisation and role of various components of the command and control system and also analyses the contents of the specific legislations that provide legal cover to the existing command and control system.
- **Chapter 5: Arrangements for Nuclear Safety and Security**: This chapter covers various, administrative and legislative measures Pakistan has instituted to ensure requisite safety and security of its nuclear assets. It also highlights the specialised institutional structures that have been created and the substantial expansion in the size and capacity of dedicated nuclear security forces especially during the past decade. Nuclear safety and security in Pakistan has been attracting a lot of attention in the international media and has drawn all sorts of positive as well as negative comments from different quarters. It continues to be a focus of all kinds of insinuations and concerns despite an acknowledgement of the safety and security measures instituted by Pakistan in the Nuclear Threat Initiative's (NTI's) Nuclear Security Index for 2014 which has declared that amongst the nuclear states Pakistan has shown the most improvement in nuclear security. The Director General of the IAEA during a recent visit to Pakistan's Centre of Excellence for Nuclear Security also appreciated the very high standards of training.
- **Chapter 6: Export Controls**: This chapter looks at Pakistan's export control regime as it existed in 1998 and how it has been augmented and brought in compliance with international standards in the years following 1998 tests. It will provide broad contours of the organisational structure that has been developed to oversee and administer the export control regime. International Export Controls Regime complements the non-proliferation regime in important ways and its significance has been reiterated by the UNSC through the passage of resolution 1540 in April 2004. The resolution makes it obligatory for all member states to

bring their nuclear export controls in consonance with international standards and has established an institutional mechanism to monitor progress in this regard. Pakistan started the process of upgrading export control laws soon after the 1998 nuclear tests. The proliferation episode involving AQ Khan that caused national embarrassment injected further urgency in the process in the light of the lessons learnt from this serious lapse in nuclear stewardship.

- **Chapter 7: Pakistan's Nuclear Regulatory Regime:** This chapter gives an overview of the evolution of nuclear regulatory regime in Pakistan. It then proceeds to describe the role and functions of Pakistan Nuclear Regulatory Authority that was established in January 2001. It also explains in some detail the National Nuclear Security Action Plan that has been developed by the PNRA to deal with any nuclear emergency in the country. Moreover, it highlights the major undertakings and achievements of PNRA and as to how has it learnt through its own experience as well as through cooperation with international organisations such as the IAEA. Given the sensitive nature of nuclear technology and disastrous consequences of a nuclear accident all nuclear installations and processes need to be tightly regulated and the evolving nuclear regulatory regime in Pakistan has been designed to achieve internationally accepted standards in this regard.
- **Chapter 8:Conclusion:**

  This chapter summarises the inferences drawn from the study and recapitulates its salient points.

Annexure– 'A'

NUCLEAR LEARNING TYPOLOGY

Type of Learning	Illustration
Perceptual Learning	This kind of learning relates to development of doctrinal precepts for the operationalization of nuclear weapons and to integrate the conventional and nuclear war fighting concepts and doctrines.
Crisis Learning	This is another common form of learning and usually leads to substantive changes in the application of security policies. During the Cold War the Cuban Missiles Crisis of October 1962 led to adoption of various confidence building and crisis management mechanisms such as the Washington-Moscow Hotline and created an environment for the beginning of arms control negotiations. In South Asia the Kargil Crisis of 1999 led to a better understanding of the complexities of a nuclearized security environment and had a salutary effect on the behaviour of India and Pakistan during the 2001-02 military stand-off and the subsequent crisis in 2008. The 1999 crisis also led to the articulation by India of its Draft Nuclear Doctrine and by Pakistan of its Nuclear Command and Control structure.
Experiential Learning[11]or Learning by Doing	This is the most common form of learning that can also be found in many other spheres of human activity and comes about with the experience of dealing with nuclear weapons over a period of time – a kind of on the job learning. The degree of learning will vary amongst individuals as well as institutions depending on the availability or lack thereof of conducive environment for learning. Also not everyone is likely to learn the same lessons from a similar experience. This type of learning is progressive and lessons learnt at an earlier stage of learning continue to be modified and improved upon with further experience, availability of new information or changes in security environment or technological developments.
Learning by Emulation or Imitative Learning	This type of learning entails learning from the experiences of other nuclear states, drawing useful lessons and adapting these in accordance with the peculiarities of own environment. This can be done with the help of publicly available information. For instance, nuclear command & control systems in US, UK and France were studied and useful ideas adapted to suit Pakistani environment while designing the nuclear command & control. However, this kind of learning is limited to selected areas only because of sensitivity of the information and legal limitations imposed by domestic laws as well international treaty obligations. In most cases the states with greater experience of handling nuclear weapons only share 'good practices' in areas such as safety and security, sensitive materials protection control and accounting (MPC&A) and export control and regulatory practices. US-

[11] This term has been borrowed from Russell Leng. See 'Russell J. Leng, 'Bargaining and Learning in Recurring Crises', Ann Arbor, The University of Michigan Press, 2000.

	Pakistan cooperation in security training, MPC&A and export controls is a case in point.
Learning by Trial & Error	This is an innovative type of learning and can be very valuable provided an individual or an organisation is willing to accept mistakes and learn the right kind of lessons from these after due analyses which requires a lot of courage to do. In the nuclear realm due to the hazardous nature of technology those dealing with this technology are generally not prepared to take any chances and therefore in the nuclear realm this is not a popular kind of learning. Although in many human endeavours this type of learning could be very productive.
Factual Learning[12]	In terms of nuclear learning this type of learning refers to knowledge about the technical characteristics of nuclear weapons such as their yield and the effects a nuclear detonation produces in the form of heat, blast and radiation. It is important for both the publics and the policy makers to be aware of the power of the nuclear weapons and their peculiar nature as distinct from the conventional weapons. Such knowledge would ensure that the public would not exert undesirable pressure on the decision makers in times of crises and the leaders would know the consequences of any decisions they take with regard to the use of nuclear weapons.
Inferential Learning[13]	This type of learning involves the broader policy implications of the possession of nuclear weapons and it is important for policy makers to be aware of these implications for their security policy to enable them to make adjustments wherever necessary to adjust either the ends of the policy or the means employed to achieve those ends or both. However, sometimes otherwise knowledgeable and experienced people fail to fully comprehend the implications of their decisions and actions. Henry Kissinger ordered DEFCON-III during the crisis arising out of 1973 Arab-Israeli War without fully understanding its practical implications and technical details and its escalatory potential.[14]
Unlearning	In some cases useful and correctly learnt lessons are unlearnt. A case in point is Pakistan learning from the Cold War experience the destabilising potential of the battlefield nuclear weapons and eschewing their development but then deciding in 2011 to move down this path.

[12] This term has been borrowed from Jeffrey Knopf. See Jeffrey Knopf, "The Concept of Nuclear Learning," *Nonproliferation Review* 19, no. 1 (March 2012): 79-93.
[13]Ibid.
[14]Richard Ned Lebow and Janice Gross Stein, "We All Lost the Cold War," Princeton University Press, 1994, p.251-57.

Annexure – 'B'

Nuclear Learning Matrix

	Decision Making	**Doctrine**	**Institution Building**	**Safety & Security**	**Legislation**	**Diplomacy**
Military	What is military's role in nuclear decision-making?	Has any Operational Doctrine, targeting policy, linkage with conventional doctrine been developed?	What new institutions have been built to exercise command and control and for operational use of nuclear weapons?	What arrangements have been put in place to ensure safety and security of nuclear weapons and materials?	What is its role in formulation of nuclear related legislation?	Any inputs in policy making?
Political Leadership	What is the role in decision-making? How effective is political control of decision-making?	Does it provide broad policy guidelines?	Any civilian institution specially designated to deal with nuclear issues?	Any steps taken to ensure safety & security of nuclear related activities?	What nuclear related laws, ordinances and regulations have been promulgated?	What is the role in policy guidance ?
Civilian Bureaucracy	What is the role in nuclear decision-making?	Has any role been played by the civilian bureaucracy, in the development of Pakistan's nuclear doctrine?	Any institutions created to specifically deal with nuclear issues?	What is its role in nuclear safety and security?	What is its role in formulation & implementation of laws, ordinances and regulations?	
Academics/ Security Analysts	Are the civilians fairly represented in the nuclear decision making process and how effective is their	Do the civilians have any input in doctrinal development or is it purely military's discretion?	Have adequate institutional Structures been built in the military as well as civilian domains?	Are there adequate safety and security arrangements to safeguard the nuclear assets and installations?	What nuclear specific legislative developments have taken place since 1998? Has the progress been satisfactory? Is it a participatory	Who plays the lead role in formulating and running Pakistan's nuclear diplomacy?

	contribution?				process?	

An**nexure – 'C'**

LIST OF RESPONDENTS

Serial No	**Respondent Designation**	**Respondent Code**
1.	A retired four star general	Respondent 'A'
2.	A very senior SPD Official	Respondent 'B'
3.	A very senior military officer at the Joint Staff Headquarters	Respondent 'C'
4.	A senior officer in Army Strategic Force Command	Respondent 'D'
5.	A senior female leader of an opposition political party	Respondent 'E'
6.	A senior International Relations Scholar and Civil-Military Relations Expert	Respondent 'F'
7.	A senior social science scholar and security analyst	Respondent 'G'
8.	A US based Pakistani security analyst	Respondent 'H'
9.	An International Relations Professor and Strategic Analyst	Respondent 'I'
10.	A young strategic studies scholar and expert on Pakistan's nuclear history	Respondent 'J'
11.	A very high ranking official at PNRA	Respondent 'K'
12.	A senior official dealing with nuclear policy/diplomacy at the Ministry of Foreign Affairs	Respondent 'L'
13.	Head of an Islamabad based security think tank	Respondent 'M'

14.	A senior lawyer and International Law expert	Respondent 'N'
15.	A young female academic with expertise in nuclear issues/via e mail	Respondent 'O'
16.	A highly placed officer in the Security Division of NCA	Respondent 'P'
17.	A senior International Relations Professors, security analyst and media-person	Respondent 'Q'
18.	An American Academic & Strategic analyst of Pakistani origin	Respondent 'R'
19.	A very senior scholar of strategic studies with expertise in nuclear policy	Respondent 'S'
20.	A former senior Professor of Physics and anti-nuclear activist/ via e mail	Respondent 'T'
21.	A senior physicist and well known anti-nuclear lobbyist/ via e mail	Respondent 'U'
22.	A veteran political leader and parliamentarian from an Islamist political party/ via e mail	Respondent 'V'
23.	A senior official in the Strategic Plans Division	Respondent 'W'
24.	A middle ranking official in the strategic Plans Division	Respondent 'X'

Chapter – 1

Literature Review

1.1 Introduction:

This chapter is intended to provide a theoretical basis for understanding Pakistan's evolution as a nuclear weapons capable state since 1998. It will provide an overview of the discourse related to the concept of 'learning' in general, and 'nuclear learning' in particular, highlighting the commonalities and differences in perceptions of scholars representing different schools of thought on the subject. This will provide a foundation for the subsequent chapters that mainly employ the empirical evidence related to evolving doctrinal thinking, force configurations and postures, establishment of command and control structures and safety and security systems, nuclear specific legislations and Pakistan's nuclear regulatory regime. Learning can take different forms and can take place at multiple levels which often overlap and their boundaries are generally blurred. Since the main purpose of this study is to determine the nature and degree of nuclear learning in the civilian and military institutions in Pakistan the focus of the study is mainly on the organisational/institutional learning. It is not easy to determine whether nuclear learning in Pakistan followed a clearly laid out plan or moved along haphazardly. It is also difficult to classify which developments can be termed as learning and which fall under the category of adaptation. However, as a general rule adaptations are impromptu responses to changing situations and have a short term utility while learning brings about more durable and longer lasting changes in conduct and behaviour.

1.2 A Brief Overview of the Concept of Learning:

Educational psychologists such as Thorndike, Driscoll, Vail, and Gonzalez etc. have explained the process of learning in several different ways. Some scholars have taken a quantitative approach to learning and consider learning as a process of an increase in the volume of existing knowledge which includes retention of facts and figures and learning and retaining different skills and techniques which can be employed as and when required. The second group explain learning as the ability to perceive the meanings and to associate various elements of knowledge not only with each other but to the broader issues and be able to grasp the reality and enhance the understanding of the world by finding new

meanings of the available knowledge. Yet others define learning as the ability to modify or revise existing concepts to suit a particular situation. However, the real challenge does not lie in the acquisition of knowledge per se but in its application to different circumstances.[1]

In view of the approaches employed by different scholars to explain the process of learning, they have been grouped under three main schools namely, the 'behaviourists' represented by scholars such as Thorndike, Watson, Skinner and Pandey, the 'humanists' including Maslow, Roger and Patterson etc., and the 'connectivists' like Gonzalez.[2] According to behaviourists, "learning is a permanent change in behaviour as a result of experience. However, not all changes in behaviour resulting from experience involve learning."[3] They also emphasise that the process of learning depends upon the relationship between 'stimulus' and 'response.'[4] The humanists on the other hand believe that learning is a process through which individuals maximise their potential through optimum utilisation of their talents.[5] While keeping in view the growing impact of technology on human lives, the connectivists argue that in the present times the knowledge is growing so rapidly that its life span has been greatly reduced and therefore, "the skill and capacity to know more is more important than what is currently known."[6] They also believe that, "the scope of formal education is shrinking and learning is becoming continual process that lasts for a lifetime."[7] In this kind of environment it is hard to make a distinction between formal learning and 'on the job learning' or 'learning by doing' and thus "there is an increased need for knowledge management and linking the individual and organisational learning."[8]

According to Thorndike, learning is deemed to have taken place if the behaviour of an individual is irrevocably modified and this change in behaviour affects both the internal actions of the individual that are not visible to outsiders as well external actions that can be discerned by others. At a broader level learning encompasses the manner in which people perceive and interpret the world around them. More importantly, Thorndike believes that

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[1]Dr Malik Ghulam Behlol and DrHukam Dad, 'Concept of Learning', *International Journal of Psychological Studies,* Vol. 2. No. 2, December 2010. www.ccsenet.org/ijps
[2]Ibid.
[3]Ibid.
[4]Ibid.
[5]Ibid.
[6]Ibid.
[7]Ibid.
[8]Ibid.

learning takes place as a result of the interaction between a 'stimulus' and the 'response' to it. This clearly means that to begin with the process of learning requires some stimulus. The amount of learning would obviously depend upon the intensity of the stimulus and whether the stimulus evokes a positive response.[9] He also recognises 'trial and error' as an important mode of learning.

Brockett and Roger argue that, learning is a deliberate effort on part of an individual to fully exploit his cognitive potential. They consider learning as a process through which an individual strives to achieve his natural potential to its fullest extent. The focus of learning here remains the individual. Roger has argued that, "simple memorisation of raw facts and information cannot be considered as learning. Learning in essentially the ability to analyse and process the available information."[10]

Driscoll does not consider learning as a one off affair but one that manifests itself in perpetually varying human ability to undertake certain actions. This change in human capabilities takes place as a result of a person's own experience as well as his interactions with his environment.[11] According to Vaill, learning is a part of the human existence. In his view it is a continuous process as a consequence of varying responses of the individuals and groups of people to different events as they unfold and the manner in which they deal with familiar or unfamiliar circumstances.[12]

In the field of business a model called the 'Uppsala Internationalisation Process Model' has been employed primarily to study the process of learning which various business firms undergo as they venture into the international market. This model however, provides useful insights into learning by organisations or institutions in general. According to this model the managements learn in the form of small incremental steps based on their own experiences which is also termed as 'learning by doing.' One of the assumptions in the model is that the knowledge in specialised areas is individual centric and cannot be easily passed on from one individual to another or from one situation to another. The

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[9] E. L. Thorndike, E. O. Bregman, J.W. Tilton and E. Woodyard, 'Adult Learning', New York, Macmillan, 1928, quoted in Behlol and Hukam Dad, op. cit.
[10]Behlol and Hukam Dad, op. cit.
[11]M.Driscoll, 'Psychology of Learning for Instruction', Needham Heights, MA., Allyn & Bacon, 2000, quoted in Behlol and Hukam Dad.
[12] P.B. Vaill, 'Learning as a Way of Being', Jossey-Blass Inc., San Francisco, California, 1996, quoted in Behlol and Hukam Dad, op. cit.

Uppsala Model lays emphasis on the importance of 'experiential learning' on part of organisations based on their ongoing operations. On the other hand it also raises the possibility that sometimes organisations can also acquire knowledge through their interaction with other organisations without themselves having to undergo the experience of those organisations. It also introduces the concept of what it calls 'Imitative Learning' which essentially means that organisations can learn by monitoring the activities of reputed and credible organisations and then adopting their ways. Moreover, the model also points at some short cuts used in the process of organisational learning, wherein the organisations sometimes buy off other business organisations and benefit from their knowledge and experience. Similarly, they sometimes hire individuals who possess expertise and knowledge in a particular field. Nevertheless, the organisations can also learn without either recourse to short cuts or relying on their own experience, by undertaking a dedicated effort to acquire the desired information.[13]

It has also been highlighted in the organisational learning literature that a positive learning does not necessarily increase the effectiveness of an organisation, however, it brings to fore alternative ways of conducting their activities. The amount of learning by the organisation in this context can be gauged by the number of alternatives it has thrown up. With the passage of time the organisation learns to carry out its activities with ever increasing efficiency. This phenomenon is also described as a 'learning curve.'[14] By repeatedly performing the same operations the alternatives are abandoned as the organisation achieves mastery over its existing methods and techniques. The Uppsala Model accords greater importance to 'experiential learning' as compared to other modes of learning such as 'imitative learning' or learning through incorporation of individuals or other organisations or even a focused effort to seek new information. The weakness of this model is its overemphasis on 'reactive' rather than 'proactive learning,' wherein reactive learning implies learning more about the procedures in vogue while proactive learning denotes an effort to seek new solutions.[15] This kind of reactive learning can be triggered by a problem confronted by the organisation during the course of ongoing operations. The

[13]M.Forsgren, 'The Concept of Learning in the Uppsala internationalisation process model: a critical review', International Business Review, 11, 2002, p.259.
[14]Ibid.
[15]Ibid., p. 260.

search for a solution does not go much beyond the existing ones and the learning process ends as soon as the problem is resolved.[16]

The display of 'incremental behaviour' indicates a lack of confidence on part of an organisation and there is an inverse relationship between the degree of uncertainty and the size of the steps an organisation will take. The institutional theory suggests that in case the organisation is not sure of itself it will adopt a 'mimetic behaviour' to follow the practices adopted by a majority of organisations because such practices enjoy credibility and success is assured.[17] The relationship between cause and effect is not very clear in the organisation theory and there is no clear connection between learning and success or failure. The experiential learning cannot be assumed to be uniform within an organisation because different individuals and groups with varying interests and abilities will interpret the same experience in different ways. There is also a tendency to claim credit for success and blame failure on the actions of others or on extraneous factors.[18] It has also been suggested that to avoid the negative impact of changing of personnel collective memory must be preserved in the form of standard operating procedures and practices to create what has been termed by some analysts as 'pool of habits' or 'institutional memory.'[19]

1.3 What is Nuclear Learning?

The concept of nuclear learning is not commonly understood despite the fact that many prominent scholars have alluded to it in their writings mainly in the context of US-Soviet nuclear rivalry during the cold war. Nuclear Learning is basically a subset of the broader concept of learning that focuses on various aspects of nuclear policy. Since there is no available definition of nuclear learning the author has attempted to define it as follows:-

> Nuclear learning is a process through which states that acquire nuclear weapons capability learn to manage it through the development of nuclear doctrines, command and control structures, safety and security mechanisms, regulatory regimes and acquire an understanding of both the technological characteristics of these weapons as well as their politico-strategic ramifications which enables them

[16]Ibid. p. 261.
[17]Ibid., p. 262 &264.
[18]Ibid., p.268.
[19]Ibid., p.270.

> to achieve a stable strategic balance through an astute manipulation of these formidable instruments of power.

Literature related to 'nuclear learning' covers both its components, that is to say, 'nuclear' as well as 'learning'.[20] Nuclear Learning is not static but dynamic in nature and continues to evolve and adjust to the changing security environments as well as technological developments. This point is evident from an overview of the evolution of nuclear doctrinal thinking in different nuclear weapon states in chapter three of the study. Most of the literature related to nuclear learning is based on the US experience in managing its nuclear capability during the 'Cold War' years. The Russians, the British, the French and the Chinese also learnt from their respective experiences but compared with the US only limited amount of information about these countries is available in public domain. Existing strategic literature clearly indicates that 'nuclear learning' is an incessant process. The US, for instance, starting with the strategy of 'Massive Retaliation' in 1954, moved to the 'Flexible Response' (early 1960s), then to 'Mutual Assured Destruction' (late 1960s), 'Limited Nuclear Options' (early 1970s), 'Countervailing strategy' (late 1970s), and on to the 'Prevailing Strategy' in the 1980s,[21] while NATO and European allies also moved from 'Massive Retaliation' to 'Flexible Response' and 'Graduated Response' respectively. These changes were introduced in order to make adjustments to the ever changing international security landscape and advancements in science and technology which made available ever more sophisticated weapons and increasingly accurate delivery systems supported by advanced surveillance and target acquisition technologies. It is also clear that whereas individual states readily change their strategies in view of the changing circumstances the alliances tend to stick to a particular policy for a longer period of time due to the difficulties in achieving consensus among the alliance partners for any change to be effected.

Nuclear learning starts with the evolution of doctrinal thinking in order to cater for the repercussions of these qualitatively different weapons on both the means available for as well as the ends sought by national security policy. Doctrine in turn provides the bedrock on which force structures are built and the institutional mechanisms are created to exercise

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[20]Jeffrey Knopf, op. cit.
[21]Colin McInnes, 'Nuclear Strategy', in Colin McInnes & G.D. Sheffield, eds., 'Warfare in the Twentieth Century', 1988, Routledge, London.

command and control over these forces. Nuclear doctrine itself has two components one of which is the declaratory doctrine, which outlines the fundamental principles embodied in the doctrine. The second component is the operational part of the doctrine, which includes the intended targets and various plans and contingencies for the employment of nuclear weapons. The latter part of the doctrine remains classified for obvious reasons. Since the declaratory doctrine is available in the public domain it catches the attention of the outside world and evokes responses from the contending states. Because of the special nature of nuclear weapons the requirements for command and control of these weapons are far more stringent than conventional weapons. Additionally, complementary structures to ensure safety and security of nuclear weapons and materials, regulate all nuclear processes and to exercise control over the export of sensitive materials and technologies also have to be built.

1.4 The Need for Nuclear Learning:

Nuclear weapons due to their immense destructive potential have had a profound effect on the way the nations devise and pursue their security policies. A day after the first atomic bomb was dropped on the Japanese city of Hiroshima, having quickly glanced through the newspaper reports of the event, Bernard Brodie, one of the pioneers of nuclear strategy, turned towards his wife and remarked that, "everything I have written so far has become redundant."[22] He was to encapsulate later the fundamental changes that have been brought about in our thinking about the use of military instruments for the achievement of policy objectives stating that, "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose."[23]The far reaching impact of the advent of nuclear weapons on international security landscape has been recognised by other scholars as well. Robert Jervis, for instance, has captured the essence of the epoch making impact of nuclear weapons on international security by terming it as 'Nuclear Revolution.'[24] He elaborates his point about the enormity of the change brought about by the advent of nuclear weapons and the need to absorb this reality due to its dire security implications saying that, "the fact

[22] Fred Kaplan, 'The Wizards of Armageddon', Stanford, Stanford University Press, 1983, p. 10.
[23] Bernard Brodie, et al., 'The Absolute Weapon', New York, Harcourt Brace, 1946, p. 76.
[24]Robert Jervis, 'The Meaning of The Nuclear Revolution' – Statecraft and the prospect of Armageddon, Cornell University Press, 1989, Ithaca and London.

that nuclear weapons could destroy the world has changed the way people think and the way nations behave. I also believe that a better understanding of their role can make the world safer."[25]The above remarks by Brodie and Jervis, echoed by many others, make it abundantly clear that nations that acquire nuclear weapons also need to undergo a process of learning to be able to readjust their security policies and national objectives in accordance with the constraints imposed by nuclear weapons. The successful management of nuclear weapons would ultimately depend on how comprehensive, effective and timely is this learning process. To be able to better understand this movement along the nuclear learning curve by the nuclear weapons states it is imperative to understand the concept of nuclear learning and its various dimensions and manifestations.

Michael Quinlan has highlighted the fact that in the absence of empirical data about the nature and consequences of a nuclear war we have to depend on untested concepts and draw inferences about a wide range of possibilities. He also points out that the concepts related to nuclear warfare though radically different from traditional concepts of war are not too difficult to comprehend and do not need special expertise in any particular academic discipline. A large body of literature is now available on the theory of nuclear deterrence and concepts related to nuclear war fighting, on which nuclear policies can be based. However, one has to be careful in choosing the appropriate kind of concepts. As Quinlan cautions, if the choice of concepts is not sound and policies are based on wrong premises the consequences could be disastrous.[26]

1.5 Approaches to Nuclear Learning and Nature of Nuclear Learning:

Whether learning is a normative or a non-normative phenomenon has been a subject of debate among scholars. Some analysts such as Jeffrey Knopf view learning as a normative process and argue that learning would have taken place only if there is a 'positive' outcome. They set a standard of evaluation that will determine that only those outcomes would be classified as learning, which are in consonance with this value judgement and anything in dissonance with this standard would not be considered as

[25]Ibid, p. ix.
[26] Michael Quinlan, 'Thinking About Nuclear Weapons – Principles, Problems, Prospects', Oxford University Press,2009, Oxford, p. 14-15.

learning.[27] Others such as Jack Levy have argued, in favour of a 'value-neutral' conception of learning and believe that any change in outlook or the understanding of a person irrespective of its direction should be considered as learning.[28] Levy's approach represents the dominant view amongst the social scientists who, believe that, one's own value system should not be employed to judge whether any idea is right or wrong. However, Knopf insists that learning at policy level is 'inherently a normative concept' keeping in view the fact that ultimately its purpose is to help in the achievement of policy objectives.[29] There are still others who take the middle road and argue that irrespective of whether or not these fit into a value system, lessons learnt, should be seen in terms of their 'effectiveness' or ability to achieve the desired goals.[30]

Psychologists contend that the process of learning usually progresses from simple to more complex learning.[31] Jeffery Knopf has explained simple learning as "an adjustment in the means being employed by a state, with no questioning of the ends being sought."[32] Joseph S. Nye has explained 'simple learning' as a modification of the means being employed to achieve a particular objective without any attempt to modify the end itself, while 'Complex Learning' according to him "involves embracing a new understanding of cause and effect relations that can lead a state to rethink the fundamental goals of policy."[33] Both these formulations relate to changes in the behaviour of states brought about by their nuclearisation. But the historical experience suggests that these changes do not normally result from a deliberate intellectual or an academic exercise but are driven home the hard way after going through crises and conflicts and through a process of trial and error.[34]

In addition to dividing learning into simple and complex learning Knopf has also divided 'nuclear learning' into two other segments namely 'factual learning' which implies

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[27] Jeffery W. Knopf, 'The Concept of Nuclear Learning', Non-proliferation Review No. 19, Vol. 1, Monterey Institute of International Studies, March 2012.
[28] Jack S. Levy, ''Learning and Foreign Policy: Sweeping a Conceptual Minefield', *International Organisation* 48*,* no. 2 (spring 1994) quoted in Knopf op. cit.
[29]Knopf, op. cit.
[30] Ibid.
[31] Robert Jervis, 'Perceptions and Misperceptions in International Politics', Princeton University Press, Princeton, New Jersey, 1976, p. 235.
[32] Jeffery W. Knopf, The Concept of Nuclear Learning', Paper presented at 'A Decade of Nuclear Learning – Ten Years after India-Pakistan Nuclear Tests', Conference held at Honolulu, Hawaii February 12-13 2009.
[33] Joseph Nye quoted in Knopf op. cit.
[34] Cuban Missiles Crisis is one such example after which both Super powers initiated certain arms control and confidence building measures such as the Washington-Moscow Hotline and the Partial Test Ban Treaty (PTBT) of 1963.

learning the basic facts related to nuclear weapons and 'inferential learning' which entails understanding of the broader implications on the basis of these facts.[35]Robert Jervis has described an aspect of learning, which he terms as 'productive learning,' which "involves the acquisition of certain broad, non-specific, general notions about the properties of the object or method experienced."[36]This concept of 'productive learning' appears to be similar in connotations to what Knopf has described above as 'factual learning.' Both these types of learning should happen in any new nuclear state with the passage of time.

Joseph S. Nye on the other hand has argued that, "states learn by responding to structural changes in their environment, or, to put it in game theory terms, they adjust their behaviour to changes in the payoff matrix.'[37] He also believes that perceptions of national interest do not remain constant and can change with changes in domestic power structure, which could be through an election, military take-over or generational change in leadership. In his view international learning takes place when "new knowledge is used to redefine the context of national interest." [38] This raises an interesting point to explore which has not been studied in any detail before and that relates to Pakistan's conduct of its security and foreign policies in the post 1998 period to determine whether it has made necessary adjustments to its policies to cater for the changes brought about by the introduction of nuclear weapons in the regional security equation or has failed to do so.

It is also understandable that some form of learning is bound to take place with the passage of time or with experience which Russell J. Leng calls "experiential learning."[39] This kind of learning can also be described as 'Learning by doing' or 'on the job learning.' However, it does not imply that only the right kind of lessons would always be learnt. Wrong lessons learnt from history and irrelevant analogies drawn from the past events often lead to disastrous consequences. Within the first decade of nuclearisation the two South Asian neighbours were involved in three serious crises, which raised questions about the viability of nuclear deterrence in South Asia and the ability of the two countries to

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[35]Knopf, op. cit.
[36] Jervis, op. cit. p. 227-8.
[37] Joseph S. Nye Jr., 'Nuclear Learning and US-Soviet Security Regimes', *International Organization,* Vol. 41, No. 3 (Summer 1987), p. 372, 378.
[38]Ibid, p. 379.
[39] Russell J. Leng, 'Bargaining and Learning in Recurring Crises', Ann Arbor, The University of Michigan Press, 2000.

prevent or manage such crises in future by learning from the crisis management by other nuclear states.

Russell Leng has, however, cautioned against depending on experiential learning in crisis bargaining because in his view the future behaviour cannot be accurately predicted on the basis of past record.[40] Nye has further elaborated this point by citing the example of the Bay of Pigs crisis of 1961. He is convinced that Khrushchev learnt wrong lessons from that crisis leading him to believe that Kennedy's response would be weak in any future crisis as well. This misperception led him to precipitate the Berlin and Cuban Missile Crises.[41] Robert Jervis on the other hand has pointed out that during the Cuban missile crisis Kennedy relearnt the lesson, that expert opinion should not be accepted on its face value, the hard way, by living through this near disaster.[42]

Nye argues that frequent changes in government officials weaken institutional memory and the new leaders are forced to reinvent the wheel. This aspect when applied to the situation in South Asia would make an interesting case study. The three post nuclearisation crises in South Asia, in fact, indicate that the new leadership may not necessarily reinvent the wheel and may deal with the crisis by imitating the conduct of their predecessors. For instance, in Pakistan General Musharraf the Army Chief of Staff at the time of the Kargil crisis (1999) was not only still the Chief of Army Staff (COAS) but had also become the chief executive of the country in 2001-02, while on the Indian side the Bharatiya Janata Party (BJP) was in power under Vajpayee's leadership both during Kargil and the 2001-02 crises. In the 2008 Mumbai crisis however, leadership had changed on both sides. On the face of it the leadership in both countries without any first-hand experience of past crises did not act in ways different from the ones followed by the leadership in previous crises and appear to have more or less emulated their predecessors. The issue of institutional memory is also important from the point of view of developing a sustainable capacity to manage nuclear assets. It will be interesting to explore whether the continuity in Pakistani nuclear management structures has helped Pakistan create the institutional memory, that has been appreciated by the Indian strategic analyst Bharat

[40] Russell Leng, quoted in Joseph Nye op. cit.
[41] Nye, op. cit. pp. 380.
[42] Jervis, op. cit, pp. 239.

Karnad who calls upon his leadership to emulate this example and establish a similar dedicated nuclear cadre.[43]

In essence learning could either mean recognition of the need to change the 'means' employed for the achievement of an 'end' or a realisation of the necessity to alter the end itself. These two variants of learning have been described in different ways by different analysts. Views of Jeffrey Knopf and Joseph Nye on the issue of simple and complex learning have already been described in the preceding paras. Others such as Ernst Haas make a distinction between 'real or genuine learning' and simple 'adaptation' in accordance with the changes in the existing environment.[44] Such a distinction, however, would not be easy to make in most practical situations and would generally be subjective in nature.

Joseph Nye contends that, 'learning is to develop knowledge by study or experience' and that availability of new information brings about changes in existing beliefs and perceptions. According to Nye, "learning often involves a shift from overly simple generalisations to complex integrated understandings grounded in realistic attention to detail."[45]Robert Jervis tends to agree with this notion and basing his argument on research by psychologists, has stated, that learning usually moves from 'simple' to more 'complex' learning.[46] Both these arguments, however, seem to imply, that the process of learning follows a linear progression from simple learning to complex learning, without taking into account the possibility that both simple as well as complex learning could also start simultaneously and progress along parallel paths, though the progress in each case may not be equal in magnitude. Another aspect of learning that has not received the desired amount of attention is what could be termed as 'reverse learning' or 'unlearning' wherein a state having learnt a useful lesson from historical precedent or its own experience disregards it subsequently and adopts policies which are contrary to that.

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[43]Bharat Karnad, "INS: Indian Nuclear Service", *The Asian Age,* August 16, 2012. Available at www.asianage.com/columnists/ins-indian-nuclear-service-094. Also see *'Deccan Chronicle*,' at www.deccanchronicle.com/columnists/bharat-karnad/ins-indian-nuclear-service

[44] Ernst B. Haas, 'Where Knowledge is Power: Three Models of Change in International Organizations', Berkeley, University of California Press, 1990.

[45] Nye, op. cit. p. 378.

[46] Robert Jervis, 'Perceptions and Misperceptions in International Politics', Princeton University Press, 1976, Princeton, New Jersey, p. 235.

Specific to the 'nuclear' aspect two types of learning takes place. Firstly, there is learning about the scientific and technical characteristics of nuclear weapons which Jeffery Knopf calls 'factual learning,'[47]while Robert Jervis has used the term 'productive learning', which according to him, encompasses acquisition of knowledge about some general characteristics of the object and the methods involved.[48] The terms factual and productive learning in essence denote the same concept. Secondly, there is learning about the broader implications of nuclear weapons for the security policy of a state which is also termed as 'inferential learning'.[49] Knopf argues that factual learning is important for both the public as well as the ruling elites. Educating the populace through media – both print and electronic - and other means of public education such as academic institutions and think tanks serves a very useful purpose especially during crises. If the masses are fully aware of the terrible consequences of a nuclear war they would not put undesirable pressure on the policy makers to take precipitate decisions in crises situations. On the other hand it is imperative that the leadership is not only cognisant of the destructive potential of the nuclear weapons but also has a good grasp of the wider implications of the possession of nuclear capability by themselves and their adversaries.[50] Such understanding will help the decision makers adjust their security policies accordingly and take unilateral, bilateral or multilateral measures to enhance strategic stability and avoid policies and actions that could lead to a nuclear conflagration.

1.6 Levels of Analysis and Nuclear Learning:

Like any other form of learning, nuclear learning also takes place at multiple levels. Knopf, for instance, has categorised learning from this perspective into five levels namely, individual learning, institutional/organisational learning, governmental learning, state learning, and international learning.[51] The institutional learning takes place both in the military and civilian institutions. Civilian institutions here imply the political elites as well as the civilian bureaucracy. The learning is usually a combination of both factual as well as

[47]Knopf, op. cit.
[48] Jervis, Perceptions and Misperceptions, p. 227.
[49]Knopf, op. cit.
[50] Ibid.
[51] Ibid.

inferential learning. It can also be 'simple' or 'complex'[52] in nature. The concept of organisational learning is also widely used in the field of business management especially for evaluating and analysing the performance of large business corporations.[53]

However, the above classification would be difficult to sustain in many practical situations where the boundaries between institutional learning and governmental learning on the one hand and governmental learning and state learning on the other get blurred and overlap each other. Choice of one or more levels of analysis will depend on the purpose for which the analysis is being carried out. If, for instance, the objective is to trace the physical and intellectual developments in a particular state for management of its nuclear capabilities institutional/organisational level of learning would be more appropriate. However, if the purpose of analysis is to determine the state of strategic stability or the ability to manage crises between two rival states, then international learning[54]would be more suitable.

Knopf for instance highlighting the significance of international learning explains that, "If the underlying motivation for asking about nuclear learning is to figure out whether or not two sides can avoid nuclear war, it may not be the case that nuclear war can be avoided if only one side learns unilaterally. It will also be important to examine whether or not the two sides share the same lessons about how to avoid nuclear war."[55]Zachary Davis suggests that there are instances where the two contending parties ended up learning entirely opposite lessons from the same event.[56]

Since learning by its very nature is a cognitive process it may not sound logical to ascribe this trait to abstract and non-thinking entities such as institutions, governments or states. However, in reality, institutions, governments and states are nothing but a collection of individuals who can and do learn to varying degrees. The cognitive nature of learning also makes it difficult to measure the amount or extent of learning with any degree of precision. To estimate the degree of learning one has to rely mainly on a comparative

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[52] Joseph S. Nye, Jr., 'Nuclear Learning and US-Soviet Security Regimes', *International Organization,* Vol.41, NO. 3 (Summer 1987), p. 371-402.
[53] Amy C. Edmondson, 'Strategies for Learning from Failure', and Francesca Gino & Gary P. Pisano, 'Why Leaders Don't Learn From Success', Harvard Business Review, April 2011.
[54]Knopf, op. cit., also Nye, op. cit. p.378.
[55] Ibid.
[56] Zachary S. Davis, 'The India-Pakistan Military Standoff – Crisis and Escalation in South Asia', Palgrave Macmillan, New York, 2011, p. 230.

analysis of the behaviour of individuals, performance of institutions or conduct of states over a certain period of time. To achieve this purpose one has to improvise and develop certain benchmarks, criteria or performance parameters to act as reference points or yardsticks for evaluation of the levels of learning. Realistically speaking, however, the results of such an exercise will at best be estimates, which would be subjective in nature and would be more or less accurate depending on the rigour of the tools of analysis devised to measure the degree of learning and the degree of access to primary sources of information.

In the post 9/11international security environment, a new but very critical factor has emerged in the form of non-state actors. This factor, however, has not been dealt with, in the available studies and literature related to nuclear learning. The problem of non-state actors, though, does not easily fit into any traditional level of analysis framework, and will have to be reckoned with, as an independent factor. However, it is important to take into account this factor due to its ability to trump any learning on the part of organisations, governments or states and to destabilise the strategic balance between two contending powers. These non-state actors have already precipitated two serious crises between India and Pakistan[57] and their ability to do so again cannot be underestimated because so far the two states have been unable to agree to any mechanism to insulate their strategic stability from the actions of non-state actors despite continuing efforts to deal with this menace.

There seems to be no agreement on the issue of levels of analysis and different scholars have shown preferences for one particular level or the other. Jack Levy has, for instance, argued in favour of the individual level of analysis,[58] while Andrew Bennet and Amandeep Gill have preferred organisational learning.[59] Joseph Nye, while acknowledging the importance of individual learning considers it an insufficient basis for organisational learning. He also emphasises the significance of 'institutional memory' and 'procedures' for organisations since these provide guidelines for both the old hands and the new entrants

[57] Terrorists belonging to Lashkar-i-Tayyeba and Jaish-i-Muhammad have been accused of carrying out attacks on the Indian Parliament in December 2001 and on targets in Mumbai in November 2008 which created serious military and political crises between India and Pakistan that could only be defused through diplomatic intervention by the US and other major powers.

[58] Levy, Learning and Foreign Policy, op. cit.

[59] Andrew Bennett, Çondemned to Repetition? The Rise, Fall and Rerise of Soviet – Russian Military Interventionism, 1973-1996, Cambridge, Massachusetts, MIT Press, 1999. Also see Amandeep S. Gill, 'Nuclear Learning Revisited,' paper presented at a CISAC social science seminar, Stanford University, June 4, 2009, both quoted in Knopf, The Concept of Nuclear Learning, op. cit.

in the organisation.[60] James Rosenau has termed these as 'pools of habits'.[61] Robert Jervis has also elaborated organisational learning arguing that, "when an event affects the perceptual predispositions of many members of an organisation, we can speak of organisational learning."[62] This, however, is a very complex phenomenon, which is not easy to quantify, because learning amongst individual members of an organisation would neither be equal, nor in the same direction.

1.7 Learning, Organisation Theory and Bounded Rationality:

Bennet, Gill, Nye and Jervis subscribe to the significance of organisational learning and Jervis using military organisation as an example has stated that, "Lessons become working assumptions and form the basis for future planning… they involve not only strategic and tactical thinking but the conduct of manoeuvres, formal instructions and standing orders."[63]Scott Sagan on the other hand, basing his arguments on the 'organisational theory'[64], has expressed scepticism about the capacity of military organisations to learn and internalise lessons that would cause them to change their routines and operating procedures. In his view professional military organisations usually have rigid routines, professional biases and vested group and sub-group interests, which could hinder their capacity for nuclear learning required of a rational actor in a nuclear deterrence environment. Such proclivities on part of the military organisations can lead to deterrence failure in his view. He also doubts the capacity of military organisations to learn the right kind of lessons from a given event due to what is termed in organisational theory, as 'bounded rationality.'[65] Whereas bounded rationality has been explained as under:-

> "Like comprehensive rationality, bounded rationality assumes that actors are goal-oriented, but bounded rationality takes into account the cognitive limitations of decision makers in attempting to achieve these goals…..The fundamental premise underlying organisational studies in political science is that behaviour of organisations mimics the bounded rationality of the actors that inhabit them. This

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[60] Nye, p. 381.
[61] James N. Rosenau, 'Learning in East-West Relations: The Superpowers as Habit-driven Actors', Los Angeles, Institute for Transnational Studies, mimeo, 1986, quoted in Nye, op. cit.
[62] Jervis, Perceptions and Misperceptions in International Politics, p. 238.
[63] Ibid.
[64] Scott D. Sagan, 'The Perils of Proliferation, Organization Theory, Deterrence Theory, and the Spread of Nuclear Weapons', *International Security,* Vol.18, No. 4 (Spring 1994), p. 66-107.
[65]Ibid.

> correspondence is not simply an analogy among phenomena at different levels; the relationship is causal…The most important components of the political theory of organisations were the concepts of limited attention spans, habituation and routine and organisational identification..." [66]

Sagan argues that large organisations – militaries included – focus more on coordinating actions amongst various units and sub-units for which they devise standing operating procedures and rules to deal with different situations, at the cost of well-reasoned decision making.[67] It is widely known that militaries are conservative by nature and are bound by traditions giving rise to the well-worn out cliché that militaries train to fight the last war. However, what distinguishes conventional and nuclear war strategies is the fact that right from the outset the theorisation of nuclear strategies has been dominated by civilian scholars and analysts and nuclear use decisions rest with the political leadership though the custody of nuclear weapons and delivery systems has remained in the military domain. Therefore, the organisational and cultural limitations of the military may not impact nuclear learning in the same way it affects the learning in the conventional sphere.

Sagan's rather pessimistic assessment is mainly based on his study entitled 'Limits of Safety'[68] wherein, he has recounted instances, where nuclear accidents actually happened in the US military, as well as those, which were near misses. He also employs Charles Perrow's 'Normal Accidents Theory' where Perrow has argued that large organisations have limited ability to fully understand the complexities of highly technical systems and that 'boundedly rational' organisations are bound to have accidents overtime due to 'high interactive complexity' and 'tight coupling' amongst their various components.[69] Since Sagan represents the 'proliferation pessimists' and his views that have been well documented in the form of his classic academic debate with Kenneth Waltz[70] should be viewed in that context.

Sagan also believes that 'new proliferants' (mainly comprising third world countries), will undergo a much longer and more difficult transition compared with

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[66] Bryan D. Jones, 'Bounded Rationality', Annual Review of Political Science, 1999.2: 297-321.
[67] Sagan, p. 71.
[68] Scott D. Sagan, 'The Limits of Safety – Organizations, Accidents and Nuclear Weapons', Princeton University Press, 1999, Princeton, New Jersey.
[69] Sagan, Perils of Proliferation, p. 94-5.
[70] Scott D. Sagan and Kenneth N. Waltz, 'The Spread of Nuclear Weapons – A Debate Renewed', W.W. Norton and Company, New York, 2003.

established nuclear powers in achieving a secure retaliatory capability. They would also be more prone to temptations for preventive war and susceptible to accidental launch of nuclear weapons because of the dominant role of militaries in many of these countries. In this context he has given the specific example of Pakistan, where military is known to have played a dominant role in security policy making, whether related to conventional or nuclear forces. Waltz however, disagrees with him on this point and believes that new nuclear powers will do everything to ensure safety and security of their arsenals and will have strong incentives to avoid accidental nuclear war.[71] Waltz' argument clearly implies that new nuclear powers will learn by doing as well as through mimicking the experiences of the more advanced nuclear powers to effectively manage their respective nuclear assets.

Military organisations can however, because of their discipline, intense socialisation, and strong bonds of esprit de corps fall prey to a phenomenon called 'Group Think,' which is called 'regimentation' in the military parlance, that can impair their judgement and quality of decision making. 'Group Think' - a term coined by a social psychologist Irving Janis in 1972 represents a tendency amongst groups to seek consensus in an attempt to balance the interests of the individual members with group's interests. This convergence of individual and group interests creates a strong bond between the group members and fortifies the group. Group think is considered to be an important ingredient of the current social concept of 'Corporatism.'[72]Janis' definition of group-think very aptly sums up the idea as, "a mode of thinking that people engage in when they are deeply involved in a cohesive group, when the members' strivings for unanimity override their motivation to realistically appraise alternative courses of action."[73]Group think can have several negative implications such as the tendency to discuss only the few "politically correct' alternatives, the solution supported by the majority is seldom revisited to identify its weaknesses, expert opinion is not sought for fear that it might not conform to the solution favoured by the group, the collection and analysis of the information is done in a very selective manner so as to bring up only those pieces of information that conform to

[71]Ibid, p. 93.
[72]http://www.softpanorama.org/Skeptics/groupthink.shtml
[73] Ibid.

the group's preferred course of action and at times enough thought is not given to contingency plans.[74]

1.8 Learning from History and the Effect of Perceptual Dispositions:

Looking at the factors that affect the process of learning the first and foremost is history, however, its lessons are not always straightforward. The real lessons of history are deeply ingrained but there is a general tendency to more readily learn the superficial lessons. More importantly, if one loses sight of the context of historical events and fails to appreciate the changed circumstances of the present, there is every possibility of drawing wrong inferences and analogies from history. Robert Jervis has opined that, 'some events like wars leave such an impression that equally dramatic developments are required to displace them.'[75] This strong influence of traumatic events makes decision makers 'insensitive to incoming information,'[76] which hampers their ability to identify the differences between the two situations and leads them to draw and apply inappropriate analogies to widely differing conditions.[77] According to Jervis there is a direct linkage between the events, lessons learnt from these and the future behaviour of the decision makers and sometimes this precludes the learning of, what may appear to be very obvious lessons.

An important factor which affects the ability of any actor to learn the right kind of lessons from past events is his 'perceptual disposition' although it is not easy to objectively determine how much influence has been exerted by the predispositions on an individual's perceptions. However, in case the reading of the past is too obviously inaccurate it is in all likelihood influenced by the existing predilections of the individual concerned. According to Jervis, "Decision makers usually fail to strip away from the past event those facets that depend on the ephemeral context. They often mistake things that are highly specific and situation bound for more general characteristics because they assume that the most salient aspects of the results were caused by the most salient aspects of the preceding situation."[78]More importantly, "people pay more attention to *what* has happened than *why*

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[74] Ibid.
[75] Jervis, p. 218.
[76] Thomson, 'Political Realism and the Crisis of World Politics,' Princeton, Princeton University Press, 1960, p. 36, quoted in Jervis, Perceptions and Misperceptions.
[77] Jervis, Perceptions and Misperceptions, p. 220.
[78]Ibid.

it has happened."[79]Joseph Nye while cautioning that the new information can sometimes be misleading, or can even be wrongly used makes a somewhat similar argument saying that, "New information affects prior beliefs, but its reception and interpretation are also affected by those prior beliefs. The extent and accuracy of learning depends upon the strength of the prior beliefs and quantity and quality of the new information."[80]

The studies by psychologists pertaining to the way people receive and convert the available information into opinions suggest that these opinions are continuously modified in the light of new information. Psychologists argue that our perceptions are subjective in nature and are usually at variance with the objective reality. We, therefore, delude ourselves into seeing what we want to see rather than what exists in reality. Understanding of this psychological phenomenon is important if we want to understand the decisions made by the leaders in different situations because it is not the way the situation exists but the way they perceive it to be, that affects their decision making.[81]

1.9 Learning from Success:

A very important aspect of learning is the matter of how we look at past events and classify them as either a success or a failure. An outcome is usually viewed as a success, when the actor involved is perceived to be better off on balance at the end of it than before. Once a policy is deemed to be successful there is no incentive for a post-facto analysis of its pros and cons. No one pauses to think that alternative courses of action might have been more successful or that it was not the policy per se but a combination of other factors including sheer good luck that might have contributed to a successful outcome. Consequently, policies that are seen as having been efficacious would be more readily repeated in the future sometimes with disastrous outcomes. The other side of the coin is that, in the absence of a thorough analysis, policies that failed in the past would be avoided.[82] Jervis has very aptly turned around Santayana's maxim that, "those who forget the past are condemned to make the same mistakes" into, "those who remember the past are condemned to make the opposite mistakes."[83] He has also modified the commonly

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[79]Ibid, p. 228.
[80] Jervis, op. cit. p. 379.
[81] Robert O. Mathews, et al., 'International Conflict and Conflict Management,' Prentice Hall Canada Inc., Scarborough, Ontario, 1989, p. 11.
[82] Jervis, op. cit. p. 234-5.
[83]Ibid, p. 267.

known cliché' that, 'nothing succeeds like success' into "nothing fails like success" to reinforce his argument.[84]

In a recent study primarily related to the field of business management, Francesca Gino and Gary P. Pisano have made a similar argument, in an article with an evocative title, "Why leaders Don't Learn From Success" – Failures get a post-mortem, why not triumphs?[85] They argue that success can breed failure by impeding the ability of both individuals and organisations to learn the appropriate lessons. They point out that individuals and institutions develop mechanisms for analysing failures with a view to learn from these, but no one bothers to create the capacity for a similar soul searching in case of a success. In their view, we have a tendency to assume that our skills and our existing strategies have resulted in success, without pausing to think that luck, chance and extraneous factors may have been responsible for this outcome. This proclivity results in what they call, making "fundamental attribution errors". Second obstacle to learning in their opinion is what they term as, "overconfidence bias," which makes us believe that no change is required in the scheme of things as they exist now. Third, is what they call, "the failure to ask why- syndrome," which prevents a systematic analysis of the reasons behind good performance.[86] They have amplified their arguments by citing the example of Alan Greenspan who was considered to be the most brilliant Federal Reserve Chairman in the US History until the economy nearly crashed in 2008. It was evident that Greenspan and his team had been the victims of the 'over confidence bias' and a belief in the infallibility of their economic models. Such over confidence can afflict organisations, whether civilian or military, bureaucratic or commercial, resulting in their lack of receptivity to new and innovative ideas.[87] People in leadership positions also develop a tendency to keep away those who bring in the bad news.

Gino and Pisano have tried to build a simple model of learning, while recognising the fact, that learning is an extremely 'complex', 'cognitive' and 'organisational process.' They accept the reality that individuals and organisations have concepts, models and rules of business, that govern their conduct. These precepts are sometimes very refined and

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[8484]Ibid, p. 278.
[85] Francesca Gino and Gary P. Pisano, 'Why Leaders Don't Learn From Success – Failures Get a Post-mortem, Why Not Triumphs? *Harvard Business Review,* April 2011, p. 68-75.
[86]Ibid, p. 69.
[87]Ibid, p. 71.

based on logic and long term experience while on other occasions these are superficial and followed through instinct. They argue that learning is nothing but updating our concepts and trying to understand why things happen in a particular way and why certain decisions yield certain types of results. They infer that, "when we succeed, we just focus on applying what we already know to solving problems. We don't revise our theories or expand our knowledge of how our business works," and go on to advise that, "celebrate success but examine it…when a win is achieved, the organisation needs to investigate what led to it with the same rigor and scrutiny it might apply to understanding the causes of failure."[88]

Gino and Pisano have also referred to practice by the militaries of systematic debriefing of each combat mission or training exercise, irrespective of their success or failure, through what are termed as "after-action reviews" or (AARs) which produce useful information that can help in improving the future performance. They suggest that Civilian organisations can emulate the military and adopt similar practices to improve their own performance. These reviews throw up some fundamental questions such as; what did we set out to do? What actually happened? Why did it happen? What are we going to do next time?[89] Answers to these questions must be sought by all organisations in order to continue to succeed.

1.10 Learning from Failure:

On the other side of the spectrum is learning from failure. Amy C. Edmondson argues that we are taught from very early on that failure is bad and that conviction hinders learning by organisations from their mistakes.[90] There is a general agreement about the value of learning from mistakes. However, in most cases it is not done in the right spirit and in the manner it should be done due to the stigma associated with failure. According to Edmondson, "Every child learns at some point that admitting failure means taking the blame. That is why so few organisations have shifted to a culture of psychological safety in which the rewards of learning from failure can be fully realised."[91] Due to this fear failures are not reported and obviously the lessons that could have been learnt, if these were highlighted, are also not utilised by making necessary course corrections. Again

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[88] Gino, op. cit., p. 72-3.
[89] Ibid, p. 73.
[90] Amy C. Edmondson, 'Strategies for Learning from Failure', *Harvard Business Review,* April 2011.
[91] Ibid, p. 49.

minor routine failures are bound to occur in large and complex organisations but these should be addressed in order to avoid systemic failures at some later stage.[92]

It is even more important to accept and learn from mistakes that are a consequence of experimentation with new ideas and cutting edge technologies because of the significance of the information that can be gleaned from those. Such failures have been called "intelligent failures."[93] It is the responsibility of the leadership to inculcate a culture of reporting and learning from mistakes and failures within their organisations by encouraging and rewarding those members of their teams who display the courage to report failures instead of shooting the messenger that brings the bad news.[94] Once the mistakes are detected or reported, these should, neither be brushed aside, nor should they be subjected to a superficial investigation. A deeper and wholesome inquiry should be undertaken, even if our egos are hurt in the process, to be able to discover the root causes of failure, for the greater good and long term health of the organisation.[95]

1.11 Brief Overview of Pakistan's Learning Experience:

Pakistan's nuclear weapons programme started in earnest in the mid-1970s after India had conducted its so called 'peaceful nuclear explosion' in May 1974. As a consequence the western industrialised world started erecting barriers in the way of transfer of nuclear technology to would be proliferators. Pakistan, therefore, adopted a surreptitious approach and espoused an official stance of denial of any military nuclear programme. This policy of denial of any weapons related activity and insistence on the peaceful nature of its nuclear research and development programme, helped deflect international pressure and sanctions. However, the downside of this policy was that issues related to prospective nuclear doctrine and strategy, command and control and safety and security could not be discussed in public. This emphasis on secrecy even discouraged in-house deliberations on these issues in the military as well as civilian institutions. The nuclear programme was even considered a taboo subject for media and academia. In May 1998 after the multiple nuclear tests, therefore, there was no institutional memory or 'pool of habits' to fall back on and Pakistan was required to learn its nuclear lessons quickly in

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[92] Ibid.
[9393] The term "intelligent failure" has been coined by Duke University Professor of Management, Sim Sitkin.
[94] Edmondson, op. cit., p. 51-2.
[95]Ibid, p. 54.

order to establish its credentials as a responsible nuclear power. While the specifics of the nature and extent of nuclear learning in Pakistan will be discussed in detail in the subsequent chapters of this study, it will suffice here to refer to a few academic works that have alluded to the subject.

Peter Lavoy has written that, before May 1998, "nuclear weapons had not been integrated into Pakistani military plans, the armed forces had no nuclear doctrine to speak of, and command and control over the nuclear arsenal and delivery systems was only vaguely defined and loosely organised."[96] He also argues that the 9/11 incident, the 2001-02 military stand-off with India and the revelations of the AQ Khan- proliferation network while complicating Pakistan's security environment also hastened the nuclear learning process in Pakistan.[97]The Naval Postgraduate School, Monterey, California has recently published three books two specifically dealing with the first two post nuclear crises in South Asia which provide an insight into learning from crises while the third deals with some aspects of nuclear learning in South Asia in the first decade.

The first of these publications focuses on the Kargil Crisis of 1999 and includes among others at least four chapters related to 'learning from the crisis.' Rajesh Basrur and Hassan Askari Rizvi have outlined the lessons learned by India and Pakistan respectively from this crisis. Rodney Jones and Joseph McMillan have written about the lessons learned by the United States from the same crisis. Finally Robert Jervis has tried to extract some lessons from the Kargil Crisis in the light of classic deterrence and international relations theory. According to Hasan Askari Rizvi, Pakistan's response as a state, to the Kargil crisis, was disjointed and dysfunctional and there was a serious lack of coordination amongst various organs of the state. In his opinion, Pakistan plunged into the Kargil crisis because its national security decision makers had not fully absorbed the implications of the 1998 nuclear tests. He goes on to suggest that Pakistan's conduct during the 2001-2 crisis was better than 1999, due to the fact, that firstly, President Musharraf had both military

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[96] Peter R. Lavoy, *'Islamabad's Nuclear Posture: Its Premises and Implementation'*, in Henry D. Sokolski eds., 'Pakistan's Nuclear Future: Worries Beyond War', Strategic Studies Institute, US Army, p. 129- 165. Available at http://www.StrategicStudiesInstitute.army.mil/

[97] Ibid.

and civilian institutions under his control and this unity of command facilitated better coordination and secondly, the lessons learned during the Kargil crisis came in handy.[98]

The second book is about the 2001-2002 Crisis,[99] and analyses various facets of the crisis, which resulted in a year-long military standoff between India and Pakistan. The book contains some very useful lessons and conclusions such as the role of non-state actors in precipitating a crisis, the potential of military crises to escalate in unexpected ways, the lack of a common understanding of deterrence dynamics between India and Pakistan, the explosive potential of the unresolved Kashmir dispute, and the elusive nature of the concept of learning in international affairs. These lessons could provide valuable insights to policy makers and guide their actions in avoiding similar crises in future.

The third publication is based on the proceedings of two international conferences and includes papers by Indian, Pakistani and American scholars on the concept of nuclear learning, doctrinal developments, command and control and strategic stability. It also highlights the challenges to nuclear learning in South Asia and contends that while nuclear learning has taken place in certain areas there is inadequate learning in others such as escalation dynamics, assessment of each other's capabilities and security compulsions and negative repercussions of provocative statements and media hype. It also contends that, "States learn by doing, and this trial and error approach to nuclear learning appeared analogous to South Asia's experience at lower escalation levels. In particular, our research highlighted the odd utility of Indo-Pak iterative brinksmanship. This approach instigated lesson learning in both countries as information on red lines and the limits of security policies were learned through crises."[100]

In another context, Robert Jervis has argued that most of the available literature about crises is based on the US-Soviet interactions or the pre-World War-I crises, which makes it difficult to relate these to differing strategic environments, different sets of actors and particular national styles of the nations involved. However, he is convinced that, since

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[98] Hasan-Askari Rizvi, *The Lessons of Kargil as Learned by Pakistan*, in Peter R. Lavoy, eds., 'Asymmetric Warfare in South Asia – The Causes and Consequences of the Kargil Conflict', Cambridge University Press, 2009, p. 333-352.

[99] Zachary S. Davis ed., 'The India-Pakistan Military Standoff – Crisis and Escalation in South Asia', Palgrave Macmillan, New York, 2011.

[100] Feroz Hassan Khan and Ryan Jacobs, *The Challenges of Nuclear Learning in South Asia*, in Feroz Hassan Khan, Ryan Jacobs and Emily Burke eds., 'Nuclear Learning in South Asia – The Next Decade,' Naval Post Graduate School, Monterey, California, p. 3-15.

the existing theories are not very precise and specific, these can be easily applied to varying situations. The problem in his view is the lack of available evidence to determine whether India and Pakistan learnt from the US-Soviet experience and emulated them or whether the demands of the situation compelled them to behave in a particular manner without regard to any historical precedence. Though, he contends that India's behaviour and indeed much of its rhetoric during the Kargil crisis resembled that of the US during the Cuban Missile Crisis of 1962.[101] He concludes with the observation that, "It would be difficult but interesting to try to determine how Kargil influenced the crisis in 2002, and to see if behaviour was more or less dangerous because of it."[102]This amply highlights both the difficulty of evaluating learning as well as the importance of learning for states and institutions to enable them to act more prudently in future crises.

Michael Wheeler believes that lessons from past events, even from a different setting, can be usefully applied to present or future situations and argues that the Cuban missile crisis had a salutary effect on the US and Soviet behaviour and both India and Pakistan can learn some useful lessons from that and other cold war experiences to enhance nuclear stability in South Asia.[103]

Michael Quinlan has emphasised the importance of learning the nuclear jargon because each of the terms used has a specific concept behind it and therefore, careful use of language is critical to get the right message across to the other side.[104] He is convinced that the lessons from the 1999 and 2001-2 crises between India and Pakistan have imposed caution on them, comparing these crises to the Berlin Crisis of 1961 and the Cuban missile crisis of 1962.[105] He is also of the view that the Pakistani government found the AQ Khan episode very embarrassing and has since taken requisite measures not only to dismantle that network but to prevent similar activities in future.[106] Quinlan argues that in both India

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[101]Robert Jervis, *"Kargil, Deterrence and International Relations Theory',* in Peter R. Lavoy, eds., Ásymmetric Warfare in South Asia, op.cit. p. 377-396.
[102] Ibid.
[103] Michael O. Wheeler, 'What was done to achieve Strategic Stability during the Cold War/ Lessons for South Asia', in Davis S. Zachary eds., 'The India-Pakistan Military Standoff – Crisis and Escalation in South Asia,' Palgrave Macmillan, New York, 2011, p. 99-126.
[104] Michael Quinlan, Thinking About Nuclear Weapons – Principles Problems, Prospects', Oxford University Press, 2009, Oxford, p. 15.
[105]Ibid, p. 135.
[106]Ibid, p. 137.

and Pakistan 'strategic communities' have enhanced their understanding about the management of their respective capabilities since the nuclear tests in 1998.[107]

The preceding comments by strategic analysts and experts are mainly related to learning from crises, development of doctrinal concepts and configuration of nuclear forces, establishment of command and control systems and strategic stability in South Asia. However, some critical aspects of learning in the realm of safety and security mechanisms, export controls and regulatory regimes and nuclear specific legislations have not been covered. It is also clear that the new nuclear states will not necessarily closely mimic the example of the established nuclear powers but will try to adapt these to suit their own peculiar security environments, the roles they envisage for their nuclear forces and above all the constraints imposed by resources – both technological as well as financial.

It is obvious that nuclear learning has neither been uniform across various institutions in both civilian and military domains nor amongst the key policy areas that have been discussed in the study for obvious reasons. The disparity in learning between civilian and military institutions is a natural corollary of the civil-military imbalance in Pakistan and the fact that a military dominated government ruled the country during the formative years of operationalization of the nuclear capability post 1998. Within the major nuclear policy domains some inequality in learning is discernible mainly for two reasons. First, it is quite normal that nuclear learning like any other form of learning would not be equal across the board and there would be some disparity in learning in different policy areas. Secondly, availability of information in the public domain about developments in different policy areas is inversely proportional to the sensitivity of those areas. Consequently, the amount of information available for instance in areas such as the regulatory and export control regimes would be the greatest, while the evidence of any progress in safety and security and command and control would be relatively limited and it would be the least in the realm of nuclear doctrine, especially, in view of the fact that Pakistan has not formally pronounced its nuclear doctrine. Given the cognitive nature of learning it would not be appropriate to assign numerical values to describe the degree of learning in various domains though it may be possible to grade nuclear learning in different fields as high, medium or low which would represent extensive learning,

[107]Ibid, p. 141.

moderate learning or minimal adaptation respectively. However, this classification would also be subjective in nature and would be dependent on whether the classification is done on the basis of a value judgment with regards to normative or non-normative nature of learning or is value neutral.

Chapter-2

A Brief History of Development of Pakistan's Nuclear Programme

This chapter establishes a linkage between Pakistan's peculiar historical experience on its journey to the acquisition of a nuclear weapons capability and its nuclear learning since 1998. Pakistan's progress down the nuclear road was mostly turbulent and riddled with adversity including economic and military sanctions, a tarnished image and occasional political isolation. There were also times when the regional and international security environment epitomised by extraordinary events such as the Soviet invasion of Afghanistan worked to its advantage, providing it a reprieve from politico-diplomatic pressures and sanctions, thus allowing it some breathing space to consolidate and further advance its nuclear programme. This traumatic experience and a strong perception of being a victim of selective application of anti-proliferation laws[1] has caused deep scars on Pakistan's perceptual dispositions and these predispositions have influenced both the nature as well as the direction of its subsequent nuclear learning experience.

2.1 Relationship between Pakistan's Historical Experience and Nuclear Learning:

Pakistan is unique among the nuclear capable states due to the fact that no other state has had to consistently justify and defend its nuclear programme against all kinds of insinuations, negative perceptions and concerns about its ability to manage its nuclear assets. It is also true that no other nuclear state has experienced the kind of turbulent internal and external security environment and politico-economic instability over a long period of time as has been the case in Pakistan especially during the last decade.[2] It is, therefore, imperative to understand the background of the controversies surrounding

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[1] The 1976 Symington and Glenn Amendments to US Foreign Assistance Act called for imposition of economic and military sanctions on Non-nuclear states trying to procure Uranium Enrichment and Plutonium Reprocessing technologies. These were not applicable retroactively, therefore, letting India and Israel off the hook but were applied against Pakistan in April 1979. Similarly, Pressler Amendment was a Pakistan specific legislation and was clamped on Pakistan in October 1990. See Pervaiz Iqbal Cheema, 'Nuclear Developments in Pakistan: Future Directions,' in P.I. Cheema, P.R. Chari et al eds., 'Nuclear Non-proliferation in India and Pakistan – South Asian Perspectives,'Manohar Publishers, New Delhi, 1996, p. 136-7 and Munir Ahmad Khan, 'Nuclearization of South Asia and its Regional and Global Implications,' Regional Studies, Islamabad, Vol. 26, No. 4, Autumn 1998.

[2] Kenneth N. Luongo and Brig Gen (Ret) Naeem Salik, 'Building Confidence in Pakistan's Nuclear Security,' *Arms Control Today*, Arms control Association, December 2007. Also see Naeem Salik and Kenneth N. Luongo, 'Challenges for Pakistan's Nuclear Security,' *Arms Control Today*, Arms Control Association, March 2013.

Pakistan's nuclear programme in order to get an insight into the mind-set and predisposition of Pakistani elites which continue to influence the strategic choices they make and the policy directions they adopt. It is this particular mind set and historic baggage which largely determines the nature of their nuclear learning at the individual, institutional or the state level.

An overview of the genesis of Pakistan's nuclear programme is, therefore, imperative. It is also important to be cognisant of Pakistan's historic experience to understand the causes of a deep seated national perception of being meted out a less than fair treatment with regard to its nuclear programme by the West in particular and the wider international community in general.[3] This predisposition has significantly influenced Pakistan's later policies and attitudes that betray a kind of xenophobia when it comes to the national nuclear programme and policy. The difficulties Pakistan had to encounter, the sanctions and politico-diplomatic pressures it had to endure, and the sacrifices the nation had to make in terms of opportunity costs en-route to attainment of nuclear capability, have bestowed upon the nuclear weapons the status of the most valued national possession.

In a politically fragmented nation the nuclear programme is probably the only issue that enjoys widespread public support which extends across the political spectrum and various strata of the society. This factor alone brings to bear pressures on the policy makers that constrain their ability to bring any flexibility or change in the nuclear policy. This has also delineated the course for nuclear learning within certain bounds and parameters.

2.2 Background:

It has been more than a decade since Pakistan conducted a series of nuclear tests in May 1998, overtly demonstrating its nuclear capability and confirming its status as a de-facto Nuclear Weapons Capable State.[4] Long before this fateful event Pakistan was known

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[3] This is a recurring theme in many Pakistani writings. See for example, Pervez Musharraf, '*In The Line of Fire*,' Simon & Schuster, New York, 2006, p. 285-88; Feroz Hassan Khan, '*Pakistan as a Nuclear State*,' and Munir Akram, *'Reversing Strategic Shrinkage*,' in Maleeha Lodhi eds., 'Pakistan – Beyond the Crisis State,' Hurst & Company, London, 2011, p. 270-71 & 298-99 respectively; Abdul Sattar, '*Pakistan's Foreign Policy 1947-2005*,' Oxford University Press, Karachi, 2007, p. 149; Pervaiz Iqbal Cheema, op. cit., p. 136-7. Also see Munir Ahmad Khan, op. cit.

[4] The term 'Nuclear Weapons Capable State' has been advisedly used instead of 'Nuclear Weapons State' due to the fact that the former denotes the five recognised nuclear states according to the NPT statutes.

to possess the necessary technological where-withal to fabricate nuclear weapons and had also been pursuing development of delivery systems based on aircraft and land based ballistic missiles.[5] Though its pursuit of nuclear weapons capabilities and the technological advances it had made were generally known to the international community, Pakistan's official position like that of India was to deny the existence of a military nuclear programme. While India preferred to call its nuclear test of May 1974 as a 'Peaceful Nuclear Explosion' (PNE)[6] and insisted on the peaceful intent of its nuclear programme, Pakistan found it expedient to deny the pursuit of any nuclear weapons related activity which enabled Presidents Reagan and George Bush to certify to the Congress until October 1990, that Pakistan had not produced any nuclear device, to allow the uninterrupted flow of military and economic assistance to Pakistan.[7] Despite these declarations of peaceful intent the international community was far from convinced. Sir Michael Quinlan very aptly remarked on this thinly veiled secret which was ultimately unveiled in May 1998 saying that: … "India and Pakistan….emerged from their half concealed closets and made themselves known openly as possessors of nuclear weapons".[8]…

Pakistan's nuclear programme has always been viewed by the outside world with suspicion and has been at the centre of one controversy after another. Such has been the intensity of concerns that the words 'Nuclear' and 'Pakistan' coming together send alarm bells ringing around the world. Pakistan like India and Israel had opted to stay out of the Nuclear Non-proliferation Treaty (NPT) that came into force in 1970 and had kept its options open. The decision not to accede to the NPT was influenced mainly by the Indian decision not to join the treaty, though Pakistan also had some legitimate concerns about the equivocation of the security assurances offered by the five recognised Nuclear Weapon

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[5]Feroz Hassan Khan, *'Eating Grass: The Making of the Pakistani Bomb,'* Stanford University Press, Stanford, 2012, p. 234.

[6] Amitabh Mattoo, 'India's Nuclear Policy in an Anarchic World', in Amitabh Mattoo, eds., *India's Nuclear Deterrent, Pokhran II and Beyond',* New Delhi, Har Anand Publications, 1999, p.17.

[7] The Pakistan-specific Pressler Amendment to the Foreign Assistance Act passed by the US Congress in the mid-1980s required the US President to render a yearly certificate that in his judgement Pakistan was not in possession of a nuclear device. Presidents Reagan and Bush provided this certification until October 1990 when refusal of President Bush to provide the certification led to the invocation of Pressler Law and economic and military sanctions against Pakistan.

[8] Michael Quinlan, 'India-Pakistan Deterrence Revisited', Survival, Vol. 47. No. 3, Autum 2005, IISS, London, p.

States (NWS) to the non-Nuclear Weapon States.[9] India, on its part cited the Chinese decision to stay out of the treaty as well as the serious imbalance between the rights and obligations of the nuclear and non-nuclear states parties to the treaty, as the justification for its refusal to join the treaty.[10]

The Vienna Convention on the Law of Treaties 1969 recognises the principle of free consent for states to decide whether they want to join a treaty or stay out of it[11] and India, Pakistan and Israel had exercised their sovereign right not to accede to the NPT and had thus not made any international commitment to give up their right to develop nuclear weapons unlike Iraq, Iran, Libya and North Korea. However, Pakistan's decision to seek a nuclear weapons capability was at cross purposes with the non-proliferation objectives of the major global powers and was seen as an infringement upon the existing international norms against further nuclear proliferation.

2.3 Why Pakistani Nuclear Programme Became Controversial?

A major cause for controversies surrounding Pakistan's nuclear programme has been its characterisation as the 'Islamic Bomb.' Most Western observers cite late Pakistani Prime Minister Z. A. Bhutto's statement in which he had lamented the fact that all civilisations in the world i.e. the Christian, the Jewish, the Hindu and even the Communists had the nuclear capability except the Muslim civilisation. Pakistanis on their part frequently complain[12] of provocative titles such as *Pakistan's Islamic Bomb – Nuclear Threat to Israel and the Middle East* used by Steve Weissman and Herbert Krosney for their 1981 publication[13] and a BBC documentary with the same title telecast in 1980. However, in reality Pakistanis themselves have also described their nuclear capability in

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[9] B.M. Kaushik & D.N. Mehrotra, *Pakistan's Nuclear Bomb*, Sopan Publishing House, New Delhi, 1980, p. 48-50. Also see Zulfikar Ali Bhutto, The Myth of Independence, Oxford University Press, Karachi, 1969, p. 153.

[10] For Indian views on NPT see, K. Subrahmanyam, in Marwah& Schulz eds., *Nuclear Proliferation and the Near Nuclear Countries*, Ballinger Publishing Company, Cambridge, Mass, 1975, p. 127 and M. Rasgotra, 'Non-proliferation Issues: The South Asian Context,' *Strategic Studies*, Vol. XI, No. 1, Summer & Autumn 1987, ISS, Islamabad, p. 82-86. Also see *The Asian Age,* New Delhi, 21 May 1998.

[11] http://legal.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf

[12] President Pervez Musharraf for instance seems to be convinced that Pakistan's nuclear tests in 1998 invoked much stronger condemnation by the world 'surely because Pakistan was the first Muslim state to go nuclear' adding that he finds the description of Pakistan's bomb as an Islamic Bomb as 'pejorative' and offensive and racist in essence. See Pervez Musharraf op. cit., p. 285-88.

[13] Steve Weissman& Herbert Krosney, '*The Islamic Bomb, The Nuclear Threat to Israel and the Middle East',* Times Books, New York, 1981.

similar terms. For instance, the biography of Dr A Q Khan written by a Pakistani journalist Zahid Malik, was entitled *Dr A Q Khan and the Islamic Bomb*. Similarly, supporters of Islamist political parties have been seen carrying mock missile models with the inscriptions of *the Islamic Bomb* during public demonstrations in the wake of 1998 tests and on some other occasions. Nor do they complain when someone describes their country as the only Muslim nation in the world with a nuclear capability. Even President Zia-ul-Haq, who was otherwise very cautious and discreet while talking about nuclear issues, during an interview with a Jeddah based Saudi newspaper in July 1978, stated that, "No Muslim country has any atomic arms. If Pakistan possesses such a weapon it would reinforce the power of the Muslim World."[14] It is however, difficult to ascertain whether Zia deliberately made this statement as part of a strategy either to send some signal to the West or to gain sympathies of the Muslim world. Though, he later dissociated himself from the statement.

The US government took note of his remarks but decided at the time not to react and waited for an opportune moment to use his remarks to justify the French decision to cancel the reprocessing agreement as well as its own concerns about Pakistan's nuclear ambitions.[15] Such characterisations, especially the ones linking Pakistani nuclear programme with Israel's security, created unnecessary concerns and hostility amongst the pro-Israeli lobbies in the US. These lobbies then actively engaged in negative propaganda and used their influence in the US Congress for initiation of punitive measures against Pakistan. The US government officials were also catching the Islamic bomb fever as is evident from comments in a secret 'Interagency Working Group Paper' pointing at, "the long term risk that Pakistan's acquisition of a nuclear capability may assist other West Asian and North African states to acquire nuclear weapons."[16] It also ominously stated with Israel in mind that, "the 'Islamic Bomb' aspect of this case could lead to a direct threat to US national interests in the Middle East and the Persian Gulf."[17]

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[14] 'Nuclear Reprocessing', Telegram 7624 dated 6 August 1978, from American Embassy, Islamabad to Department of State.
[15] Ibid.
[16] Interagency Working Group Paper, 'South Asian Nuclear and Security Problems: Analysis of Possible Elements in a US Strategy'. Available at nsarchive@gwu.edu.
[17] Ibid.

The second reason for controversy was Pakistan's unconventional approach to the acquisition of nuclear capability. This approach was forced upon Pakistan by the circumstances. Countries like India were able to procure complete fuel cycle facilities without any hindrance from the industrially developed countries before the NPT came into force and well before the institution of any export control regime. However, when Pakistan embarked on its nuclear weapons programme the environment had changed with the entry into force of the NPT. To add to its difficulties the Indian nuclear test in May 1974, not only vitiated the India-Pakistan relations, which were on the mend after the Simla Agreement,[18] but also led the industrialised countries to establish an increasingly restrictive export controls regime. Pakistan had to navigate its way through and around this regime, making use of the loopholes which were still unplugged. The race between the supplier countries' attempts to close all the avenues and Pakistan's efforts to exploit whatever openings were available brought Pakistan on the wrong side of the non-proliferation regime. Pakistan imported most of the technology part by part through trading companies and middlemen. These imports were legitimate[19] as long as these items were not placed on export control trigger lists. As pointed out by Feroz Hassan Khan, "Pakistan's strategy was to keep its procurement activities within the limits of commercial law of the country, and if necessary, operate within the legal grey areas."[20] Nevertheless, such acquisitions were politically unacceptable to the West and turned Pakistan into a virtual pariah state. Thirdly, there was a general perception that in South Asia the India-Pakistan relationship was more unstable than the US-Soviet relationship due to geographic proximity and history of prior wars between the two countries.

The negative perceptions about Pakistan's nuclear programme and doubts concerning its ability to maintain an effective stewardship of its nuclear assets continue to persist to this day. A significant portion of the blame in this regard, must however, be shared by Pakistan's officialdom as well as its intelligentsia. In contrast to India, which asserted its sovereign right to have access to nuclear technology, skilfully using the Chinese nuclear threat as a justification for its own nuclear endeavours, Pakistan simply

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[18]Simla Agreement was signed between Pakistani Prime Minister Zulfikar Ali Bhutto and the Indian Prime Minister Indira Gandhi at Simla in India on 02 July 1972 leading to reciprocal vacation of captured territories by either side and the repatriation of Pakistani Prisoners of War. It also laid down a road map for improvement of relations in various fields. http://www.jammu-kashmir.com/documents/simla.html

[19] David Albright, 'Peddling Peril', New York, Free Press, 2010, p. 35.

[20]Feroz Hassan Khan, 'Eating Grass', op.cit. p. 126-7.

hedged behind India. It neither asserted its sovereign rights nor did it try to construct a rationale for its nuclear capability in terms of its own security dilemma. Pakistani contribution to published literature on South Asian nuclear issues has been insignificant and only a few books have so far been written by Pakistani experts providing a Pakistani perspective on the subject.[21]Many of the articles written by Pakistani scholars on the subject have been published in Pakistani journals with modest circulation and limited access to international researchers. Unfortunately, such writings are almost exclusively in English language and have thus not even impacted the domestic discourse nor have they contributed towards public education because of high illiteracy rates and limited to non-existent English language skills of the common man.

2.4 The Chronology of the Programme:

History of Pakistan's nuclear programme is usually divided into three segments. The first phase beginning in 1954 and ending in 1974 can be characterised as the peaceful development phase, the second starting in 1974 and ending in 1998 as the development of nuclear weapons option and third commencing in 1998 and continuing to-date as the operationalization/consolidation phase. The second phase was also predominantly a covert or secret phase. However, one can argue with some justification, that, the second phase actually started in 1972, after Prime Minister Zulfikar Ali Bhutto had authorised the creation of a nuclear weapons option in January 1972. Since, little information was available in the public domain about the developments in the intervening period between the decision to develop a nuclear option in January 1972 and the Indian nuclear test in May 1974, the latter date was usually taken as the starting point of Pakistan's nuclear weapons option. However, now with the availability of relevant information[22] about the developments in that period we know that it saw the transformation of the nature of Pakistan's nuclear programme from a peaceful endeavour to a weapons oriented

[21] See for example, Kamal Matinuddin, The Nuclearization of South Asia, Oxford University Press, Pakistan, 2002; NaeemSalik, The Genesis of South Asian Nuclear Deterrence, Karachi, Oxford University Press, 2009; Zafar Iqbal Cheema, India's Nuclear Strategy, Karachi, Oxford University Press, 2010 and Feroz Hassan Khan, Eating Grass – The Making of the Pakistani Nuclear Bomb, Stanford University Press, Stanford, 2013.

[22] This information is available in the forms of speeches and interviews by prominent nuclear scientists such as Munir Ahmad Khan and Samar Mubarakmand, which provide an insight into the developments which had taken place during that period largely away from the limelight.

programme based on a clearly laid out road map. The ending of the early phase and the beginning of the second phase have, therefore, been adjusted accordingly.

2.5 The Early Phase: 1954 – 1972:

Pakistan was a relatively late entrant into the nuclear field. India had started the spadework in this field in 1944, well before its independence in 1947, by initiating the training of scientists and technicians at the Tata Institute of Fundamental Research in Science and Technology[23] largely due to a personal initiative by Dr Homi Bhabha. The British Indian officialdom had nothing to do with it and it was a purely non-governmental and private initiative. Consequently, this initial groundwork helped India establish its Atomic Energy Commission in 1948 not long after its independence under the Chairmanship of Dr Bhabha. Pakistan, initially, did not evince any interest in nuclear technology and it was only in 1954, when a touring exhibition under the auspices of President Eisenhower's Atoms for Peace Programme came to Pakistan, that some interest was generated in the applications of nuclear technology. Consequently, a 12 member Atomic Energy Committee tasked with the preparation of plans for the promotion of peaceful uses of atomic energy in Pakistan was established in 1955. On the recommendation of the committee the government set up a high powered 'Atomic Energy Council' in March 1956. The Council had a Governing body comprising two Federal Ministers, two federal government secretaries and Chairman of the Atomic Energy Commission. The second component of the Council was a rather modest 'Atomic Energy Commission' with six scientists under the Chairmanship of Dr Nazir Ahmad. The third component was an 'Advisory Committee' consisting of thirty scientists, doctors, industrialists, agriculturists and educationists.[24]

The Council was tasked to undertake planning for utilisation of peaceful potential of nuclear energy, involving a wide range of activities like exploration, acquisition and disposal of radioactive materials, setting up of research institutions, installation of research and power reactors, and negotiation of agreements for cooperation with international nuclear agencies. It also had to develop applications of radioisotopes for agriculture,

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[23] SIPRI Yearbook, 1975, The MIT Press, Cambridge, Massachusetts, p. 17. Also see K. Subrahmanyam, 'India's Nuclear Policy' in Onkar Marwah& Ann Schulz, eds., *Nuclear Proliferation and Near Nuclear Countries,* Ballinger Publishing Company, Cambridge, Massachusetts, 1975, p. 141.

[24]Ashok Kapur, *Pakistan's Nuclear Development, New York,* Croom Helm, 1987.P.53.

industry and medicine. However, despite this broad mandate the funding for the nuclear programme was meagre and the amount allocated for the fiscal year 1956-57 amounted to 2.5 million Pakistani Rupees (which amounted to 0.5 million US dollars), which was doubled for the next financial year. The total allocation during the period of the First Five Year Plan i.e. 1956-60 was 23.5 million Pak Rupees.[25] The execution of the plan was also impeded by the non-availability of scientific and technical manpower and the absence of requisite training facilities in the country. Arrangements were therefore made to send a large number of scientists for training in specialised disciplines in US, UK, France and Canada. At the same time the Pakistan Atomic Energy Commission (PAEC) finalised its plans in 1957 to acquire a 5 MW research reactor from the United States. It was hoped that the reactor would become operational by 1960 but due to lack of interest on part of the national leadership and bureaucratic impediments including active opposition by the Finance minister and the Planning Commission,[26] the reactor became functional only in 1965.[27]

To the good fortune of the PAEC, a young, enthusiastic and western educated Z. A. Bhutto was inducted as the Minister for Fuel, Power and Natural Resources in President Ayub's cabinet in 1958. The atomic energy programme was also part of his portfolio. He tried his best to give some stimulus to the programme as he was later to claim from his death cell that:

> "I have been actively associated with the nuclear programme of Pakistan from October 1958 to July 1977, a span of nineteen years…..when I took charge of Pakistan's Atomic Energy Commission it was no more than a sign board of an office. It was only a name. Assiduously and with granite determination, I put my entire vitality behind the task of acquiring nuclear capability for my country…I negotiated the agreement for the 5 MW research reactor located in PINSTECH. In the teeth of opposition from Finance Minister Shoaib and Deputy Chairman of Planning Commission Said Hassan, I negotiated with success to obtain from Canada the 137 MW Karachi nuclear power plant."[28]

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[25] P. B. Sinha & R.R. Subrahmaniam, *Nuclear Pakistan- Atomic Threat to South Asia,* Vision Books, New Delhi, 1980, p. 30.
[26]Shahid-ur-Rehman, Long Road to Chagai, Print Wise Publications, Islamabad, 1999, p. 20-21.
[27] Ashok Kapur, op. cit.
[28] Z.A. Bhutto, *If I am Assassinated,* Vikas Publishing House, New Delhi, 1979, p.137.

Mr Bhutto's key role in Pakistan's nuclear development is undisputed. He was the only Cabinet Minister in the Ayub government who was keeping a watchful eye on the nuclear developments taking place in India. Bhutto took a serious note of the inauguration of a plutonium reprocessing plant by the Indian Prime Minister Shastri in April 1964. He urged President Ayub Khan to get a similar plant, which the French were willing to supply at the time, but his request to the President for sanctioning a sum of 300 million rupees was turned down because it was deemed to be beyond Pakistan's economic capacity.[29] Even the military showed no interest in the nuclear programme at the time, since it was part of the US led military alliances such as SEATO and CENTO and had received substantial quantities of US military equipment. Pakistani military considered themselves to be well trained and better equipped than the Indian military and were confident that they could deal with any Indian threat with their superior conventional weaponry. The military's confidence had been boosted after the poor showing by the Indian Army, in the latter's border conflict with China in 1962. Bhutto, nevertheless, made a historic and widely quoted statement in 1965 saying that, "If India makes an atomic bomb then we will also do so, even if we have to eat grass or go hungry, an atom bomb can only be answered by an atom bomb."[30]According to former Foreign Minister Abdul Sattar, Bhutto's rhetoric was, however, not matched by practical steps. President Ayub, himself, was not enamoured by the idea, despite the fact, that at the time nuclear technology was easily available, safeguards were lax and there were no export controls.[31]

Meanwhile, Dr Ishrat Usmani, a former member of the Indian Civil Service and a Physicist trained at the Imperial College of Science and Technology at London, had taken over as the Chairman of the PAEC. Usmani, with his bureaucratic background, was much better qualified to chalk out and implement plans for developing the nuclear infrastructure in Pakistan as compared to his predecessor. With valuable help from Dr Abdus Salam, Chief Scientific Advisor to the President, a renowned Physicist and future Nobel Laureate and political support from Z.A. Bhutto, Usmani strongly advocated the case for development of nuclear energy. He justified the need for nuclear power highlighting the limited hydro-electric power potential and fossil fuel reserves in Pakistan. His lasting

[29] Sinha, op. cit., p. 34-5.
[30] Abdul Sattar, *Pakistan's Foreign Policy 1947-2005 – A Concise History,* Oxford University Press, 2007, Karachi, p. 144
[31]Ibid, p. 145.

contribution however, was the training of the scientific and technical manpower. He arranged to send a large number of scientists and engineers for advanced training abroad and also developed indigenous training facilities by setting up Pakistan Institute of Science and Technology (PINSTECH) near Islamabad. He established two research centres, one each in West and East Pakistan for research related to applications of radioisotopes in agriculture and food preservation, besides establishing eight nuclear medical centres. Usmani was a strong protagonist of the peaceful uses of nuclear energy and was opposed to the development of nuclear weapons capability.[32]

Though the September 1965 war with India ended in a stalemate, the Pakistani leadership realised that it might well have lost the last opportunity to militarily wrest Kashmir from India. On the other hand, India had embarked on a massive rearmament and military expansion programme in the aftermath of the 1962 war with China and that effort was now nearing fruition. Pakistan's delusion that its allies will come to its assistance in the event of a conflict with India, was effectively dispelled when the US, instead of helping Pakistan during the war, had put an embargo on the military supplies and even withheld vital spare parts. A growing feeling of vulnerability started emerging in Pakistan. In this backdrop, Mr Bhutto visited Vienna in October 1965, where he met Munir Ahmad Khan, a Pakistani nuclear engineer working at the IAEA as the head of its nuclear power and reactors division. Munir gave Bhutto an assessment of India's nuclear programme, based on his personal knowledge gained during a visit to India's main nuclear complex at Trombay in 1964. He pointed out, that India had already built all the necessary facilities, which are essential for a nuclear weapons programme and pleaded that Pakistan needed a nuclear deterrent of its own for its survival.[33]Munir's assessment reinforced Bhutto's own opinion about India's nuclear ambitions. On Bhutto's enquiry whether he had ever shared this information with President Ayub, he learnt that Munir had never met the President. Consequently, Bhutto set up a meeting between the President and Munir Khan at London in December 1965, where the latter briefed Ayub Khan. Munir also informed the Pakistani President that at the time there were no restrictions on the acquisition of nuclear technology and that India was accumulating whatever it could procure. He further

[32] Ashok Kapur, op. cit. p. 53, and Dr Samar Mubarakmand, 'A Science Odyssey', Speech delivered on November 30, 1998 at Khwarzimic Society, Punjab University, Lahore.
[33]Munir Ahmad Khan, Speech Delivered on March 20, 1999 on the occasion of Chaghai Medal Award Ceremony at PINSTECH, Islamabad.

explained that the technology was not very expensive and all the essential facilities could be purchased for merely $ 150 million. At the end of all this, Ayub said that, Pakistan is too poor to afford such an expense and naively added that if ever we need the bomb we will buy it off the shelf from one of our friends. When Munir briefed Bhutto about his meeting with the President, he was disappointed but remarked that, "don't worry our time will come."[34]Munir later lamented those lost years and windows of opportunity available in the pre-NPT era for unrestricted acquisition of nuclear technology that were subsequently closed.[35]

By 1968 Pakistani engineers and technicians had returned from Canada after completion of their training and participated in the construction of the Karachi Nuclear Power Plant (KANUPP) alongside the Canadian experts. The plant became operational in 1971 and was formally inaugurated by then President Bhutto and linked with the national power grid in 1972.[36]

2.6 Development of the Nuclear Weapons Option: 1972-1998:

On 20th of January 1972, barely a month after assuming power, Bhutto convened a conference of nuclear scientists in Multan to discuss the possibility of initiating a nuclear weapons programme.[37] This was a very sensitive national security issue and in normal circumstances should have been discussed behind closed doors in a secure building, but living up to his populist style of leadership, Bhutto held this meeting under canvas in the lawn of the house of one of his party leaders. After an animated discussion most of the scientists, especially the younger ones, strongly supported the idea and Bhutto got a pledge from them that they will produce the bomb within 5 years. Bhutto on his part promised to provide all the necessary funds and administrative support. He also announced the setting up of a new Ministry of Science and Technology and Dr Usmani was, on the spur of the moment, appointed as Secretary of the new Ministry. He was, thus, eased out of his position as the PAEC Chairman, ostensibly due to his opposition to the weapons option,

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[34] Ibid.
[35]Ibid.
[36]Samar, op.cit. Also see Jozef Goldblat and Peter Lomas, 'The Threshold Countries and the future of the non-proliferation regime,' in John Simpson, ed., *Nuclear Non-proliferation – An Agenda for the 1990s,* Cambridge University Press, Cambridge, 1987, p.309.
[37] Bashir-ud-din Mahmood, Interview with Waqt TV on 23 July 2009; also see Samar Mubarakmand speech at Khwarzimic Society and Munir Ahmad Khan speech at PINSTECH; BBC Panorama documentary entitled 'The Islamic Bomb' aired in 1980.

and Munir Ahmad Khan, also present on the occasion, was appointed Chairman of the PAEC, a position he was to hold until 1991.[38]

In hindsight, the promise of producing the bomb in 5 years was an unrealistic and tall claim, in view of the fact, that Pakistan lacked the critical nuclear infrastructure needed for a weapons programme. Pakistan at the time only had a 5 MW research reactor at PINSTECH near Islamabad and a 137 MW nuclear power plant at Karachi, both of which were under international safeguards. It lacked even the basic facilities such as those required for processing of uranium and its conversion into uranium oxide and then into fuel elements. It neither had a plutonium production reactor and reprocessing plant, nor a uranium enrichment facility, which are essential requirements for the production of fissile material. There was no gasification plant (the plant where uranium is converted into uranium hexafluoride gas as feedstock for enrichment) or a solidification plant (where enriched uranium hexafluoride gas is turned back into solid form). There were no teams of specialists to design weapons or produce special explosive lenses. Neither were there any diagnostic experts nor were there any test sites. There were no manufacturing facilities either, for the production of special metals and sophisticated components used in fissile material production facilities and nuclear devices. The biggest problem however, was the shortage of trained manpower, since half of the trained manpower had been lost after East Pakistan became Bangladesh 1971. The total manpower trained in various disciplines now available comprised 283 personnel.[39] The overambitious goal of production of a nuclear bomb in five years may explain Prime Minister Bhutto's later frustration with the PAEC, because he ostensibly wanted to use the achievement of nuclear capability to facilitate his re-election bid. Failure of the PAEC to deliver the bomb in five years was later exploited by A Q Khan who convinced Bhutto that PAEC was too bureaucratic and was neither sincere nor capable of producing quick results. Whereas, given a free hand, he can achieve much better results. Consequently, he was made the Director of the Uranium enrichment project and made autonomous of the PAEC with complete financial and administrative powers.

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[38] Ibid; The author got a first-hand account of the Multan meeting from well-known Pakistani journalist Khalid Hassan who was one of the participants of the meeting in his capacity as Press Secretary to the Prime Minister during an interview with him at Washington, D.C. in March 2006.

[39] Munir, speech at PINSTECH, op. cit.

Munir Ahmad Khan, the PAEC Chairman, on his part, wanted to move systematically to lay a solid foundation for the programme and started with a survey of the available facilities and industrial infrastructure in Pakistan. He then prepared a road map to achieve a complete nuclear fuel cycle capability, which was essential for a *sustainable* nuclear programme. PAEC was able to prepare a comprehensive nuclear development plan within two months of the Multan Conference. The Chairman PAEC himself presented the plan to the Prime Minister and it was approved within hours.[40] According to Munir, the Prime Minister directed Finance Minister Dr. Mobashar Hassan to abolish all committees dealing with the nuclear programme and instructed him to instantly release funds as and when required and asked for by PAEC Chairman. Since Bhutto had assumed personal control of the nuclear programme, the Chairman PAEC had direct access to the Prime Minister without any intervening bureaucratic channels.[41] The relationship between Bhutto and Munir was similar to the one that had developed between Prime Minister Nehru and the founding father of the Indian nuclear programme Homi Bhabha. Bhabha also had direct access to Nehru, could bypass bureaucratic channels and obtain approvals for his projects without any hindrance or delay.[42] After getting the approval of its proposed development plan from the Prime Minister the PAEC promptly established a procurement network and deputed S.A. Butt, a scientist, to the Pakistani embassy at Brussels and later to the Paris mission to supervise this effort. The procurement operation was very successful and many critical technologies and materials which were not subject to export controls at the time were acquired from European suppliers. However, major plants and manufacturing facilities could only be imported through government to government agreements. Pakistan, therefore, entered into negotiations with France in 1973 for the purchase of a reprocessing plant.

After protracted negotiations over the safeguards arrangements a formal tripartite agreement was signed between France, Pakistan and the IAEA in 1976. The agreement was duly approved by the IAEA Board of Governors.[43] This agreement would however, become a contentious issue between United States and Pakistan on the one hand and

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[40] Ibid.
[41] Ibid.
[42] Naeem Salik, *Genesis of South Asian Nuclear Deterrence,* Oxford University Press, Karachi, 2009, p. 15.
[43] Charles K. Ebinger, *Pakistan Energy Planning in a Strategic Vortex',* Indiana University Press, Bloomington, 1981, p. 93. Ebinger considers the tri-lateral safeguards agreement concluded between IAEA, France and Pakistan as the toughest ever negotiated. (See p.104).

United States and France on the other, until the French government decided to renege on the agreement in 1978. According to former Foreign Minister Abdul Sattar, Pakistan had by then paid over 100 million dollars to France which were partially compensated by France many years later.[44] His account is confirmed by a statement issued by Pakistan's Foreign Office Spokesman that, France had agreed to pay $118 million to Pakistan during the visit to France by Pakistani Prime Minister Nawaz Sharif scheduled for 15-19 January 1992,[45] fourteen years after France had unilaterally abrogated the agreement.

On 18th of May 1974, India had stunned the world by conducting a nuclear explosion, which it preferred to call a 'peaceful nuclear explosion' (PNE) at the time, though Raja Ramanna, who led the team of scientists which conducted the underground test, acknowledged in 1996 that it was indeed a weapon's test.[46] As a result there was a realisation amongst the advanced industrialised countries that nuclear technology shared with developing countries for peaceful purposes, could be exploited for the pursuit of a nuclear weapons programme. The international reaction to the Indian explosion was rather mild especially on the part of the US and the Soviet Union, both of whom feared that any harsh response by either of them would push India into the lap of the other super power. Henry Kissinger thought it was futile to fight a fait accompli.[47] Kissinger has been quoted to have told his Canadian counterpart Mitchell Sharp that, "we didn't see much purpose in making abig issue out of an accomplished fact."[48] Referring to the poor safeguards on the Canadian supplied research reactor 'CIRUS' and lack of safeguards on the US supplied heavy water for this reactor, Kissinger remarked that, "Canada's safeguards were lousy, but so were ours." [49]This clearly demonstrates the attitude of the US and its allies that India was already out of the barn, but Pakistan could still be prevented from doing so. Consequently, international non-proliferation effort was mainly focused on Pakistan. This was a major setback for the fledgling Pakistani programme as it had to face the fall out of the Indian action. According to former PAEC Chairman Munir Khan, it was conveyed to

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[44]Sattar, op. cit., p. 149.
[45]"Pakistan Says France Will Pay $ 118 Million for Supply Breach," *Nucleonics Week,* 16 January 1992; in NTI Nuclear and Missile Database, 16 January 1992, http://www.nti.org. Accessed on 05 February 2014.
[46] Amitabh Mattoo, 'India's Nuclear Policy in an Anarchic World', in Amitabh Mattoo (ed.), *India's Nuclear Deterrent – Pokhran-II and Beyond,* New Delhi: HarAnand Publications, 1999, p. 17.
[47]Abdul Sattar, op. cit. p.146.
[48] William Burr, 'The United States and the Origins of the Nuclear Supplier's Group 1974-76: Nuclear Nonproliferation through Export Regulations'. Paper presented at a conference at ETH Zurich in June 2010.
[49]Ibid.

Pakistan that, "India could not be denuclearised because what had been learnt, could not be unlearnt. It was also told that if India had done something awful, it was now the moral duty of Pakistan to stay away from following suit."[50] He also complains that when Pakistan brought up the matter of the Indian nuclear test before IAEA's Board of Governors on 8 June 1974 only a few countries criticised India and at the end of the debate the Pakistani delegate was told by a senior IAEA official that, "Even though it was India which had carried out the nuclear explosion, it would be Pakistan which would be punished for that."[51]

The Indian test also brought about a change in the American leadership's approach towards nuclear non-proliferation. President Nixon and Henry Kissinger, who hither-to-fore had been dismissive of the NPT, began worrying about further proliferation of nuclear capabilities. The Arms Control and Disarmament Agency (ACDA) and the state department officials were able to convince Kissinger that the countries, which were determined to acquire nuclear weapons capability, still lacked the requisite technologies.[52] There was a realisation that it was impossible to prevent a determined country from ultimately attaining the nuclear capability. However, measures could be taken to make its task as difficult as possible and thus retard its progress. With this objective in mind, Washington sought to harness the support of not only its allies but adversaries as well. Consequently, during 1974-5, the US initiated an intense diplomatic campaign involving advanced industrialised countries such as Canada, France, Germany, Japan and the Soviet Union. This effort culminated in the formation of the nuclear export control 'cartel' initially called the London Suppliers Club and later renamed as the Nuclear Suppliers Group (NSG).[53] It was no mean achievement to harmonise non-proliferation concerns with the commercial interests of major exporters of nuclear technology such as Germany and France. France presented a bigger challenge as compared to Germany, since at that time it was not a state party to the NPT. Since it was not an NPT member it also could not be a member of the Zangger Committee and therefore, did not subscribe to export control

[50]Munir Ahmad Khan, "Nuclearisation of South Asia and its Regional and Global Implications," *Regional Studies,* Islamabad, Vol. 26, No. 4, Autumn, 1998.
[51]Ibid.
[52]Burr, op. cit.
[53]Ibid.

trigger list of the Committee.[54] France was then negotiating the supply of reprocessing plants to South Korea and Pakistan, while Germany was discussing a major nuclear deal with Brazil which was also a non-NPT state at the time.

The United States well aware of the adversarial nature of the India-Pakistan relationship could anticipate the Pakistani reaction to the Indian nuclear test and tried to dissuade Pakistan from going nuclear. Zulfikar Ali Bhutto, the Pakistani Prime Minister had clearly articulated the linkage between India's nuclear ambitions and Pakistan's threat perceptions and had given expression to his feelings through the "eating grass" statement in 1965.[55] He had dilated upon nuclear issues in much greater detail in his book *The Myth of Independence* published in 1969.[56] Bhutto understood that the strategic threat posed by the adversary's nuclear weapons can only be countered by nuclear weapons of your own. After the Indian test, Bhutto convened a meeting of the Defence Committee of the Cabinet (DCC) on 15th of June 1974 and decided to initiate a nuclear weapons programme,[57] this time around in a more formal setting. Since the Indian test had further vitiated Pakistan's security environment, the acquisition of a nuclear weapons capability had now become unavoidable. As Feroz Hassan Khan has aptly remarked, India's maiden test in the Pokhran desert had turned a "policy option" for Pakistan into an "imperative."[58] Bhutto reacted very strongly to the Indian test both in his address to Pakistani parliament as well as his exchange of letters with the Indian Prime Minister Mrs. Indira Gandhi. While addressing the National Assembly on 7th June 1974 he stated that, "a more grave and serious event … has not taken place in the history of Pakistan."[59]

The immediate challenge for the US was to somehow prevent Pakistan from acquiring a nuclear reprocessing plant for which it had already entered into an agreement with France. In a dual track approach, the US simultaneously started exerting pressure on Pakistan and France to cancel the agreement. However, the guidelines approved by the

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[54] Ibid. 'Zangger Committee' was formed in 1971, under the chairmanship of Claude Zangger , to draft a "trigger list" of (a) source or special fissionable materials, and (b) equipment or materials especially designed or prepared for the processing, use, or production of special fissionable materials. Under Article III.2 of the NPT these items are subject to IAEA safeguards if supplied by NPT parties to any non-nuclear weapon state party to NPT. The Trigger List was first published in September 1974 as IAEA document INFCIRC/209.
[55]Abdul Sattar, op. cit., p. 144.
[56]Zulfikar Ali Bhutto, *The Myth of Independence,* Oxford University Press, Oxford, 1969.
[57]Feroz Hassan Khan, 'Nuclear Proliferation Motivations – Lessons from Pakistan," *Non-Proliferation Review* 13, no.3 (November, 2006), p. 503.
[58]Ibid, p. 501.
[59]India Quarterly xxx, no.4 (October-December 1974) p. 262.

NSG were not retroactively applicable and the US was on a weaker wicket in opposing the agreements already concluded between France and Pakistan and between Germany and Brazil. France, however, started demanding stricter safeguards on the reprocessing plant it was selling to Pakistan. The Pakistani negotiators complained that in every successive round of talks the French were moving the goal posts. Consequently, the trilateral agreement finally signed between France, Pakistan and the IAEA contained some of the toughest safeguards provisions known at the time. The safeguards agreement not only prohibited the use of reprocessed material for other than peaceful uses but also imposed the restriction that in case Pakistan replicated the technology in an indigenously built reprocessing plant, that plant would also automatically come under safeguards. This condition had never been applied before in a similar agreement. To discourage France from getting into bilateral agreements with countries like South Korea and Pakistan, the United States suggested the setting up of regional reprocessing centres with the involvement of the supplier countries. To this end, the US actively lobbied for establishing a regional reprocessing centre in Iran for the South West Asian region.[60]

In December 1975, the CIA issued a secret memorandum on the 'Prospects for Further Proliferation of Nuclear Weapons'. The memorandum revised the estimates of Special National Intelligence Estimate (SNIE) of 1974 that had forecast the time frame of a decade before Pakistan could produce a nuclear device[61] and predicted that Pakistan could do so as early as 1978. There was no technical ground for this revised estimate and the only conceivable basis for the CIA estimate might have been a statement purportedly attributed to Prime Minister Bhutto wherein he had stated shortly after the Indian test that, "he had completed a plan which would produce a nuclear device in four years."[62]The memorandum also alluded to the fact, that Pakistan was seeking French assistance to build a small reprocessing plant, but added that French insistence on stringent IAEA safeguards,

[60]Burr, op. cit.
[61] A 'Nuclear Device' is large and unwieldy contraption meant to test the functioning of various components of a nuclear weapon system and in no way is an equivalent of a usable nuclear weapon that can be mounted on top of a missile or dropped from a military aircraft. The device can only be carried and delivered by a transport aircraft.
[62] CIA, 'Memorandum to Holders of Special National Intelligence Estimate: Prospects for Further Proliferation of Nuclear Weapons,' 18 December 1975.

prohibition on transfer of materials and replication of technology would "severely circumscribe the facility's value for a nuclear weapons programme."[63]

While the international community was expending a lot of diplomatic capital to prevent Pakistan's acquisition of the French reprocessing plant, Pakistani nuclear establishment was exploring the alternative route to the bomb through uranium enrichment. In November 1974, Munir Khan had tasked Sultan Bashir-ud-Din Mahmood, a nuclear engineer then working at KANUPP, to commence exploratory studies on various options available to develop Uranium Enrichment technology. These studies led to the decision to pursue the Gas Centrifuge Enrichment technology. Around the same time Dr Abdul Qadeer Khan (AQ Khan), a Pakistani scientist then working in Holland had written a letter to Prime Minister Bhutto. Khan informed him that, through his work at the URENCO's enrichment plant at Almelo in Holland, he had learnt a lot about enrichment technology and offered his services for the country.[64] It is difficult to ascertain whether AQ Khan's letter instigated an interest in enrichment technology on part of the PAEC or was it just a coincidence that Dr Khan's approach to Bhutto and PAEC's initiation of studies on uranium enrichment somehow happened almost simultaneously. Mahmood was, later, dispatched by the PAEC Chairman to Europe to meet AQ Khan. The meeting took place at Brussels and was followed up with another round of discussions at Amsterdam at Khan's house. On his return Mahmood reported that AQ Khan could be very useful for the programme.[65] However, Khan was told to stay in Holland, continue collecting useful information and sharing it with PAEC. Finally, in December 1975, AQ Khan returned to Pakistan to join the enrichment project, which had been initiated by the PAEC, at the Engineering Research Laboratories (ERL) at Rawalpindi, with Bashir-ud-Din Mahmood as the Project Director.[66] AQ Khan, however, was not satisfied with the slow and methodical approach of the PAEC and made a complaint to the Prime Minister. He accused PAEC of incompetence and lack of commitment and claimed that he could quickly deliver the desired results if he was appointed the head of the enrichment project. Consequently, on 17 July 1976, AQ Khan was made Project Director with complete financial and administrative

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[63] Ibid.
[64]Feroz Hassan Khan, '*Eating Grass*', op. cit., p. 140-42. According to Feroz' account PAEC initiated the enrichment project in October 1974.
[65]Sultan Bashir-ud-Din Mahmood, interview with WAQT TV on 23 July 2009. Also see Feroz Hassan Khan, *Eating Grass,* op. cit., p. 146.
[66]Feroz Hassan Khan, *Eating Grass,* op. cit., p. 142.

autonomy and a three member oversight board comprising Defence Secretary Ghulam Ishaq Khan, Foreign Secretary Agha Shahi and Finance Secretary, A.G.N. Kazi as Chair was constituted to deal with him.[67] In the meantime, at Kahuta, an hour's drive away from Islamabad, construction work was being undertaken at the site of the enrichment plant by the Special Works Organisation created under the supervision of the Army Corps of Engineers.[68]

In early 1976, Pakistani negotiations with France to purchase a pilot scale reprocessing plant in addition to its ongoing efforts to acquire the larger commercial scale reprocessing plant caused more anxiety in the United States. It was feared that this pilot plant would be capable of producing several kilograms of plutonium per year probably enough for a nuclear device.[69] The PAEC on its part appears to have made an error of judgement in pursuing the plutonium route to the bomb, at least in the sequencing of its projects. The justification offered by the PAEC for the procurement of a large reprocessing plant was that Pakistan was about to embark on an ambitious nuclear power programme which would be economically unsustainable without the capability to reprocess the spent fuel from its nuclear reactors.[70] In reality, without having initiated the process to acquire and build any nuclear power plant, proceeding with the reprocessing deal looked like a classic case of putting the cart before the horse and that is what fuelled suspicions about real Pakistani intentions amongst foreign experts. It was not until fiscal year 1975-76, that funds were allocated for the purchase of a 600 MW, later modified to 900 MW, nuclear power plant to be built at Chashma.[71] Had the PAEC started construction of one or two power plants before embarking on the reprocessing project, its claims would have been more credible. It appears that the Indian nuclear test and the international response to it had caught the PAEC on the wrong foot.

It is apparent that the PAEC Chairman had also realised that his plutonium project had run into snags at a very early stage and if he had to deliver the bomb he had to follow

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[67]Ibid., p.148-150.
[68]Ibid., p. 144-45.
[69] Department of State, Washington, D.C., 30 January 1976, to Mr Hartman-Eur, from David H. Schwartz , Eur/Rpe, 'Demarche to Pakistan on Nuclear Fuel Reprocessing.'
[70] In a nuclear reactor/power plant only a small proportion of the fuel (approximately 5 %) is burnt before it becomes unusable due to contamination and has to be removed from the reactor. Reprocessing helps in separating the contaminants and the un-burnt fuel, which can then be recycled and reused.
[71]Naeem Salik, *Genesis of South Asian nuclear Deterrence,* Oxford University Press, Karachi, 2009, p. 84.

an alternative path. The problem with the plutonium route is that it requires major nuclear plants such as a research/ production reactor, a chemical reprocessing plant, a heavy water plant and a fuel fabrication facility. All of these installations are highly visible and cannot be built or acquired surreptitiously since these large plants cannot be disaggregated into smaller components. On the other hand the advantage in gas centrifuge technology is that it consists of a large number of cylindrical rotating machines called 'centrifuges'. Each of these centrifuges has approximately 100 or so small components. If a country is able to master the technology of fabricating one centrifuge it can replicate it and produce it in large numbers. Moreover, individual centrifuge parts can be obtained quietly without raising alarm and can be assembled into centrifuges. These can also be reverse engineered and produced indigenously depending on the availability of requisite specialised materials and appropriate manufacturing facilities.

Gas Centrifuge technology[72] however, is a highly complex cutting edge technology and requires many other complex precision engineered pieces of equipment besides the centrifuge machines to run an enrichment plant. These include a gasification plant to convert uranium oxide also known as the yellow cake into uranium hexafluoride gas, which is the feed material for the centrifuge plant and a solidification plant to convert the enriched gas back into solid form to be machined into weapons cores. Specially designed gas feed and extraction equipment is required to feed the uranium hexafluoride gas into the centrifuges and collect the end product at the other end. The centrifuges run at extremely high speeds, which require high speed inverters, and poses exacting demands on the materials used for fabricating the centrifuges. Any flaw in the material would cause the machines to crash. The most critical part in the centrifuge is the rotor and the efficiency of the machines depends on the sturdiness of the rotor which in turn depends on whether the rotor is made of aluminium alloy, maraging steel or carbon fibre. These are not trivial challenges to overcome especially by a developing country like Pakistan. However, Pakistan realising the snags in its pursuit of the plutonium route to the bomb quickly got out of this blind alley and switched to the enrichment route. It also promptly learnt the

[72]For details of enrichment technology see World Nuclear Association (WNA) brief entitled 'Uranium Enrichment' available at http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Uranium-Enrichment/. For a more technical explanation see Alexander Glaser, "Characteristics of the Gas Centrifuge for Uranium Enrichment and their Relevance for Nuclear Weapons Proliferation," *Science & Global Security*, 16: 1-25, 2008, Taylor & Francis. Available at https://www.princeton.edu/~aglaser/2008aglaser_sgsvol16.pdf

intricacies of the gas centrifuge enrichment technology. Pakistan, in fact, successfully modified the available centrifuge designs and produced machines that were more advanced and more efficient compared with the original machines.[73]

Much is made out of the blue prints of the Almelo centrifuge plant 'stolen away' by Dr AQ Khan but more importantly it was his knowledge about the vendors who supplied various pieces of equipment to URENCO's plant at Almelo that proved to be more valuable. As pointed out by Professor Martin Brabers, "In buying equipment, [AQ Khan] knew all the companies, he knew so many people abroad in many countries…Why, he knew so many languages, and he is so charming [that] he managed to buy many things that other Pakistanis would not manage to buy."[74] This information greatly facilitated Pakistan's own procurement effort which involved purchase of pieces of equipment from countries such as Germany, France, Switzerland, Belgium, Italy and Britain. Many of these parts were dual use technologies, were not subject to export restrictions and could be legitimately imported. In other cases European companies found it difficult to resist the temptation of making hefty profits. At the same time Pakistan did not yield any ground on the reprocessing issue and continued to pursue the French deal which helped keep the international attention focused on the reprocessing issue masking the preparatory work on the enrichment plant.

In order to dissuade Pakistan from the reprocessing deal with France, Secretary of State Henry Kissinger came to Pakistan in August 1976 and met the Pakistani Prime Minister at Lahore. In terms of carrots Kissinger offered to seek Congressional approval for the sale of 110 A-7 aircraft to bolster Pakistan's conventional defences and to alleviate its security concerns. The sticks were in the form of a warning to Prime Minister Bhutto, to back off from the reprocessing project, hinting that the Democrats who were likely to win the coming US elections would take a much harder line on this issue. This 'warning' by Kissinger became a subject of much controversy later. Kissinger maintained that he had only cautioned Bhutto that a Democratic administration in Washington will take a much tougher stance on this issue while Bhutto claimed that Kissinger had threatened him, that if he did not cancel the agreement with France, the Americans will make a horrible example

[73] For a detailed expose of the Pakistani efforts in mastering enrichment technology and the difficulties it confronted see Feroz Hassan Khan, *Eating Grass,* op. cit., p. 150-160.
[74]Steve Weissman and Herbert Krosney, *The Islamic Bomb*, New York, Times Books, 1981, p. 182.

out of him. Bhutto later blamed the United States for destabilising his government and engineering his downfall for his refusal to back down from his nuclear ambitions. Meanwhile, American success in persuading South Korea to cancel its reprocessing agreement with France encouraged the Ford administration to keep up the pressure on Pakistan.[75]

In February 1976, Canada upset by India's misuse of Canadian supplied technology, demanded more stringent safeguards on its existing nuclear agreements with Pakistan and wanted retroactive application of these new safeguards. On Pakistan's refusal to oblige Canada cut off all nuclear cooperation with Pakistan, withdrew its technicians working at KANUPP and stopped the supply of fuel, heavy water and spares for the plant, for which it had an agreement with Pakistan. The Canadian decision to withdraw support forced Pakistani engineers to learn to run the plant on their own and compelled the PAEC to initiate a project to indigenously produce fuel elements for the plant. It also reinforced the Pakistani perception that they are being treated unfairly.[76]

In January 1977, President Jimmy Carter, a strong proponent of nuclear non-proliferation became the US President while in Pakistan Bhutto was deposed by General Zia-ul-Haq in July of the same year. Initially, it was not clear whether Zia would pursue the nuclear programme with the same zeal as Bhutto or would yield to US pressure. Zia, however, could not afford to change course on the nuclear policy, since that would have confirmed Bhutto's allegation, that he was removed from power due to his steadfast stand on the nuclear issue. Any weakness on the nuclear policy would have shown Zia as an American stooge, who dismissed Bhutto's government at the behest of the Americans. Given his military background he would also have recognised the significance of the nuclear programme for Pakistan's long term security and decided to persist with the nuclear weapons programme. President Carter visited New Delhi in 1978 and unlike Eisenhower and Nixon he did not stop over in Pakistan, clearly indicating the widening gulf between US and Pakistan. In September 1977, Joseph S. Nye Jr., an expert on nuclear affairs in the State Department, was sent to Islamabad to deliver a stern message. This time around, there were no carrots as the offer to sell A-7 aircraft had been withdrawn by the

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[75] Dennis Kux, op. cit., p. 222; also see Zafar Iqbal Cheema, 'Pakistan's Nuclear Policy under Z.A. Bhutto and Zia-ul-Haq: An Assessment,' *Strategic Studies,* Vol. XIV, No. 4, Summer, 1992.
[76]Munir Ahmad Khan, *Nuclearisation of South Asia,* op. cit.

Carter administration. Nye warned his Pakistani interlocutors that if Pakistan persisted with the reprocessing project the US would cut off all economic assistance to Pakistan under the provisions of the Glenn amendment.[77] Pakistan's plea that the proposed plant would be under strict safeguards did not seem to make much impression. However, Zia told Nye in unequivocal terms that he had no intention of abandoning the project. The American threat to cut off economic aid did not carry much weight, since the total value of the annual US assistance had already been reduced to a paltry amount of $ 50 million.[78]

The US efforts to dissuade Pakistan from the reprocessing deal had apparently failed, but the US pressure on France bore fruit as the French informed them that they were prepared to terminate the reprocessing agreement with Pakistan. In order to save their credibility and to avoid paying reparations they did not want to simply walk out of the deal. The ploy used by the French government was to offer Pakistan a 'co-processing' plant instead of the reprocessing plant, correctly estimating that, the unproven technology would not be acceptable to Pakistan. The French sent a nuclear expert to Islamabad with the offer, which as expected was turned down by the Pakistani government. The French thus had a convenient excuse to renege from an international agreement.[79]

In April 1978 a CIA memorandum, concluded that, "Pakistan is strongly motivated to develop at least a potential nuclear capability, in part for prestige purpose but more strongly because, it genuinely believes its national security could ultimately be threatened by India…But at present there is no visible sense of urgency about the matter and a decision to proceed may be postponed for many years."[80] While expressing doubt over the coming to fruition of the Pakistan -France reprocessing agreement it stated that should Pakistan obtain this plant and was also willing to violate its safeguards agreements it could

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[77]Glenn Amendment of 1977 to the Foreign Assistance Act 1961 prohibits U.S. assistance to any non-nuclear weapon state (as defined by the Non-Proliferation Treaty), that delivers nuclear enrichment equipment, materials, or technology to any other country, or receives such equipment, materials, or technology from any other country, unless before such delivery—"(1) the supplying country and receiving country have reached agreement to place all such equipment, materials, or technology, upon delivery, under multilateral auspices and management when available; and"(2) the recipient country has entered into an agreement with the International Atomic Energy Agency to place all such equipment, materials, technology, and all nuclear fuel and facilities in such country under the safeguards system of such Agency.
http://www.irmep.org/ila/nukes/glenn/default.asp

[78]Kux, op. cit., p.235.
[79] Ibid.
[80] Pakistan Nuclear Study, Memorandum dated 26 April 1978, prepared by CIA.

obtain plutonium for a few nuclear devices.[81] In an apparent reference to the theoretical physics group working under Dr Riaz-ud-Din, the memorandum mentioned that PAEC had set up an organisation to work on weapon designs, indicating that the CIA was closely watching the developments in Pakistan.[82] The cause of American concern was the possibility of Pakistan emulating the Indian example by detonating a nuclear device and terming it a peaceful nuclear explosion (PNE). However, by that time the French President Giscard d'Estaing had decided to back out of the agreement with Pakistan and the US government was duly informed of the French decision around May 1978. When the French formally informed Pakistan of their decision, President Zia reacted by writing a strongly worded letter to his French counterpart which was not received well by the French.[83]

The US having succeeded in persuading the French to cancel the agreement with Pakistan, now wanted to resume assistance cut off under the provisions of the Glenn amendment, in view of the deteriorating security situation in the region as a result of the Communist coup in Kabul. To allay the suspicions of the non-proliferation lobby in the Congress the US administration wanted the Pakistani government to give at least private assurances that it will not try to build its own reprocessing facility. Foreign Minister Agha Shahi, however, told the US ambassador in Islamabad that no government in Pakistan could give such an assurance and still stay in power, due to strong public sentiments on the issue and added that the US demand impinged on Pakistani sovereignty.[84] Agha Shahi reiterated the Pakistani position a few days later during his meeting with US Deputy Secretary of State in New York. He also made it clear that, "the Government of Pakistan has to tell its public that Pakistan has the unfettered right to do what it wishes and will retain all its options." [85]

While the controversy over the reprocessing plant was still raging, the issue of Pakistan's efforts to purchase high-speed electrical inverters from a British manufacturer caused a controversy in the British Parliament. These inverters are dual use items that are

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[81] Ibid.
[82] Ibid.
[83]Telegram 28319 dated 25 August 1978, 'French Views on Pakistan Reprocessing Plant', from American Embassy, Paris to Secretary of State, Washington.
[84]Telegram 7480 of 05 August 1978, 'Pakistan Reprocessing Plant – USG Stipulations,' from American Embassy, Islamabad to Secretary of State, Washington, D.C.
[85] Telegram-205550 of 14August 1978, 'Discussion between Under Secretary Newsom and Pakistan's Minister of State for Foreign Affairs Agha Shahi on the Reprocessing Issue', from Secretary of State, Washington, D.C. to American Embassy, Islamabad.

used in textile plants and are also essential for running the centrifuges at high speeds in an enrichment plant. This incident brought Pakistan's thus far secret enterprise, to acquire uranium enrichment technology, into the open. The US Ambassador confronted General Zia with the available intelligence but he dismissed it as 'ridiculous' and offered to allow American experts to visit any site in Pakistan for verification of facts. He later on, made this access conditional on the Indian readiness to allow similar access to the American experts. The Indians expectedly did not allow such an inspection and Zia ultimately expressed his inability to allow a unilateral inspection, thus extricating himself from an offer, he had probably made on the spur of the moment, without having thought through its implications.[86]

The American officials based on the available intelligence information about Pakistan's procurement activities in Europe were convinced by the spring of 1979, that Pakistan was pursuing a secret uranium enrichment programme. Deputy Secretary of State Warren Christopher visited Islamabad to raise the issue with Pakistani officials and warned Zia that without a solemn assurance from the Pakistani government to the US President that it was not developing nuclear weapons, the administration would be compelled to cut off assistance to Pakistan under the Symington amendment.[87] Zia on his part, emphasised the peaceful intent of the Pakistani nuclear programme but did not rule out the possibility of a 'PNE' nor was he ready to accept international safeguards on his country's nuclear facilities. Consequently, the Carter administration decided to suspend aid to Pakistan for the second time in two years and the announcement to this effect was made by the State Department in April 1979.[88]

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[86] Telegram-2413 of 27 February 1979, from American Embassy, Islamabad to Secretary of State, Washington, D.C. and American Embassy, New Delhi.

[87] Symington Amendment of 1976 is an amendment to Section 669 of the Foreign Assistance Act and is related to Nuclear Enrichment Transfers that prohibits provision of any economic assistance, military or security supporting assistance or grant of military education and training, or extending military credits or making guarantees, to any country which, on or after the date of enactment of the International Security Assistance Act of 1977, delivers nuclear enrichment equipment, materials, or technology to any other country, or receives such equipment, materials, or technology from any other country, unless before such delivery unless both the supplier and the recipient have agreed to place all such material and equipment under multilateral oversight and management and have agreed to place not only this material and equipment but all other nuclear facilities and equipment in the recipient country under IAEA safeguards (commonly known as the comprehensive safeguards).

[88] Kux, p. 236-39.

The State Department and especially the Arms Control and Disarmament Agency (ACDA) experts were closely monitoring Pakistani nuclear activities and actively considering options to retard its progress as far as possible. Around mid-1979 the US Ambassador to IAEA and State Department specialist Robert Gallucci[89] gave an assessment of Pakistan's nuclear programme to the IAEA Director General Eklund based on US intelligence information. The briefing was intended to seek greater oversight and monitoring of Pakistan's nuclear activities by the IAEA. The IAEA DG was informed that Pakistan had acquired bulk of critical parts required for setting up a gas centrifuge plant and that the US had succeeded in closing down the supply of centrifuge parts. Eklund saw Pakistani nuclear programme as a danger to the future growth of nuclear power programmes.[90]

In September 1979, Assistant Director ACDA, Van Doren, during a briefing to a General Advisory Committee meeting at the State Department, acknowledged the delayed response to Pakistani effort to acquire enrichment technology saying that, "This is a railroad train that is going down the track very fast and I am not sure anything will turn it off."[91]The issue of a preventive strike also came up during the meeting and one of the participants pointed out that the Israelis were talking about 'Entebbe Two'.[92] However, Van Doren pointed out that the option for such a preventive strike had been compromised by a New York Times' report that prematurely made the US plans public. The meeting also considered such drastic measures as imposing an oil embargo on Pakistan.[93] Throughout, the 1980s there were rumours of an Indian, an Israeli or a joint military strike against Pakistani enrichment plant at Kahuta. Although the strike did not materialise, this

[89]Gallucci had during a visit to Islamabad had driven to the Kahuta site with some embassy official and had taken some photographs of the under construction facility.
[90] 'Pakistan Nuclear Issue: Briefing of IAEA Director General Eklund', Memo of Conversation of Ambassador Gerard Smith's Discussion of Pakistan's Nuclear Issue with IAEA Director General Eklund on 25 and 27 June 1979 on Edges of IAEA Board meeting in Vienna.
[91] Department of State, General Advisory Committee on Arms Control & Disarmament, 14 September 1979, Washington, D.C.
[92] 'Entebbe-1' was a lightening Israeli commando raid that successfully liberated Israeli hostages from a hijacked aircraft at Entebbe airport in Uganda and therefore the term Entebbe 2 was used. Attack on Osirak reactor in Iraq took place only in 1981.
[93] Ibid.

constant threat and hostility has left an indelible mark on Pakistani psyche which is still influenced by what a Pakistani official called the 'Kahuta Syndrome.'[94]

President Carter, who had twice suspended assistance to Pakistan, was compelled by the Soviet invasion of Afghanistan to offer $ 400 million in military and economic assistance, but the offer, was turned down by President Zia terming it as 'peanuts.'[95] Zia argued that acceptance of such insignificant assistance would further endanger Pakistan's security. Foreign Minister Agha Shahi's talks in Washington also failed to break the deadlock, since Carter had turned down Pakistan's request for the supply of F-16 aircraft. He, however, reaffirmed the commitment to Pakistan's security against outside aggression in his State of the Union speech in what came to be known as the 'Carter Doctrine'.[96] When Zia visited New York in October 1980 in connection with the General Assembly meeting, he was also invited to the White House. However, he politely declined the assistance offer, despite the fact that Carter had changed his earlier decision with regards to the F-16s, suggesting that due to US President's deep involvement in the forthcoming elections the matter could be discussed at a more opportune moment.[97]

By 1980 the construction work on the enrichment plant at Kahuta had been completed and the plant had started operating with some initial hiccups. Around the same time the construction work on the two tunnels at Chaghai and Kharan in Balochistan, which had started in 1976, was also completed. Other facilities such as Chemical Plants Complex (CPC) at Dera Ghazi Khan had also started producing both the fuel for the KANUPP as well as the Uranium Hexafluoride gas for the Kahuta enrichment facility. Simultaneously, the theoretical physics and explosives groups were making good progress towards designing of a nuclear device and manufacturing its components including specialised explosives.[98]

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[94]This term was used by the former DG SPD, Lt General Kidwai during a meeting with a visiting scholar in 2004 in the presence of the author.
[95]Feroz Hassan Khan, *Eating Grass,* op. cit., p. 209.
[96]Kux, p. 248-52.
[97]Ibid, p.253-4.
[98]Samar Mubarakmand and Munir Khan, speech at PINSTECH, op. cit.

2.7 Reagan Administration – Willing to live with a Pakistani Bomb:

In January 1981, Ronald Reagan became the US President with a more hawkish approach towards the Soviet Union and a determination to check the growing Soviet expansionism in Asia and Africa. Reagan's desire to support the Afghan resistance against the Soviet occupation forces could not have been fulfilled without intimate cooperation with Pakistan. The Secretaries of State and Defence and the CIA Director were all supportive of a much more substantive aid package than the one that had been offered by the Carter administration. The US Ambassador in Islamabad was also in favour of the proposed package of $ 3.2 billion in military and economic assistance. President Zia however, wanted to clarify the terms of engagement and sent Foreign Minister Agha Shahi and his Chief of Staff General K.M. Arif to Washington for discussions with the US leadership. Shahi and Arif told Secretary of State Alexander Haig in clear terms that Pakistan would in no way compromise on its nuclear programme. Haig responded by saying that the US does not want to make the nuclear issue as the centrepiece of its relations with Pakistan. However, he cautioned that in case Pakistan conducts a nuclear test it would be impossible for the administration to seek Congressional approval for the kind of cooperation it wants to have with Pakistan. The implication was very clear that the "Reagan administration was willing to live with Pakistan's nuclear programme short of a nuclear explosive test by Pakistan."[99]

The administration also abandoned the idea of using sanctions to dissuade countries like Pakistan from pursuit of nuclear programmes. In a statement before the House Foreign Affairs Committee Deputy Assistant Secretary of State, Jane Coon argued that sanctions have not succeeded in preventing proliferation and we should rather address the legitimate security concerns of countries like Pakistan which would encourage a more positive and cooperative relationship.[100] Under Secretary of State James Buckley in an August 1981 letter to the New York Times also stressed that the US is strengthening Pakistan's conventional defence capabilities to lessen the security concerns that are compelling it to acquire a nuclear capability.[101]

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[99]Kux, 256-57.
[100]Ibid, p. 260.
[101]Ibid, p. 261.

The US though aware of Pakistani procurement activities for a gas centrifuge enrichment facility was unsure about the actual progress Pakistan had made. The tendency on part of many European experts to underrate the technical skills of Pakistani scientists and engineers also worked to Pakistan's advantage. European companies such as Emerson Electrical Company of UK sold equipment to Pakistan knowing its possible applications in the nuclear programme assuming that the Pakistanis would not be able use these sophisticated items of equipment.[102] There were compelling reasons for scepticism as the Gas Centrifuge Enrichment technology is highly sophisticated and it had taken an industrially developed country like Japan ten years to master it. Secondly, until then centrifuge enrichment technology had only been used by countries like Germany, Japan, and the URENCO consortium comprising Germany, Holland and Britain, for producing low enriched uranium, to be used as fuel for their nuclear power reactors and no country in the world had used it to produce weapons grade material.[103] Precisely for this reason the sceptics, including people such as a former Chairman of the PAEC Dr Usmani, thought that pursuit of gas centrifuge enrichment technology by Pakistan was a waste of effort and money.[104]Munir Ahmad Khan's continued stress on the significance of plutonium reprocessing technology for Pakistan could also be based on three underlying reasons. Firstly, he may have wanted the attention of the US and other Western countries to remain focused on Pakistan's reprocessing project while Pakistan was quietly accumulating pieces of equipment for its enrichment programme. Secondly, he himself may have entertained some doubts about the success of the enrichment effort and may have wanted to keep the plutonium option open. Thirdly, since AQ Khan had taken over the enrichment project, the PAEC felt that it would forever remain dependent on KRL for the fissile material for its weapons programme and wanted to develop the plutonium route as an alternative which it

[102] 'The Islamic Bomb', BBC, Panorama Documentary aired in 1980.
[103] All major nuclear powers including the US had used 'Gaseous Diffusion' process of enrichment of uranium for their nuclear weapons programmes. In this process Uranium in gaseous form is passed through a successive series of thin membranes to gradually separate the heavier U238 from relatively lighter U 235. Gaseous Diffusion process consumes ten times more energy than the more modern centrifuge enrichment process.
[104] This was personally narrated to the author by a senior Pakistani diplomat who had this conversation with Dr Usmani when the former called on him while he was posted as a junior diplomat at the Pakistani embassy at Brussels.

eventually did by starting work on the construction of the Khushab plutonium production reactor in the late 1980s.[105]

2.8: Major Technological Landmarks:

On 11th of March 1983 Pakistan successfully conducted the first cold test[106] of the nuclear device designed by PAEC scientists and engineers. Chairman PAEC called on President Zia the same evening and informed him that Pakistan was now ready with a nuclear device. However, Munir Khan commented that PAEC had conducted the cold test well before the fissile material for a 'hot test' was available, adding that, "we were ahead of others",[107] implying that the enrichment plant at Kahuta had not produced bomb grade material till then.[108] He was also suggesting that PAEC had accomplished its task ahead of A Q Khan who had been denigrating the PAEC for its slow pace of work. The design team now had to decide on whether to wait for the availability of fissile material and the opportunity to conduct a hot test or to continue its work to refine its designs and produce more compact, rugged and aircraft and missile deliverable designs. They decided to follow the latter route. The design and manufacturing team was to develop several new designs during the 1980s and 1990s. The new designs were also confirmed through several cold tests. These included a small, compact but high yield design, which was termed by the head of the testing and diagnostics team as 'state of the art' design.[109]

In the uranium enrichment project the first landmark was reached on 04 June 1978, when a prototype centrifuge was successfully run for the first time, after a number of failed attempts. The machine was also able to separate the two isotopes of uranium. Dr A Q Khan who had by then assumed the charge of the project director duly reported the success in a letter dated 10 June 1978 to President Zia, who personally congratulated the team of scientists. Pakistan thus became the first country outside the developed world to have

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[105]Bashir-ud-din Mahmood, Waqt interview.

[106]Munir Khan, speech at PINSTECH, op. cit., Samar Mubarakmand, op. cit. [A 'Cold Test' is the detonation of a complete nuclear device but what differentiates it from a full-fledged nuclear test is that the fissile material core is replaced with natural uranium. As a result all components of the device including its triggering mechanism, the electronics package and the conventional explosive lenses are tested besides the functioning of the neutron source. It causes fission and neutrons are released but no nuclear explosion takes place because the fission reaction is not sustained.]

[107]Munir Khan, op. cit.

[108] Ibid. [In natural uranium two isotopes of uranium are found in the proportion of U-238- 99.3 % and U-235 – 0.7 %. The process of increasing the proportion of U-235, which is a fissile material, is called enrichment. Uranium with a proportion of 90% or above of U-235 is called the 'bomb grade material.']

[109]Samar Mubarakmand, op. cit.

achieved the enrichment capability. This was followed by successful setting up of a 54-machine cascade[110] at the pilot scale enrichment plant at Sihala near Kahuta the same year. The pilot plant became operational in 1979 while the Kahuta enrichment plant was completed in 1980. By 1984 Pakistan is believed to have achieved the capability of uranium enrichment on a significant scale. The news broke through an interview by Dr A Q Khan to an Urdu language daily Nawa-i-Waqt from where it was picked up by The Times, London in a report entitled 'Hint of Pakistani Atom Bomb.' Dr Khan had claimed in the interview that, Pakistan had broken the monopoly of the Western countries on enrichment technology and that if the scientists were tasked by the President to do something in the national interest, they would not disappoint the nation.[111] However, despite AQ Khan's claim, it is difficult to ascertain the level of enrichment Pakistan had achieved at the time. It is, however, important to understand that most of the enrichment effort is expended in enriching uranium from 0.7% of U-235 to 5% U-235. Beyond that it is relatively easier to upgrade it to the weapons grade (90% of U-235) which can be achieved within weeks. Complex technological challenges of running a large enrichment plant, consisting of thousands of machines, rotating at very high speed, interconnected through miles of pipes and complex gas feed and collection systems, all controlled with a process control system, had thus been overcome.

President Zia immediately played down the interview stating that, "Pakistan only wanted to acquire nuclear technology for peaceful purposes."[112] Nevertheless, this, caused a lot of furore in the US Congress and Indian media and led to President Reagan's letter to Zia in which he for the first time cautioned him not to cross the 'red line' of enriching uranium beyond 5% level. There was previously no such demand and the tacit understanding was that Pakistan could continue to pursue its enrichment activity but will stop short of a nuclear explosion. The episode ultimately led to the passage of the Pressler amendment in 1985, which made it mandatory for the US President to certify annually that Pakistan is not in possession of a nuclear device failing which no military or economic assistance could be provided to Pakistan.[113] The Pressler amendment was invoked in

[110] A Cascade is a set of centrifuge machines interconnected with pipes and are capable of running as a unit to enrich uranium.
[111] 'The Hint of Pakistani Atom Bomb', *The Times* (London), 10 February 1984.
[112] 'Zia moves to quell rumours about manufacture of bomb', *The Guardian,* 14 February 1984.
[113] Kux, op. cit. p. 276-7.

October 1990 slapping wide ranging sanctions on Pakistan. This caused a lot of acrimony, with the Pakistanis accusing the Americans of abandoning them, after the Soviet withdrawal from Afghanistan and the Americans blaming Pakistan for going beyond the mutually understood limits on nuclear activity.

On 01 March 1987, during the course of a military crisis resulting from India's exercise 'Brass Tacks,' an interview by A Q Khan with Indian journalist Kuldip Nayyar was published by the London *Observer*, in which the former had purportedly claimed that Pakistan had achieved nuclear capability despite West's doubts about his abilities. Despite AQ Khan's protestations that he had been misquoted by the interviewer, he was taken to task by President Zia for his indiscretion, while Mushahid Hussain, editor of Islamabad based newspaper *Muslim*, lost his job for facilitating the interview. A month later Zia himself declared in an interview with *Time* magazine that, "you can write today that Pakistan can build a bomb whenever it wishes," adding by way of clarification, that though Pakistan had the technical capability it had no intention of making a bomb.[114] Pakistan seemed to have learnt the art of sending signals about its nuclear deterrent capability without unambiguously acknowledging its nuclear capability.

In 1986, the PAEC initiated the project to build a plutonium production reactor at Khushab. The work on the reactor started in 1987, with Bashir-ud-Din Mahmood as the project director and was successfully completed by 1997.[115] By then the small reprocessing facility called the 'New Labs' near Islamabad had also become operational thus providing Pakistan with an alternative source of fissile material in the form of plutonium. Plutonium weapons are more compact and lighter in weight and can easily be mounted on top of missiles with limited payload carrying capability. The completion of the plutonium production reactor also fulfilled PAEC's long-standing desire of following the plutonium route to the nuclear weapons and ended the KRL's monopoly over fissile material production.

2.9 The Shakti Tests and Decision Time for Pakistan:

In early 1998 during the election campaign in India, the Bharatiya Janata Party (BJP) had announced in its election manifesto that on coming into power it will

[114]Kux, op. cit., p. 284-5.
[115]Bashir-ud-din Mahmood, interview with Waqt TV.

operationalize India's nuclear capability. Many observers dismissed this declaration as part of the election rhetoric. BJP had also stated that it would review and overhaul the national security structure in India. It was expected that BJP would not take any major decisions before the completion of this review. However, to everyone's surprise one of the very first decisions taken by Prime Minister Vajpayee was to give a go ahead to India's nuclear scientists, to carry out multiple nuclear tests. It, however, did not come as a surprise for Pakistan and based on the statements by the BJP leadership and credible intelligence reports, Prime Minister Nawaz Sharif had written letters to major international powers including the US, warning them of the imminence of Indian tests.[116] Unfortunately, Pakistani warnings were not heeded. The CIA on its part failed to pick up India's preparations for the test. Admiral Jeremiah, who was assigned by the CIA director to investigate this major intelligence failure, in response to a question by a journalist about the Pakistani letter, sarcastically remarked that, they have been warning us since 1974.[117]

On 11th May 1998, the Indian Prime Minister announced that, India had successfully conducted three nuclear tests, including a thermonuclear test. However, unlike 1974, this time there was no pretension of peaceful nuclear explosions and he declared India as a nuclear weapon power. Two days later, on 13 May 1998, India again claimed to have conducted two more tests. Again like 1974, since India had already crossed the line, all attention focused on preventing Pakistan from responding in kind.[118] In the words of President Musharraf, "The world and its powers relentlessly pressured us to desist"…[119] Sanctions mandated by the 1994 Nuclear Proliferation Prevention Act (NNPA), also commonly known as the Glenn Amendment, were automatically triggered and the US officials in their pronouncements condemned India's actions. Pakistan waited for the world to act strongly, but France and Russia made it known that they were not in favour of any sanctions and the G-8 reaction was also very mild. President Clinton personally called the Pakistani Prime Minister several times and also sent a delegation led by Deputy Secretary of State Strobe Talbott to Islamabad, in an effort to dissuade Sharif from going ahead with

[116]*The Nation,* Lahore, 24 May 1998.
[117]Naeem Salik, *Genesis of South Asian Nuclear Deterrent,* op. cit., p. 139.
[118]Feroz Hassan Khan, *Pakistan as a Nuclear State,* op. cit., p. 271
[119]Pervez Musharraf, *In The Line of Fire,* op. cit., p. 287.

the tests.[120] However, Nawaz Sharif told them that, no leader in Pakistan could hope to survive in power after shying away from nuclear tests in view of the prevailing public sentiment in Pakistan.[121]

The Indians also played their part in provoking a Pakistani decision to test by making inflammatory and threatening statements, probably in their keenness to have a companion in the international dog house.[122] Indian effort was premised on two main assumptions. First, some people in India were of the view that Pakistan's nuclear programme was a bluff, created with the connivance of the West, to constrain India's nuclear options and thought that it was time to call Pakistan's bluff. In case Pakistan failed to respond with nuclear tests of its own, its nuclear bogey would be exposed forever. Second, they thought that if Pakistan also conducts nuclear tests, the international pressure on India would be dissipated. The US, on its part, failed to come up with an attractive package of incentives for Pakistan, beyond vague promises, in return for refraining from conducting the nuclear explosions. As pointed out by a pre-eminent South Asia expert Steve Cohen, the US did not offer Pakistan any 'real incentives' for refraining from testing and that price being offered to Pakistan was nowhere near the one which had been offered to Pyongyang in 1994.Cohen explained that, "Pyongyang got $ 4 billion in American assistance to cap its nuclear programme; Pakistan was given vague promises that it might finally be given the 28 F-16 aircraft it bought and paid for almost a decade ago. And we and the Chinese were unwilling to offer the Pakistanis security guarantees that would have made them feel comfortable."[123]Pakistan was in no doubt, given the statements by senior Indian leaders including Home Minister L.K. Advani, asking Pakistan to accept India's predominance, that the strategic balance in South Asia had been seriously undermined and needed to be restored.

Prime Minister Sharif was in Almaty, the capital of Kazakhstan, on May 11, 1998, for summit meeting of the Economic Cooperation Organisation – a regional grouping of South West and Central Asian States, when the news of Indian tests broke out. He called the Army Chief General Jehangir Karamat and told him to initiate preparations for the

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[120] Strobe Talbott, '*Engaging India-Diplomacy, Democracy and the Bomb,'* Brookings Institution Press, Washington, D.C., 2004, p. 65-67.
[121] Ibid.
[122]Kux, p. 345-6.
[123] Hassan Askari Rizvi, 'Pakistan's Nuclear Testing', *Asian Survey,* 41, 6, 2001, p. 943-55.

tests, who in turn asked him to return to Islamabad as soon as possible and convene a meeting of the Defence Committee of the Cabinet, so that an institutionalised decision could be taken.[124] The DCC meeting was held on May 15, 1998, and was attended by Finance Minister Sartaj Aziz, Foreign Minister Gauhar Ayub, Foreign Secretary Shamshad Ahmed and the three services chiefs. Dr A Q Khan was also there while the PAEC was represented by Member Technical and head of Directorate of Technical Development, Dr Samar Mubarakmand, in the absence of PAEC Chairman Dr Ishfaq Ahmad who was on a visit to the US. The DCC meeting had to decide on two urgent matters, the first, was regarding whether or not to conduct a nuclear test and the second was with regard to which of the two organisations i.e. PAEC and KRL to be entrusted with the task. Dr Samar gave a technical evaluation of Indian tests and there was also a detailed discussion of the financial and economic impact of the sanctions likely to be imposed in case of a Pakistani nuclear test. Finance Minister Sartaj Aziz cautioned against the tests on grounds of poor state of the economy and especially the low foreign exchange reserves, while the Foreign Minister and Foreign Secretary were amongst the strongest voices supporting the tests. However, the meeting remained inconclusive.[125]

Dr Ishfaq returned from the US on 16th May and was summoned by the Prime Minister the next day. When he went to see the Prime Minister along with Dr Samar, he was asked by the PM about his views on whether or not Pakistan should conduct the tests and PAEC's preparedness to undertake the task. He told the PM that the decision to conduct the test would be a political decision and assured him that PAEC was fully prepared to fulfil its responsibilities should a decision be taken in favour of the tests. He received a call from the Prime Minister the next day to go ahead with the tests.[126]

During the next ten days there was feverish activity. The team of scientists and engineers led by Dr Samar Mubarakmand travelled in special Pakistan International Airlines flights to Quetta from where they were moved to the test site at Chaghai in Balochistan. At the same time Pakistan Air Force C-130s escorted by F-16s were ferrying the sensitive material and equipment to Quetta from where it was moved by helicopters

[124]Author's personal interview with General Jehangir Karamat at Washington, DC in 2006. Former Foreign Secretary Shamshad Ahmed in a 2009 conversation with the author stated that the PM had called the Army Chief on his insistence and advice. Also see Feroz Hassan Khan, *Eating Grass,*op. cit., p. 270.
[125]Shaid-ur-Rehman, op. cit., p. 9-13 and Feroz Hassan Khan, p. 272.
[126]Ibid. Also see Dr Samar Mubarakmand, op. cit. Also see Feroz Hassan Khan, p. 278.

and ground transport to the test sites.[127] The international pressure to dissuade Pakistan from conducting the tests was building up while some unconfirmed intelligence reports pointed to Indian and Israeli preparations to attack Pakistani nuclear sites. As a result the Pakistan Air Force was placed on a state of high alert and the Army Chief contacted US Deputy Chairman Joint Chiefs of Staff General Ralston seeking clarifications about the Israeli plans. Ralston talked to the Israelis and informed General Karamat, that the Israelis have strongly denied any such plan. The Israelis on their part went a step further to reassure Pakistan, with their Ambassador at Geneva contacting his Pakistani counterpart to reiterate the Israeli position.[128]

There was however, a crisis during the night of 27/28 May, with intelligence sources reporting heightened air activity across the border. Consequently, Indian High Commissioner in Islamabad was called to the Foreign office at 01 am on May 28, 1998 and was warned of the consequences of any hostile action by India.[129] Finally, what was described by Foreign Office in Islamabad as 'Pakistan's Finest Hour' arrived at 3:16 pm on 28 May, when 5 nuclear devices were successfully detonated, turning the black granite of Ras Koh mountain white. Two days later another device was detonated at the Kharan test site 150 kilometres away from Chaghai.[130]

It is clear that despite the pursuit of a nuclear weapons programme since the early 1970s the top Pakistani leadership, including the Prime Minister, had not tried to learn even the basics and was unaware of the respective roles and capabilities of PAEC and KRL. Had they known that the PAEC had prepared the test shafts and had carried out dozens of cold tests starting in March 1983, the decision would have been straight forward. Even if the claims of KRL are accepted that it had developed its own nuclear device, it was ill equipped to carry out the tests. By its own account, the KRL has claimed to have carried out a solitary cold test, whereas PAEC had conducted dozens of cold tests over a decade, had designed and prepared the test sites and had the test equipment and trained manpower.[131]

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[127]Feroz Hassan Khan, *Eating Grass,* op. cit., p. 279-80.
[128]In an email exchange with the author on 01 November 2013, General Karamat confirmed the occurrence of the exchange with General Ralston and the Israeli assurances.
[129] Hassan Askari Rizvi, 'Pakistan's Nuclear Testing', *Asian Survey,* 41, 6, 2001, p. 943-955.
[130]Shahid-ur-Rehman, op. cit., and Samar Mubarakmand, op. cit.
[131]Feroz Hassan Khan, *Eating Grass,* p. 272-3.

It has been debated both within and outside Pakistan as to why Pakistan conducted six tests in all. Many Pakistani analysts naively assume that Pakistan conducted six tests to be a step ahead of India's five tests. But more surprising is the contention of some very knowledgeable and well known American scholars using the same argument with a further twist that Pakistan carried out six tests to get even with India's five tests in 1998 and one test in 1974.[132] Nuclear testing is a complex and technologically challenging process and nuclear devices are tested for technological reasons not for satisfaction of egos. There were serious technical considerations which determined the actual number of tests. First, and foremost, was the number of tunnels available at the test sites. Had five tunnels at Chaghai and the sixth one at Kharan not been available, there was no way Pakistan could have conducted six tests. Neither could it have hurriedly prepared the tunnels on the eve of the tests. The second consideration was the availability of devices based on different designs and since these were available, PAEC wanted to use the opportunity to test all of these, knowing that this may well be their last opportunity to do so. It does not make any sense to test multiple devices of the same design. Finally, it was the availability of adequate quantity of fissile material, without which, it would not have been possible to conduct the desired number of tests. No country can afford to waste precious and scarce fissile material by conducting unnecessary tests just for point scoring.

Thus the long and arduous journey which began almost two decades earlier came to fruition. A beaming Pakistani Prime Minister addressing the people of Pakistan on National Television declared, "Today we have settled a score…Our hand was forced by present Indian leadership's reckless actions."[133] Pakistan's claims about the yield of its tests were disputed by international experts, as was the case with the Indian claims. However, there was no disputing the fact that Pakistan had unambiguously demonstrated its nuclear capability. The tests were received with public display of jubilation in major Pakistani cities and received popular approval.

2.10 Lessons Learnt by Pakistan:

The most important lesson Pakistan learnt through its nuclear enterprise was the fact that if a nation pursues any project, even the most technologically challenging one,

[132] Scott D. Sagan and Kenneth N. Waltz, '*The Spread of Nuclear Weapons – A Debate Renewed',* New York, W.W. Norton and Company, 2003, p. 88.
[133]Kux, op. cit., p. 345-46.

with single minded determination, national resolve and across the board national consensus, even the apparently insurmountable challenges can be overcome. The successful mastery of a very complex and cutting edge technology by a relatively poor country with a limited industrial base was owed to the fact that requisite organisational structures were built and a pool of highly trained and skilled manpower was created. This recognition of the importance of purpose built institutions and specially trained manpower would help Pakistan in establishing the nuclear management infrastructure in the post-1998 phase of its nuclear development. Second, the historical experience of persistent international pressures and efforts to stifle and undermine Pakistan's nuclear programme stretching over almost three decades has seriously impacted on the collective national memory, creating a deep seated mistrust – a kind of xenophobia - that continues to influence its outlook. This peculiar mind set and deeply ingrained perception that Pakistan, unlike India and Israel, was singled out for sanctions and pressures in complete disregard to its legitimate security concerns, continues to cast a long shadow over Pakistan's nuclear policy. Third, Pakistan also learnt that there are no ironclad rules in inter-state relations and countries do not hesitate to bend their own rules if dictated by their national interests, as was evident by the change in policy direction by President Carter after the Soviet invasion of Afghanistan and its continuation during the Reagan presidency and that geopolitical and commercial interests of the major powers would always trump their non-proliferation agenda.

It is also an established fact that one of the important factors affecting the learning process is the historical experience especially if it is a traumatic one[134] as was Pakistan's experience of defeat and dismemberment in 1971. The perceptual dispositions thus developed determine the nature and direction of the learning process and could lead the decision makers into drawing incorrect inferences and applying analogies from past events that may have been transient in nature to very different situations in future. Jervis has established a linkage between past events, lessons learnt from these and the future behaviour of the leadership which sometimes fails to learn some lessons that may appear to be very obvious to an outside observer.[135]Feroz Hassan Khan points out that states without

[134]Thomson, 'Political Realism and the Crisis of World Politics,' Princeton, Princeton University Press, 1960, p. 36.
[135]Jervis, Perceptions and Misperceptions, p. 220.

credible security guarantees from allies and faced with security threats from powerful neighbours are essentially "orphan states"[136] and in his view Israel and Pakistan fall in this category. Such was the severity of their security dilemma that, neither security guarantees nor conventional forces could assure their survivability and therefore both states opted for nuclear weapons as ultimate guarantors of their security.[137]

[136]Feroz Hassan Khan, *Eating Grass,* op. cit., p. 70. The term "orphan states" has been used by Michael Mandelbaum in "Lessons for the Next War," *Foreign Affairs,* 74, March/April 1995, p. 28-30.
[137] Stephen P. Cohen, *India: Emerging Power,* Brookings Institution Press, Washington, DC, 2001, p. 204.

Chapter-3

Pakistan's Evolving Nuclear Doctrine

3.1 Preamble:

This chapter will explore the reasons for Pakistan's pre-1998 inability to formulate a nuclear use doctrine or to contemplate various choices that would be available in terms of the nature and type of nuclear doctrine as and when it would decide to operationalise its nuclear capability. It will provide a theoretical overview of the nature and types of military doctrines in general and nuclear doctrine in particular. It will then trace Pakistan's efforts to formulate a suitable doctrine in the aftermath of its nuclear tests in May 1998 encompassing the broad contours of the early doctrinal thinking, gradual maturing of the understanding of the nuances of nuclear doctrines and the current approach to nuclear deterrence. In view of the fact that Pakistan has not pronounced a formalised nuclear doctrine one has to delve into and comb through the statements by senior Pakistani leadership with oblique or direct references to the salient features of its nuclear doctrinal preferences. As Peter Lavoy points out, "Pakistan has not formally declared a nuclear employment doctrine. But this does not mean there is no doctrine. Pakistan has operational plans and requirements for nuclear use integrated within its military war-fighting plans."[1] The study of the progression from a non-existent nuclear doctrine to a fairly mature understanding and articulation of various aspects and implications of the doctrinal choices will also provide an insight into the nature and quality of nuclear doctrinal learning in Pakistan.

The covert nature of Pakistan's nuclear weapons programme between 1972 and 1998 that was designed to mitigate the international non-proliferation pressures, also meant that there could be no public debate over the nature and type of nuclear doctrine Pakistan would need, whenever the nuclear capability would be operationalised. Surprisingly

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[1] Peter R. Lavoy, *'Islamabad's Nuclear Posture: Its Premises and Implementation'*, in Henry D. Sokolski ed., 'Pakistan's Nuclear Future: Worries Beyond War', January 2008, p. 135. Available at, http://www.StrategicStudiesInstitute.army.mil/

though neither the military nor the civilian institutions initiated even an internal debate to shape the ideas about a nuclear use doctrine. As a result, the intellectual aspects of the nuclear development lagged far behind the technological progress. In the wake of nuclear tests in May 1998, Pakistan was faced with the challenge of bridging this gap. Pakistan promptly set about accomplishing this task and an initial blue print of the doctrine was prepared within a few months. The delineation of doctrinal objectives helped in determining the configuration of the nuclear forces including the tentative requirement of nuclear warheads and the number and types of delivery systems. This in turn helped lay down developmental and production goals for the strategic organisations within the existing resource constraints.[2] Pakistan however, chose not to formally pronounce a nuclear doctrine preferring ambiguity over a clearly articulated nuclear doctrine, despite pressures to respond to India's pronouncement of its Draft Nuclear Doctrine on 17th of August 1999.[3] This doctrinal opacity while complicating the adversary's calculations has also led to highly speculative interpretations of Pakistan's perceived nuclear doctrinal goals.

3.2 Military Doctrine - its Significance, Role and Manifestations:

A military doctrine can provide guidance for employment of military forces on the battle field, offer direction for training of the forces for combat during peace time or to dictate the adoption of an appropriate military posture to deter aggression or overawe the enemy.[4] According to Scott Sagan, "Military doctrine consists of plans about how and when military force is to be used." [5] Depending on the geo-strategic environment of a country, its resource base, including human resources, availability of strategic materials, industrial potential, communication infrastructure and relative strength vis-a-vis its adversary, a country would choose either an offensive or a defensive doctrine. The doctrine could be aimed at achieving decisive victory in war or could have more limited objectives.

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[2] Author's personal experience being part of the team of officers constituted on 30th of May 1998, in the Army Headquarters immediately after the last nuclear test on 30 May 1998.

[3] Complete Text of India's Draft Nuclear Doctrine based on the report of National Security Advisory Board can is available at Appendix 4 to P. R. Chari, Sonika Gupta and Arpit Rajain eds., 'Nuclear Stability in Southern Asia,' New Delhi, 2003, Manohar, p. 184-88.

[4] Greg Austin, 'The Sources of Military Doctrine – Lessons from the Cold War about Scholars and the Intelligence Community', *Australian Defence Studies Centre Working Paper No: 18,* University College, University of New South Wales, Australian Defence Force Academy, Canberra, p.1.

[5] Scott D. Sagan, 'The Origins of Military Doctrine and Command and Control Systems', in Peter R. Lavoy, Scott D. Sagan and James J. Wirtz eds., Planning the Unthinkable, Cornell University Press, Ithaca and London, 2000, p. 17.

It will determine, especially in case of a nuclear conflict, whether the preferred targets would be military (counter-force) or cities and major industrial hubs (counter-value) or opposing leadership and command and control (decapitation) or some combination of these. It would also indicate whether the ultimate objective is war deterrence or war fighting.

Some analysts such as former U.S. Secretary of Defence, James Schlesinger, have emphasised the transient nature of military doctrines. In his view, "doctrines control the minds of men only in periods of non-emergency. They do not necessarily control the minds of men during periods of emergency. In the moment of truth, when the possibility of major devastation occurs, one is likely to discover sudden changes in doctrine."[6]

Scott Sagan has explained the military doctrine using the '*Organisation,' 'Realism'* and the *'Strategic Culture'* theories as his frames of reference. He concludes after examining the organisation theory that, military planners because of their professional training and experience develop a tendency to focus mainly on military factors directly impacting on military operations to the neglect of political considerations and as an organisation the military also harbours 'parochial interests'. As a consequence of this outlook, the militaries in Sagan's view have a bias towards adoption of offensive doctrines which in addition to making their planning simpler, also legitimises their demands for an increased share in the budget, since much larger forces are needed to conduct offensive as compared to defensive operations. In his view, firstly, militaries are inclined to favour 'preventive wars.' Secondly, military officers doubt the ability of civilian leaders to control the escalation and thus do not want them to interfere in operational planning. Third, a penchant for seizing the initiative will lead the military officers to push for 'pre-emptive strikes' or at least the adoption of 'launch on warning' strategies. Fourth, military officers would prefer counter-force targeting as compared to 'counter-value targets, to reduce the ability of enemy forces to attack and kill their own forces. Fifth, because of preferences for pre-emption and launch on warning the militaries are not very keen to develop secure second strike capabilities.[7]

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[6] James Schlesinger quoted in Brigadier V.K. Nair, 'Nuclear India', New Delhi, Lancer International, 1992, p. 135.
[7] Sagan, op. cit., p. 18-22.

Sagan's apparently very cogent arguments are based on broad generalisations and stereo-typing of military organisations and are mainly grounded in his study of the US military history. The US military's world-view has always been influenced by abundance of resources, technological superiority and the political primacy of the United States in the international system. Most of the militaries around the world do not enjoy these advantages and there are many other variables in different sets of rivalries among nation states that determine the choices that each military makes in adopting the doctrine most suited to its peculiar requirements.

Sagan suggests that military's preferences and biases will affect the state policy in three different ways. First, in the states, which lack even the nominal civilian control over the military, the military will be the final arbiter in the choice of a doctrine. Second, even in countries with effective civilian control over the military, the ability of the civilian leadership is severely curtailed due to the fact that they are not well prepared to grasp the complexities of the military doctrine. Third, even if the civilians are well informed the military officers are likely to put direct or indirect pressures on the decision makers to lead them to the doctrine preferred by the military.[8] The second assertion is a clear admission of the fact that lack of civilian oversight of military plans cannot always be blamed on the militaries' reluctance to accept civilian guidance. In many cases, it is the inability of the civilian leadership to understand the complexities of modern warfare, that inhibits them from exercising effective control over military planning and therefore they are more inclined to abdicate their prerogatives to the military.

According to realists, doctrine is considered to be a rational response to threat perception and that the anarchic nature of the international system compels states to take all possible measures to protect their respective national security interests including internal as well as external balancing.[9] Barry Posen in his *Sources of Military Doctrine* has discussed various choices, states can make, in terms of their doctrines depending on their circumstances. For instance, states that desire to change the status quo will need offensive weapons and would adopt offensive doctrines to realise their objectives. In the second category are states, which would adopt offensive doctrines, in order to defend their vulnerable allies. The third category comprises states that are faced with multiple enemies,

[8] Sagan, op. cit., p. 22.
[9]Ibid, p. 23.

and would prefer to adopt offensive doctrines to be able to deal with their enemies sequentially.[10] However, Posen's formulations were essentially based on the European military experiences during the two World Wars and these precepts are rooted in the pre-nuclear era with limited relevance for the nuclear age.

Amongst the realist thinkers, Glen Snyder has introduced the concept of 'the stability-instability paradox,' which posits that, "greater the stability of the strategic balance of terror, the lower the stability of the overall balance at its lower level of violence."[11] Robert Jervis has summed up the same dilemma as follows: "To the extent that the military balance is stable at the level of all-out nuclear war, it will become less stable at lower levels of violence."[12] Paul Nitze on the other hand has introduced the term "counter deterrent doctrine," implying that states armed with both conventional and non-conventional weapons, confronted with similarly armed adversaries, may use the unconventional weapons as a shield behind which they could undertake conventional aggression without fear of escalation by the adversary.[13] However, neo-realist scholars such as Kenneth Waltz disagree with these ideas and believe that all states would exercise restraint in the use of their un-conventional weapons and keeping in mind the serious risks of retaliation would only use these weapons for deterrence purposes.[14] In the same context Sagan has argued that evidence from Cold War history suggests that 'revisionist powers' would use their nuclear weapons as a buffer to enable them to launch conventional aggression.

Proponents of the organisation theory and the realists differ on the impact of civilian control of military or lack thereof, on the nature of doctrine. The organisational theorists believe that doctrinal decisions will be influenced by military's preferences, in states where military plays a dominant role. The realists, however, are of the view that military officers even when in control of the government are compelled to make rational decisions on the basis of their national interests. The organisational theorists, however, concede that the highly technical nature of military planning becomes a limiting factor in

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[10] Barry Posen, 'Sources of Military Doctrine', p. 59-79, quoted in Scott Sagan, op. cit., p. 24.
[11] Glenn Snyder, 'The Balance of Power and Balance of Terror', in Paul Seabury ed., The Balance of Power, San Francisco, Chandler, 1965, p. 184-201.
[12] Robert Jervis, *The Illogic of American Nuclear Strategy* (Ithaca: Cornell University Press, 1984), p. 31.
[13] Paul Nitze, 'Deterring our Deterrent', *Foreign Policy*, No. 25 (Winter 1976-77): p. 196, quoted in Sagan, op. cit. p. 26.
[14] Kenneth Waltz, 'More May be Better', in Sagan and Waltz, *The Spread of Nuclear Weapons,* p. 1-45.

civilian oversight which is further restricted during crises and wartime due to paucity of time to modify the plans.[15]

'Strategic Culture' theorists argue that, choice of doctrines and strategies is influenced by the domestic political environment and cultural background of a country. The military doctrines are, from this standpoint, ingrained in the 'historical experience,' the 'myths' related to national historical experience and societal 'norms.' Under the influence of these factors different states faced with comparable strategic environments are likely to select different doctrines.[16] Neo-culturists on their part, take into account, the nexus between domestic politics and strategic culture and the resultant restrictions the militaries have to contend with in the process of formulation of their doctrines. They also pay more attention to 'moral norms' and 'cultural taboos' that are likely to influence a leader's preferences especially in the nuclear domain. The neo-realists also contend that civilian leaders try to influence military policy in ways that will increase their own political stock, not necessarily for furtherance of national interests.[17]

Elizabeth Kier disagrees with the assertion of the exponents of organisation theory that, militaries are biased towards offensive doctrines and believes instead that different military organisations choose doctrines appropriate for them, on the basis of their historical experiences and the shaping of their mind set through different training regimes.[18] She argues that the political leadership may not try to directly influence the military's doctrinal choices, but they can achieve the same by indirect means that is to say through budgetary decisions and their preferences for certain weapon systems or types of forces.[19] They could do this by sanctioning the budget for acquisition of a particular type of weapon systems and may deny funds for some others. The most recent example is the US Congress allocating budget for development or retention of certain weapon systems the Pentagon doesn't want. These weapons include, the Global Hawk block 30 Drone programme, the C-27 J Spartan cargo aircraft, upgrades to the M1 Abrams tank, Air National Guard

[15] Sagan, op. cit. p. 29.
[16] Sagan, op. cit. p. 30.
[17] Ibid, p. 31.
[18] Ibid, p. 32.
[19] Ibid, p. 32-33.

funding, and a proposed East Coast missile defence system. Congress has also forced the Pentagon to retain the ageing fleet of A-10 strike aircraft.[20]

In a recent study on nuclear postures Vipin Narang has employed a different criterion to categorise nuclear postures as under:-

1) Catalytic Posture:[21] This kind of posture is adopted by weak and vulnerable states, based on ambiguous nuclear capabilities and is designed to attract the military or diplomatic intervention by powerful international players on their side through their nuclear posturing. He cites Israel's approach during the 1973 war in the Middle East and Pakistan's conduct during several crises during the 1980s and in 1990 to illustrate his point.
2) Assured Retaliation Posture:[22] This posture is aimed at directly deterring nuclear threats and coercion and requires an assured second strike capability. He includes Chinese and Indian nuclear postures in this category.
3) Asymmetric Escalation Posture:[23] This posture calls for 'rapid' first use of nuclear weapons to deter a conventional attack and requires a high degree of operational preparedness. NATO and French postures against the Soviet Union during the Cold War and the current French and Pakistani postures are cited as examples of this posture.

The foregoing discussion amply highlights the complex interplay of factors such as organisational biases, hard-core realist compulsions and domestic political and cultural pressures that influence the ultimate choice of a particular doctrine by a country. After their respective nuclear tests in May 1998, both India and Pakistan declared their intentions to adopt 'credible minimum deterrence' doctrines. Minimum deterrence itself is a vaguely defined concept and addition of the term 'credible' with it makes it even harder to understand. It may, therefore, be appropriate to amplify the meanings of the formulations minimum deterrence and credible minimum deterrence before proceeding to analyse the specifics of Pakistan's nuclear doctrine and its evolution over the years since 1998.

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[20] http://www.daytondailynews.com/news/news/congress-pushes-for-weapons-pentagon-didnt-want/nRC7w/
[21] Vipin Narang, 'Posturing for Peace? Pakistan's Nuclear Postures and South Asian Stability.' *International Security,* Vol. 34, No. 3 (Winter 2009/10), p. 41-2.
[22] Vipin Narang, op. cit., p. 43-4.
[23] Ibid., p. 44-5.

3.3 The Concept of Minimum Deterrence:

One of the simplest definitions of minimum deterrence states that, "Minimum Deterrence is an attempt to prevent enemy attack through reliance on a small nuclear retaliatory force capable of destroying a limited number of key targets."[24]This definition, however, does not provide any criteria for measuring either the size of the 'small nuclear retaliatory' force or the 'limited number of key targets.' The qualifier 'credible' used by both India and Pakistan adds another complication. The use of the term credible with minimum deterrence indicates dissatisfaction and unease with minimal level of forces on part of the two South Asian antagonists. They embraced the minimum deterrence concept to alleviate international concerns about the possibility of an unbridled nuclear arms race in South Asia and to present themselves as responsible nuclear capable states. However, by adding the prefix 'credible' they expanded the scope of their respective nuclear arsenals to be something more than minimal.

A prominent US expert of South Asian nuclear scene, Rodney W. Jones agrees that, "the term credible is much more demanding criterion than 'minimum deterrence' might imply by itself."[25]Commenting on the minimum deterrence postures of India and Pakistan Rodney Jones has raised some very pertinent questions as under:-

> Although the term 'minimum' rapidly became a fixture of the public discourse in South Asia neither India nor Pakistan officially clarified, what the term minimum means, leaving this open to speculation. Does minimum imply the sufficiency of small numbers of nuclear weapons? Nuclear weapons held in reserve? Low readiness or alert rates of a nuclear force? Renunciation of nuclear war-fighting? Mainly counter-value targeting? Or does the term 'minimum' merely make a virtue of today's facts of life in the subcontinent – limited resources, scarce weapons material, unproved delivery systems, and still undeveloped capabilities?[26]

The context of some of the questions raised by Rodney Jones in 2001 has since changed, due to substantial technological developments in South Asia. For instance, both India and Pakistan have considerably enhanced their fissile material stockpiles over the last

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[24]John Baylis, Ken Booth et al eds., 'Contemporary Strategy' Vol-1, London, Croom Helm, 1987, p. 312.
[25] Rodney W. Jones, 'Minimum Nuclear Deterrence Postures in South Asia: An Overview', Defence Threat Reduction Agency, Advanced Systems and Concepts Office, Final Report, October 1, 2001, p. 3.
[26] Ibid, p. 2-3.

decade. Similarly, they have been regularly conducting missiles flight tests and the proven systems have been integrated into the military forces. Cruise missiles have also been developed and tested by the two countries and missiles with increasingly longer ranges have been fielded. All these developments indicate a maturing of their respective operational nuclear capabilities. However, neither country has clarified in quantitative terms the intended size of their prospective nuclear arsenals.

For instance, replying to a question about the size of India's nuclear arsenal, the former Indian Minister for External Affairs Jaswant Singh instead of clarifying the situation added some additional layers of ambiguity stating that:-

> "Minimum deterrence is not quantification. It is not a fixity. It is the enunciation of a fixity. The principle is codified in cold war phraseology. It is to be determined in accordance with the reality of an assessment of the security situation. And as the security situation alters with time determination of minimum deterrence also alters."[27]

India's Draft Nuclear Doctrine at its subsection 2.3 also alludes to a similar approach to credible minimum deterrence stating that, "This is a dynamic concept related to strategic environment, technological imperatives and the needs of national security. The actual size, components, deployment and employment of nuclear forces will be decided in the light of these factors."[28] According to a respected Indian analyst Rajesh Basrur, "the concept of minimum deterrence has not been adequately spelled out and hence might be undermined by pressures emanating from perceived threats or by groups with vested interests." [29]

According to a report published by the Bulletin of Atomic Scientists in 2011, Pakistan was estimated to have 90-110 nuclear weapons and with likely average annual production of 10 weapons per year it could by 2014 have 120-140 weapons.[30] A similar report on India's nuclear arsenal published in 2012 estimates India's arsenal at 80-100

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[27]Jaswant Singh, interview with *India Today,* January 11, 1999. Available at http://www.indianembassy.org

[28] P.R. Chari, Sonika Gupta and Arpit Rajain, eds., *'Nuclear Stability in Southern Asia'*, New Delhi, Manohar, 2003, p. 185-6.

[29] Rajesh M. Basrur, 'Nuclear India at the Cross Roads', *Arms Control Today*, Arms Control Association, Washington, DC, September 2003.

[30]Hans M. Kristensen and Robert S. Norris, Pakistan's Nuclear Forces 2011, *Bulletin of the Atomic Scientists,* 2011 67:91. Available at http://bos.sagepub.com/content/67/4/91

weapons which could be projected to have grown to 100-120 weapons by 2014.[31] Even giving an allowance of 10% plus or minus in the estimated figures these cannot be described as 'small nuclear retaliatory forces' as per the definition of minimum deterrence and both countries continue to produce more fissile material to fabricate even more nuclear weapons. Vipin Narang states that, "Pakistan describes its current nuclear doctrine as 'credible minimum deterrence,' but its salient features are anything but minimal and emphasize all of the characteristics of a first use asymmetric escalation posture."[32]

The concept of minimum deterrence derives from the unique characteristics of nuclear weapons. Such is the destructive power of each individual nuclear weapon that even a small number can cause unacceptable damage.[33] This special quality of the nuclear weapons gave rise to the idea of the 'great equalising power of the atom,' which was used by the French strategists such as Andre Beaufre and Pierre Gallois to justify France's independent nuclear deterrence in the early 1960s. The argument is primarily based on the fact that due to the tremendous destructive power of the nuclear weapons, there is no need to match the adversary bomb for bomb and unlike conventional weapons numerical ratios are immaterial.[34] If the preceding argument is embraced in its true spirit it could help dampen the arms racing tendencies driven by the action-reaction syndrome and therefore, the overall size of the arsenal can be kept at a lower level.

From another stand point minimum deterrence posture is normally adopted when the purpose of the nuclear forces is simply to deter nuclear attack or prevent a nuclear blackmail, but if the objective is war fighting the requirement of nuclear weapons both in terms of numbers and the variety of warheads and delivery systems is considerably higher. The efficacy of minimum deterrence is historically proven by China's case, wherein it was able to deter the two super powers in the 1960s and 1970s with an arsenal which bore no comparison with the huge nuclear stockpiles of US and the USSR. Even now China has around 20 or so ICBMs capable of reaching the American homeland but its deterrence remains credible. The situation will, however, change once the US deploys a fully operational National Missile Defence System, which will force China to qualitatively as

[31]Hans M. Kristensen and Robert S. Norris, Indian Nuclear Forces 2012, *Bulletin of the Atomic Scientists,* 2012 68:96. Available at http://bos.sagepub.com/content/68/4/96
[32]Vipin Narang, op. cit., p. 58.
[33]Agha Shahi, et al op. cit.
[34] Ibid.

well as quantitatively upgrade its strategic nuclear deterrent. China was the first nuclear power to adopt a *No First Use Policy* and *non-use of nuclear weapons against non-nuclear states*. Given the size of the British and French nuclear forces compared with the Soviet/ Russian arsenal their nuclear posture could also be characterised as minimum deterrence. However, one has to keep in mind the fact that their national deterrence forces were woven into the overall deterrence architecture of the Western alliance and augmented by the US strategic deterrence forces as well as its battlefield nuclear weapons deployed in Europe. It would be worthwhile here to offer a brief overview of the doctrinal developments in the five established nuclear powers USA, Russia, Britain, France and China to provide a context for the doctrinal thinking in Pakistan. Amongst the aforementioned nuclear powers the American nuclear doctrines have been the best documented and most widely discussed. Due to the close dyadic security relationship between India and Pakistan and the simultaneous commencement of their respective journeys along the road to nuclear learning it would also be appropriate to describe the salient features of the Indian nuclear doctrine because of its direct impact on Pakistani doctrinal choices.

3.4.1 US Nuclear Strategy:

The United States is the only country to have used the nuclear weapons in war against the Japanese cities of Hiroshima and Nagasaki on 6th and 9th of August 1945 respectively. However, the first ever employment of nuclear weapons took place in the absence of any nuclear doctrine. The Strategic Air Command (SAC) considered it an extension of its bombing campaign against major Japanese cities and industrial targets. It was not until the 12th of January 1954 that Secretary of State John Foster Dulles pronounced the first ever nuclear doctrine in a speech at the Council on Foreign Relations in New York. This doctrine termed as the 'massive retaliation doctrine' relied upon the threat of a massive nuclear retaliation to deter any Soviet military aggression against the US or its allies. The role of the conventional forces was reduced to act only as a trip wire to warn of an attack and then the nuclear weapons would be unleashed. This was, however, as critics pointed out an incredible, inflexible and dangerous doctrine especially in case of a limited military incursion by the Soviets. The targeting and employment policy however,

was left at the discretion of SAC.[35] At the time the massive retaliation doctrine was adopted by the US the Soviet Union did not have long range bombers to carry out a retaliatory strike against the US mainland while the US had the advantage of overseas bases in Europe and Asia from where its strategic bombers could reach the Soviet heartland. However, when the Soviets launched the Sputnik satellite on 4 October 1957 which provided them the technological capability to convert this into long range ballistic missiles the nature of threat radically changed and led to the creation of NASA and an accelerated US space programme.[36]

In the early 1960s President Kennedy's Secretary of Defence, Robert McNamara, carried out a detailed review of the nuclear strategy. Consequently, he announced first at a meeting of NATO Defence Ministers in 1962 and later at the University of Michigan, Ann Arbor the 'Flexible Response Doctrine.' The new doctrine emphasised flexibility in response options, damage limitation, city avoidance and intra-war bargaining by allowing for pauses between successive nuclear strikes. This doctrine was aimed at responding to the threat with a corresponding level of force and gradually escalating from conventional to tactical nuclear response, then on to the theatre nuclear weapons and finally, the strategic nuclear exchange. Though, the doctrine was adopted by NATO as its official nuclear doctrine in 1967 McNamara had started losing confidence in it. Its major weakness was that the doctrine could only work in case the Soviet Union also agreed tacitly or explicitly to the desirability of restraint. Amongst its other flaws were the impracticality of damage limitation measures such as civil defence and the inability of NATO allies to provide for larger conventional force levels envisaged by this doctrine. Compared with the massive retaliation doctrine which was based on a simple punishment model of deterrence, flexible response was based on war fighting or deterrence by denial model.[37] It also required a wider variety of nuclear weapons in much larger numbers. McNamara, therefore, began to shift towards 'Assured Destruction' by 1965. It was envisaged that assured destruction could be achieved by the ability to destroy 1/3rd to 1/5th of Soviet population and 3/4th to 1/2 of its industry. The advantage in specifying finite targets meant that an upper ceiling could be fixed on the number of weapons required. However, by that

[35]Colin McInnes & G.D. Sheffield eds., 'Warfare in the Twentieth Century,' London, Unwin Hyman, 1988, p. 147.
[36]http://history.nasa.gov/sputnik/
[37]McInnes, op. cit., p. 148.

time the Soviets had also reached a level of essential equivalence with the US and could cause a similar amount of damage to the United States and as such the concept was re-christened as 'Mutual Assured Destruction' or MAD.[38]

In his message to Congress in 1970, President Nixon expressed his unease with the MAD doctrine because this left the President only with a choice between 'suicide' or 'surrender'. The review he ordered produced what came to be known as the 'strategy of limited nuclear options' also known as the Schlesinger doctrine. This doctrine was a nuclear war fighting doctrine but potential targets were grouped into small packages and between successive packages there would be deliberate pauses to allow for a negotiated ceasefire. The emphasis was on selectivity in targeting, avoiding hitting the cities and keeping these as hostages (withholds) and focusing on counter force targets and Soviet recovery economy while exercising restraint in the use of nuclear weapons. [39] The adoption of this strategy was made possible by the availability of a large variety of warheads and highly accurate delivery systems.

President Carter's Secretary of Defence Brown announced Carter administration's new 'Countervailing Strategy' in July 1980. This was also a nuclear war fighting strategy with the declared purpose of denying victory to the Soviets at every level of violence by causing unacceptable damage. The strategy reiterated counter force targeting and American ability to fight a prolonged nuclear war. The targets comprised Soviet nuclear forces, other military targets, military and political leadership and war supporting and war recovery industries.[40]

President Reagan who had been critical of Carter's nuclear strategy during the election campaign ordered a fresh review and consequently came up with what is called the 'Prevailing Strategy.' Whereas Carter's countervailing strategy was designed to deny victory to the Soviets, the new strategy was aimed at ensuring an American victory in every eventuality. On 23rd of March 1983 Reagan announced his Strategic Defence Initiative (SDI) commonly known as the 'Star Wars,' aimed at preventing any Soviet missiles from entering the US airspace. This very expensive programme involved many esoteric technologies and after an expenditure of scores of billions of dollars over three

[38]Ibid., p. 149.
[39]Ibid, p. 149-50.
[40]Ibid, p. 150-51.

decades is yet to become fully operational. Since then the US has issued several 'nuclear posture reviews' with some adjustment in targeting priorities. American nuclear strategy has been marked by a persistent dilemma of failure to find an entirely satisfactory nuclear doctrine.[41]

The 2002 Nuclear Posture Review indicated departure from the existing US nuclear policy in some key areas. There were at least three important features of the review that attracted most criticism: first, possible use of nuclear weapons against chemical or biological weapons use against US forces or its allies; second, inclusion of non-nuclear states such as Iran, Iraq, Libya, North Korea and Syria as possible nuclear targets; and third, blurring of distinction between conventional and nuclear weapons by declaring the intent to develop low yield earth penetrating nuclear warheads to be used against deep underground bunkers.[42] The April 2010 Nuclear Posture Review issued by the Obama administration laid down five key objectives of US nuclear policy as under:-

1) Preventing nuclear proliferation and nuclear terrorism;

2) Reducing the role of U.S. nuclear weapons in U.S. national security strategy;

3) Maintaining strategic deterrence and stability at reduced nuclear force levels;

4) Strengthening regional deterrence and reassuring U.S. allies and partners; and

5) Sustaining a safe, secure, and effective nuclear arsenal.[43]

The 2010 NPR came after President Obama's Prague speech wherein he had expressed his desire to see a 'nuclear-free world' and on the eve of NPT Review Conference in May 2010. The 2010 review has used a more nuanced language however, in content there were only minor differences. For instance, whereas the 2002 NPR named some non-nuclear countries as possible nuclear targets, the 2010 NPR stated the same as follows: "the United States will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the NPT and in compliance with their nuclear non-

[41]Ibid., p. 151.
[42]http://www.defense.gov/news/jan2002/d20020109npr.pdf, http://www.iwar.org.uk/news-archive/crs/8039.pdf, www.isn.ethz.ch/Digital-Library/Publications/Detail/?ots591,
[43]http://www.defense.gov/npr/docs/2010%20nuclear%20posture%20review%20report.pdf

proliferation obligations" after blaming North Korea and Iran for persistent violations of their NPT obligations.[44]

It is evident from the foregoing that the US nuclear policy and doctrines have been constantly undergoing changes due to changing nature of threat as well as technological developments in weapons designs and delivery systems which provided them with a much greater variety of options.

3.4.2 Soviet Nuclear Strategy:

Soviet nuclear strategy was influenced by several factors such as their historical experience, ideological considerations and bureaucratic wrangling. They would try to prevent the outbreak of a nuclear war but if it starts would fight and win it. The strategic thinking was stifled by Stalin's emphasis on his 'permanently operating factors' which included size, quantity and the destruction of enemy forces in a land war. These factors were relics of the traumatic Soviet experience of the Second World War and were more relevant to a conventional war scenario. When Khrushchev took over in the mid-1950s he showed his preference for a minimum deterrence strategy rather than Stalin's preference for quantitative superiority and called for a reduction in the conventional forces as well. This new approach was necessitated partially by economic difficulties and partly by Khrushchev's greater confidence in the stability of strategic balance. His pro-nuclear posture and his attempt to reduce the size of conventional forces earned him many critics at home who characterised his strategy as "nuclear mania."[45] He assigned higher priority to strategic forces and air defences which would play a decisive role in a nuclear conflict. This attempt to degrade the importance of conventional forces coincided with his 'adventurist' foreign policy. Khrushchev's policy between 1957 and 1962 has thus been variously described as 'missile diplomacy,' 'psycho-strategic warfare,' and 'rocket rattling.'[46]

The most significant development in Soviet Union was, however, not in the doctrinal domain but in the technological realm in the form of launching of 'Sputnik' space

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[44]'Nuclear Posture Review Report April 2010', Department of Defense, United States of America, available at http://www.defense.gov/npr/docs/2010%20nuclear%20posture%20review%20report.pdf

[45] Ken Booth, *Soviet Defence Policy,* in John Baylis, Ken Booth, John Garnett and Phil Williams eds., Contemporary Strategy – II, London, Croom Helm, 1987, p. 64.

[46]Ibid., p. 65.

craft in 1957,[47] which for the first time provided them the capability to directly threaten the US mainland with a pre-emptive or retaliatory strike thus enhancing the credibility of their strategic deterrence. Khrushchev, however, deliberately exaggerated the Soviet missile capability which caused the fear of a missile gap in the US wherein it was felt that the US was trailing behind the Soviet Union in the missile competition. This assessment led to a redoubling of the American effort to build up their missile capability. This reckless policy precipitated the Cuban Missile Crisis in 1962 which badly exposed Khrushchev's rhetoric and bluster and it was found that in reality it was not the US but the Soviet Union that was falling behind in the nuclear race.[48] From that point onwards Khrushchev relied more on arms control diplomacy which resulted in the formulation of the Partial Test Ban Treaty (PTBT) in 1963. Khrushchev was finally deposed in 1964. Despite all his failings he brought the Soviet Union out of isolation of the Stalin years and Soviet missile and air defence capabilities improved under his leadership.[49]

In the late 1960s and 1970s under Brezhnev and Kosygin the Soviet Union achieved parity with the United States in terms of strategic offensive forces and land based ICBMs. However, since Soviet ICBMs could carry heavier payloads and more powerful warheads they had an overall superior destructive potential. In addition to these achievements in the strategic forces the Soviets also enhanced the strategic airlift capabilities of their conventional forces and had strengthened the overall capabilities of their air force. These Soviet achievements led to the Strategic Arms Limitation Treaty (SALT) in 1972 which codified the strategic parity between the two super powers.[50]

In essence the Soviet strategy was meant to avert war failing which they were prepared to fight and win it by resorting to pre-emptive strikes to limit the damage likely to be caused by enemy's retaliatory strikes. The Soviets preferred war fighting and showed no inclination to embrace concepts such bargaining and limitation.[51] After the demise of the Soviet Union and the pre-eminence of US military power, the Russian Federation has increased its reliance on nuclear weapons as their conventional military capabilities have substantially declined overtime.

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[47]McInnes, op. cit., p. 152.
[48] Ken Booth, op. cit., p. 65.
[49]Ibid., p. 66.
[50]Ibid., p. 67.
[51]McInnes, op. cit., p. 154.

3.4.3 British Nuclear Strategy:

British strategic discourse characterised nuclear weapons as the 'great leveller' that could counter balance overwhelming Soviet advantage in conventional forces. After Churchill's return to power in 1951, Chiefs of Staffs prepared a 'Global Strategy paper' under the direction of Chief of Air Staff Sir John Slessor. The paper emphasised the 'massive retaliatory power of nuclear weapons while assigning a very minor role to the conventional forces,' in a way predating Dulles' Strategy of Massive Retaliation enunciated in 1954. This concept came under severe criticism by analysts such as P.M.S. Blackett, Liddell Hart and Anthony Buzzard. Buzzard on his part articulated a strategy of 'Graduated Response' making a distinction between tactical and strategic nuclear weapons. However, throughout the 1950s massive retaliation remained the official policy as was evident in the 1957 Defence White Paper which emphasised greater reliance on nuclear weapons and massive nuclear retaliation.[52]

The British debate also endeavoured to rationalise the need for an independent British nuclear deterrent. Doubts were openly aired about the credibility of American nuclear guarantees especially in the backdrop of the Suez crisis of 1956 in which the US had refused to endorse the joint Franco-British-Israeli operation. However, the limitations of the 'independent' deterrent became apparent when Britain purchased components for 'Blue Streak Missile', and after the abandonment of that project, acquired Skybolt missiles and Polaris submarines from the US. Consequently, the 1962 Defence White Paper adopted a more objective outlook, though the 1964 paper showed shades of Gaullist approach and Britain's position as a second centre of decision making was emphasised.[53]

According to Lawrence Freedman, "the attraction of this approach lies as much in its diplomatic convenience as in the rigour of its strategic logic. It allows Britain to maintain an independent force, while insisting that this is for the greater good of the alliance."[54] Ironically, the British 'independent' deterrence has long been dependent on the US supplied delivery systems from the Polaris SLBMs to the current Trident SLBMs and whatever new system the British government would choose to replace Trident missiles would also be acquired from the US.

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[52]Ibid, p. 155-56.
[53]Ibid., p. 156.
[54]McInnes, op. cit., p. 157.

3.4.4 French Nuclear Strategy:

The French nuclear policy like the British was also predicated on considerations of prestige and concerns about the credibility of the American nuclear guarantees based on the question whether the Americans would be willing to sacrifice New York and Washington for London and Paris. President De Gaulle's strategic approach was aimed at attaining French strategic autonomy and to restore its 'grandeur.' In his bid to justify the need for an independent French nuclear deterrent, General De Gaulle enunciated in 1964, the concept of "proportional deterrence" which has since then remained the centrepiece of French strategic doctrine. He argued that, in the nuclear realm there was no need to match the adversary bomb for bomb. Therefore, France can have an effective deterrent even with a nuclear force constituting a small proportion of American and Soviet arsenals. The basic requirement was to convince the aggressor of France's ability to survive a first strike and still cause unacceptable damage in a retaliatory strike. Early French doctrine was similar to the doctrine of massive retaliation wherein on identification of a major aggression by the enemy the complete French nuclear arsenal would be unleashed against adversary's cities. As with the US doctrine the French doctrine also underwent changes and provided the decision makers with more options to choose from rather than the only option of a spasm strike. These changes in approach were facilitated by the increasing size and variety of nuclear weapons and were premised on the understanding that with the availability of tactical nuclear weapons the conventional forces aided by the threat of use or actual use of tactical nuclear weapons would make the enemy pause. However, if the enemy pursued its offensive actions France would respond with the full might of its strategic nuclear forces – a kind of a delayed massive retaliation.[55]

In March 1969, in a speech at the French Military Academy, the new French Chief of Staff General Fourquet rejected the massive retaliation as well as the American doctrine of Flexible Response that required meeting the aggression with adequate force at various levels of conflict. Instead, he came up with the 'graduated deterrence' strategy that was designed to raise the threshold of nuclear use to an optimal level somewhere between the massive retaliation and flexible response. Fourquet was trying to find a balance between

[55]John Baylis, 'French Defence Policy,' in John Baylis, Ken Booth, John Garnett and Phil Williams, eds., Contemporary Strategy-II, London, Croom Helm, 1987, p. 185.

the all or nothing conception of massive retaliation and the watered down deterrence of flexible response.[56]

The actual or threatened use of tactical nuclear weapons was seen as enhancing the options for the decision makers. Once a major offensive was identified the tactical nuclear weapons would be used as a "shot across the bow" to convey the seriousness of the French resolve to escalate to a nuclear exchange if required. The process of change in French strategic thinking was carried forward by General Mery in his speeches delivered in 1976. He rejected the notion of 'total sanctuary' or 'Fortress France' for his new concept of 'enlarged sanctuary' which meant a forward battle, which would also entail greater coordination with NATO forces in Germany. Mery disapproved the massive retaliation and was amenable to a graduated deterrence strategy which closely resembled the Flexible Response strategy adopted by NATO in 1967.[57] According to John Baylis the 'demonstrative use' of tactical nuclear weapons remains an important feature of French policy. However, he also points out that President Giscard d'Estaing in the mid-1970s and General Fourquet before him had also hinted at the possibility for their use as battlefield weapons. There were critics like General Gallois who questioned the utility of tactical nuclear weapons as well as proponents such as Colonel Geneste who argued in favour of a well prepared tactical nuclear defence supported with shelters, concealment and deception measures to fight and defeat a Soviet offensive.[58] In Colin McInnes's view, however, General Guy Mery's strategy implied that tactical nuclear weapons were to be used as battlefield weapons rather than warning shots.[59]

French President Jacques Chirac announced a new French nuclear doctrine in January 2006 which has profound implications and major departures from traditional French doctrinal thinking. Some of the elements of the new doctrine had already been alluded to by Chirac in a speech in June 2001. The new doctrine emphasises France's new objective of deterring regional powers and its ability to employ more flexible and usable nuclear options. Basically the doctrine aims at deterring state sponsors of terrorism by threatening to cripple their 'capacity to act' by using techniques such as detonating nuclear

[56]Baylis, op. cit., p. 186.
[57]Ibid., p. 187.
[58]Ibid.
[59]McInnes, op. cit., p. 159.

weapons at very high altitudes to create a strong Electromagnetic Pulse (EMP) to destroy the targeted state's communications and command and control structures and using nuclear armed missiles with fewer warheads than they can carry. A significant aspect of the doctrine is inclusion of 'strategic supplies' as one of France's vital interests, whose disruption could evoke a nuclear response from France. As elaborated by then Foreign Minister Alain Juppe in 1995 any use of chemical or biological weapons against France would also be responded to with nuclear weapons. French policy in this regard is similar to the British and American policy. Bruno Tertrais, a prominent French analyst, had pointed out in 2003 that 'vital interests' principle could also be employed to deter attacks against France with conventional missiles through a nuclear response by France. These recent changes have greatly expanded the scope of French nuclear deterrent from its traditional objective of deterring great powers.[60]

3.4.5 Chinese Nuclear Strategy:

The Chinese chose to pursue their national nuclear programme as a result of failure of their erstwhile ally USSR to unambiguously support them during the Quemoy Crisis in 1958, while the US supporting Taiwan had openly threatened the use of nuclear weapons against the mainland Chinese targets in case of a Communist Chinese invasion of the islands.[61]The Sino-Soviet relations further deteriorated after the crisis and the Chinese leadership was convinced that they cannot rely on the Soviet support in any future crisis. They were also convinced that they would be subjected to nuclear blackmail in any future crisis as well. Therefore, they decided to acquire a nuclear capability of their own and conducted their first nuclear test in October 1964. However, the Chinese approach to nuclear weapons is unique and doesn't resemble either the Western or the Soviet thinking. Even after acquiring the nuclear capability Chinese defence strategy continued to depend mainly on the strength of their conventional forces and the people's war concept.

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[60]David S. Yost, 'France's New Nuclear Doctrine', *International Affairs (Royal Institute of International Affairs),* Vol. 82, No. 4 (Jul 2006), p. 701-721. Available at http://www.jstor.org/stable/3874154.Accessed on 12/01/2014.

[61] See http://www.globalsecurity.org/military/ops/quemoy_matsu.htm. Also see http://www.chinapost.com.tw/commentary/the%20china%20post/joe%20hung/2008/08/23/171420/Why-Quemoy.htm

Chinese were the first nuclear power to declare a minimum deterrence doctrine, a 'no first use policy,' and non-use of nuclear weapons against non-nuclear states. Since they did not view nuclear weapons as war fighting weapons, this doctrine suited their requirements very well. Consequently, they have maintained a rather small nuclear arsenal which is estimated to be around 250 weapons.[62] China was able to deter both the US and the Soviet Union with this small arsenal which constituted a very small fraction of their vast nuclear inventory, thereby proving the efficacy of the concept of minimum nuclear deterrence. Countries like Pakistan can learn useful lessons from the Chinese example. The Chinese have, however, not elaborated their nuclear policy beyond the aforementioned basic tenets. Similarly no details about the Chinese nuclear command and control structure are known except that the control of nuclear weapons stays with the Central Military Committee of the Chinese Communist Party.

3.4.6 Salient Features of Indian Nuclear Doctrine:

India's then National Security Advisor Brajesh Mishra announced what was termed as a Draft Nuclear Doctrine (DND) on 17 August 1999.[63] The six page document was prepared by the 32 member National Security Advisory board (NSAB) comprising former civil and military officials and academics nominated by the Indian government, under the leadership of veteran Indian strategic expert K. Subrahmanyam. It was announced that the document would have to be approved by the Indian government for it to become official policy. The salient features of the DND are as under:-

- India shall pursue a doctrine of credible minimum nuclear deterrence.
- India will have a 'no first use' (NFU) policy but will respond with punitive retaliation should deterrence fail.
- India will maintain sufficient, survivable and operationally prepared nuclear forces, capable of shifting from peacetime deployment to fully employable force in the shortest time.

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[62]McInnes, op. cit., p. 160-61.

[63] Draft Report of National Security Advisory Board on Indian Nuclear Doctrine, 17 August 1999, Appendix 4 to P.R. Chari, Sonika Gupta and Arpit Rajain eds., *Nuclear Stability in Southern Asia'*, Manohar, New Delhi, 2003, p. 184-88.

- A robust command and control system with effective intelligence and early warning capabilities would be established, for which space-based and other assets shall be created. Authority for the release of nuclear weapons will vest in the person of the Prime Minister of India, or his designated successor(s).

- Comprehensive planning and training for operations will be carried out in line with the strategy.

- India will demonstrate the political will to employ nuclear forces.

- Highly effective conventional military capabilities will be maintained to raise the threshold of outbreak of both conventional as well as nuclear war.

- India will have effective, diverse, flexible and responsive nuclear forces based on a triad of land based missiles, aircraft and sea based assets.

- Survivability will be ensured through redundancy, mobility, dispersion and deception.

- India shall not accept any restraints on its R&D capability and will continue to conduct sub-critical nuclear tests even if it decides to sign the CTBT at a future date.

- India will not use nuclear weapons against non-nuclear weapon states (NNWS), other than those which are aligned to any nuclear power.

The DND however, neither defined the country/countries against whom, India's deterrence was directed, nor did it outline the command and control structure. The document retained its draft status until on 04 January 2003 India's Cabinet Committee on Security (CCS) issued a one page document which besides providing the broad contours of India's nuclear command and control also reiterated some of the salient points of the DND with some nuanced changes. However, it has never been clarified whether DND has been superseded by the new document or whether those points of the draft doctrine that have not appeared in the new document have been discarded. For instance, the new document does not mention anything about operational preparedness, creation of space based assets for early warning, planning and training for nuclear operations or creation of a triad of land,

air and sea based forces. Neither does it talk of unrestrained R&D and conducting sub-critical tests. The important points of the new document are as follows:-

- Building and maintaining a *credible minimum deterrent*.
- A posture of *no first use*.
- Nuclear retaliation to a first strike will be *massive* and designed to inflict unacceptable damage.
- Retaliatory attacks can only be *authorised* by the *civilian political leadership* through NCA (Nuclear Command Authority).
- *No use of weapons against non-nuclear weapon states*.
- In the event of a major attack against *India or Indian forces anywhere*, by *biological* or *chemical* weapons, India will retain the option of *retaliating with nuclear weapons.*
- A continuance of *controls on export of nuclear and missile related materials* and technologies, *participation in the Fissile Materials Cut-Off Treaty negotiations* and observance of the *moratorium on nuclear tests*.[64]

A closer look at the new document reveals that India has declared its intention to retaliate with nuclear weapons against any use of chemical or biological weapons against India or Indian forces anywhere. This formulation has not only expanded the threshold of its nuclear use but extended its geographical scope beyond Indian-territory thereby, virtually negating the no first use and retaliatory nuclear use commitments. While the DND talked of a 'punitive retaliation' against a nuclear first strike against India, the new document has replaced it with a more aggressive 'massive retaliation.'

3.5 Evolution of Pakistan's Nuclear Doctrine:

The historical experience of other nuclear powers suggests that it is not possible to devise an enduring doctrine that is impervious to changes in the security environment or

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[64]Prime Minister's Office, Press Release 4th January 2003. http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003/r040120033.html. See also C. Raja Mohan, 'Nuclear Command Authority Comes into Being,' *The Hindu,* 05 January 2003.

technological breakthroughs. As a prime example the US nuclear doctrine continually changed from 'Massive Retaliation' (1954) to 'Flexible Response' (1963), to 'Mutual Assured Destruction' (mid 1960s onward), to 'Limited Nuclear Options' (early 1970s), to 'Countervailing Strategy' (late 1970s) to 'Prevailing Strategy' (early 1980s) and finally to 'Strategic Defence Initiative' in 1983. It would, therefore, be unfair to expect that the Pakistani nuclear doctrine will remain static. It is obvious from the historical experience and from lessons learnt during the first decade and a half of nuclearized South Asia that Pakistani nuclear doctrine would also continue to evolve and adjust to the ever-changing strategic landscape and advancements in weapons and their delivery systems. As it gains more experience and acquires more advanced and sophisticated technologies its doctrinal thinking will also undergo a metamorphosis. Despite the fact that Pakistan has the advantage of hindsight it is still too early for it to have found definitive answers to its nuclear dilemmas. The current situation should, therefore, be considered a transient phase in the evolving doctrinal thinking. It is also important to recognise that India and Pakistan are in a very close dyadic nuclear relationship and given their historic rivalry dominated by the 'action-reaction' syndrome, it is obvious that one country cannot remain oblivious to the developments in the other.

Peter R. Lavoy in his analysis of the premises of Pakistan's nuclear posture has stated that the fundamental principle of Pakistan's nuclear weapons policy was outlined by Z.A. Bhutto as far back as December 1974 citing his statement that: "Ultimately, if our backs are to the wall and we have absolutely no option, in that event, this decision about going nuclear will have to be taken." [65] It may however, be unfair to characterise this statement which implies a last resort policy, as a nuclear weapons' use policy mainly due to its timing. The statement was made at a time when Pakistan had just initiated its nuclear weapons effort and it was too early to predict whether Pakistan will ultimately succeed in its endeavour or not, given the almost insurmountable technological and political odds it was faced with. What Bhutto implied by 'going nuclear' at the time was not about the employment of nuclear weapons in war. He was, in fact, signalling to the United States that he would be compelled to seek the acquisition of a nuclear weapons capability unless

[65] Z.A. Bhutto reported in *The Pakistan Times*, 27 December 1974, quoted in Peter R. Lavoy, 'Islamabad's Nuclear Posture: Its Premises and Implementation', in Henry D. Sokolski ed., 'Pakistan's Nuclear Future: Worries Beyond War', January 2008, p. 135. Available at, http://www.StrategicStudiesInstitute.army.mil/

Pakistan's precarious security situation was addressed by removing sanctions and restrictions on the supply of conventional weapons. The American response, however, came a bit too late when in July 1976 on a mission to persuade Bhutto to retract his agreement to procure a nuclear reprocessing plant from France, Henry Kissinger offered to sell 110 A-7 fighter aircraft as a quid-pro-quo. The offer was, however, turned down by Bhutto on the counsel of his senior advisors.[66]

3.5.1 Early Thoughts:

In one of the earliest public articulations of what was considered to be a prospective nuclear doctrine for Pakistan, three former high-ranking officials including former Foreign Minister Agha Shahi, former Foreign Secretary and later Foreign Minister Abdul Sattar and former Air Chief, Air Marshal Zulfiqar Ali Khan published a joint newspaper article in October 1999. It cannot be definitively concluded whether the timing of the article was coincidental or it was in response to the announcement of India's Draft Nuclear Doctrine a few weeks earlier. However, given the fact that Pakistan had not declared any nuclear doctrine at the time, these former officials who by virtue of their senior positions had good insight and understanding of strategic issues[67] in all probability might have thought it prudent to provide a template for a Pakistani nuclear doctrine. Michael Krepon has also observed that the article was published after India's NSAB had released its DND document[68] implying that the article by these three senior former officials was in response to the enunciation of India's draft Nuclear Doctrine. It may also be pointed out that these veteran officials who were neither privy to nor part of the actual policy formulation post-1998,[69] rightly recognized that Pakistan cannot afford to squander its limited economic resources on building up an unnecessarily large arsenal exceeding Pakistan's legitimate

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[66] Abdul Sattar, *Pakistan's Foreign Policy 1947-2004*, Oxford University Press, Karachi,

[67]Agha Shahi had been part of the 3 member oversight & coordination committee established by Prime Minister Bhutto and retained by General Zia to oversee the Uranium enrichment project besides being the Pakistani representative in the Eighteen Nation Disarmament Committee and at the UN during NPT negotiations, Zulfiqar Khan was a former Chief of Air Staff and Abdul Sattar had been ambassador in Vienna and later Foreign Secretary.

[68]Michael Krepon, *Pakistan's Nuclear Strategy and Deterrence Stability,* Henry L. Stimson Center, 2012, p. 8. See http://www.stimson.org/images/uploads/research-pdfs/krepon_Pakistan_Nuclear_Strategy_and_Deterrence_Stability.pdf

[69]The draft nuclear doctrine and proposed command and control structure had been formulated by a small team of officers including this author at GHQ by end 1998. The documents were presented to the Prime Minister in April 1999 after approval by the Army Chief in February. However, the government had not accorded its formal approval until it was deposed on 12 October 1999. Incidentally the GHQ had also recommended a 'credible minimum deterrence' doctrine.

security needs. Therefore, they suggested that it should avoid entering into a futile arms competition with India, which it could never hope to win, arguing that:-

> "Although the precise contingencies in which Pakistan might use nuclear weapons have not been articulated or perhaps even defined by the government, the assumption has been that if the enemy launches a general war…threatening to occupy large territory or communication junctions, the 'weapon of last resort' would have to be invoked."[70]

They made a compelling case for 'minimum deterrence' by ruling out the possibility of nuclear war fighting considering it futile due to large disparity in the geographical sizes and resource bases of India and Pakistan, adding that:-

> "Deterrence was the sole aim and a small arsenal was considered adequate. At no time did Pakistan contemplate use of nuclear weapons for war fighting or seek to develop capability for a pre-emptive attack. Apart from the obvious constraint of resources, it was not so unrealistic as to entertain such thoughts. India is too large and too well armed to be vulnerable to a disabling strike. Besides, any such attempt would provoke retaliation with disastrous consequences. Pakistan's purpose warranted no more than a minimalist approach…"[71]

This line of argument clearly indicated a realistic approach to deterrence, keeping in view the existing power disparities vis-à-vis India. Interestingly, these analysts recommended a 'minimalist approach' in line with the common conception of 'minimum deterrence' and they did not use the term 'credible minimum deterrence' in their article. However, they refrained from suggesting any numbers to quantify the size of Pakistan's nuclear forces. They argued instead that *minimum deterrence* is not an abstract number, which remains constant, but rather a dynamic concept capable of changing with the changing circumstances thus opening up the possibility of an ever expanding arsenal. They thought the efficacy of Pakistan's deterrent could only be maintained by keeping the size of the force flexible, explaining that:

> "Minimum deterrence has been and should continue to be the guiding principle of Pakistan's nuclear pursuit. Of course minimum cannot be defined in static

[70]Agha Shahi, Zulfiqar Khan and Abdul Sattar, "Securing Nuclear Peace," *The News International*, October 5, 1999. Also reproduced in P.R. Chari, et al., eds., *Nuclear Stability in Southern Asia,* pp. 189-194.
[71]Agha Shahi, Zulfiqar Khan and Abdul Sattar, op. cit.

> numbers. In the absence of mutual restraints, the size of Pakistan's arsenal and its deployment pattern have to be adjusted, to ward off dangers of pre-emption and interception. Only then can deterrence remain efficacious."[72]

Speaking at a seminar at Islamabad in November 1999, one of the authors of the article, Abdul Sattar, who had by then become the Foreign Minister in the Government of General Pervez Musharraf, explained that Pakistan was compelled to go nuclear to deter aggression, prevent war, and to safeguard its peace and security. Its decision was in no way motivated by any pretensions to great power status or desire for regional domination. He emphasized Pakistan's determination not to get embroiled in a nuclear arms race with India, repeating the earlier statement that:

> "Minimum nuclear deterrence will remain the guiding principle of our nuclear strategy. The minimum cannot be quantified in static numbers. The Indian build up would necessitate review and re-assessment…But we shall not engage in any nuclear competition or arms race".[73]

This point was again reiterated during an international seminar on Command and Control of Nuclear Weapons held at Islamabad in February 2000, when former Foreign Minister Agha Shahi invoked the traditional *action-reaction syndrome* that has dominated Indo-Pakistani relations for over six decades. Arguing that, since India wanted to keep the size of its minimum deterrent flexible and subject to change with changing circumstances, Pakistan would perforce have to respond with equivalent flexibility in its own conception of a minimum deterrent.[74]

Foreign Minister Abdul Sattar provided further insight into Pakistan's nuclear doctrine while speaking at the National Defence College in May 2000 stating that:-

> "For the past decade or so, nuclear capability has been the bedrock of our defence and security policy...its sole purpose is to deter and prevent war. Unlike some other countries, Pakistan neither aspires to great power status or permanent membership of the Security Council nor nourishes any design for regional dominance…We support a global, non-discriminatory international regime of nuclear and missile restraints, voted for the CTBT [Comprehensive Test Ban Treaty], will participate in negotiations for FMCT [Fissile Material Cut off Treaty], and are prepared to

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[72] Ibid.
[73] Strategic Issues, Institute of Strategic Studies, Islamabad, March 2000, p. 2–3.
[74] Ibid.

> strengthen our existing stringent controls against export of strategic weapons technology. Our policy of Minimum Credible Deterrence will obviate any strategic arms race…the idea of no-first-use of nuclear weapons needs to be expanded into a no-first-use of force, lest the former should be interpreted to sanction first use of conventional weapons".[75]

The logic of dynamic and flexible deterrence constantly adjusting to any expansion in the adversary's arsenal is seemingly contradictory to the commonly understood conception of minimum deterrence and can potentially lead down a slippery slope towards an unintended arms race. It also opens up the possibilities of an open ended increase in the number of nuclear weapons.

Other hints on Pakistan's nuclear policy can be found in the statements made at the highest levels of leadership. Former President Musharraf, for instance, used the term "minimum defensive deterrence,"[76] in some of his statements, which apparently was meant to convey the same meaning as credible minimum deterrence, but with an emphasis on the defensive nature of Pakistan's nuclear deterrence. Highly placed Pakistani officials have suggested that the most credible and authentic source of Pakistan's nuclear policy and posture can be found in the Press Statements issues after the meetings of the National Command Authority (NCA).[77] Michael Krepon has also hinted at this by stating that, "Succinct authoritative reaffirmations of doctrine are usually embedded in press releases by the military's Inter Services Public Relations (ISPR) Directorate after missile flight tests or after meetings of Pakistan's National Command Authority (NCA)."[78] Moreover, Pakistani officials have repeatedly stated that Pakistan's nuclear policy is built around the twin principles of *restraint* and *responsibility*[79] and is driven by its security concerns, in a bid to highlight the contrast with India's pretensions to global power status. Pakistan has

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[75] Abdul Sattar, address at the National Defence College, Islamabad, May 24, 2000.
[76] 'No Compromise on minimum deterrence', *The News,* Islamabad, April 6, 2005.
[77] Author's interviews with very senior officials at the NCA on August 7, 2012. See https://www.ispr.gov.pk/front/main.asp?o=t-nca_press_release_archive
[78] Michael Krepon, op. cit., p. 8.
[79] Lieutenant General Khalid Ahmed Kidwai, 'Pakistan's Evolution as A Nuclear Weapons State', address at CCC, 27 October 2006. http://www.nps.edu. Also see the Press Release issued after the 16th NCA meeting on January 13, 2010, No PR11/2010-ISPR available at https://www.ispr.gov.pk/front/main.asp?o=t-nca_press_release_archive

also made it clear that its nuclear deterrence is aimed at India,[80] which makes its calculations much simpler as compared to India which has to take into account China as well.

In January 2002, in the midst of the brewing crisis with India, following a militant attack on the Indian parliament, Lieutenant General Khalid Ahmed Kidwai, Director General of the Strategic Plans Division, gave a rare interview to two visiting Italian scientists. When repeatedly pressed by the visitors during the interview to elaborate Pakistan's potential nuclear 'red lines' he explained the thresholds, a combination of some or all of which could potentially create a situation wherein Pakistan's very existence is imperilled, could trigger a Pakistani nuclear response. The four thresholds are as under:-

- India attacks Pakistan and conquers a large part of its territory (space threshold).
- India destroys a large part either of its land or air forces (military threshold).
- India proceeds to the economic strangling of Pakistan (economic strangling – *which could be in the form of a naval blockade or disrupting water supplies from the Indus rivers system*).
- India pushes Pakistan into political destabilisation or creates a large-scale internal subversion in Pakistan (domestic destabilisation).[81]

In addition to the description of Pakistan's possible nuclear thresholds, General Kidwai also highlighted that Pakistan's nuclear weapons are kept separate from their delivery systems but these can be assembled quickly. He also said that nuclear artillery is not part of the Pakistani nuclear plans *'at the moment'* adding that there are a range of nuclear use options and that control of the nuclear weapons would not be delegated.[82] When the interview was posted on the website of the Italian think tank it immediately triggered a debate. The main criticism was focused on the thresholds, which were considered by critics such as Ejaz Haider, to be too broad and too vaguely defined and they especially found the fourth threshold incomprehensible. However, Pakistan's history tells us that such internal subversion had preceded India's military intervention in the erstwhile East Pakistan in 1971. In a scathing critique of Pakistan's nuclear strategy, which he

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[80] P. Cotta-Ramusino and M. Martellini, *A Concise Report of a Visit by Landau Network Centro Volta, Nuclear Safety, Nuclear Stability and Nuclear Strategy in Pakistan,* January 2002, Landau Network Centro Volta, Como, Italy, January 21, 2002, http://www.centrovolta.it/landau/, also see Krepon, op. cit., p. 7.
[81] P. Cotta-Ramusino and M. Martellini, Landau Network Centro Volta, Como, Italy, January 21, 2002, http://www.centrovolta.it/landau/
[82] Ibid.

considered to be 'flawed' Ejaz Haider termed the fourth scenario as "outlandish and vague". He thought that:

> "Pakistan wants to create deterrence stability in a situation of perpetual conflict and threatens, if deterrence were to break down, to escalate to nuclear level. By creating a linkage between nuclear capability and sub-conventional warfare, it has sought to bring the nuclear threshold down and make space for low intensity conflict without the fear of having to fight a large scale conventional conflict." [83]

He did not subscribe to the view that the ongoing military stand-off between India and Pakistan meant a deterrence failure but considered the Pakistani nuclear strategy flawed because in his view it had failed to prevent India from following a policy of military brinkmanship and coercive diplomacy to extract concessions from Pakistan over its Kashmir policy.[84] On the other hand, Rodney Jones in a rejoinder to Haider's article argued that:

> "This outline of Pakistan's nuclear deterrence posture is an entirely credible statement of nuclear deterrence strategy, proportioned to Pakistan's military capabilities and overall security situation. Kidwai's statement contains no hint of vital 'forward' objectives, offers no nuclear umbrella to regional neighbours and places no tactical nuclear rungs low down in the India-Pakistan nuclear escalation ladder. It begs the question of course how Pakistan's operational nuclear assets may influence interaction with India during a confrontation or whether low-intensity operations by either side are made easier by the nuclear shadow. But it contains no promise that Pakistan's nuclear deterrence can prevent Indian military brinkmanship or related political gains." [85]

A few months later President Pervez Musharraf in an interview with the German magazine *Der Spiegel* reiterated the core assertion of General Kidwai's interview with the Italians about contemplating the use of nuclear weapons only when Pakistan's very existence was at stake stating that:-

> "Nuclear weapons are the last resort. I am optimistic and confident that we can defend ourselves with conventional means, even though the Indians are buying up the most modern weapons in a megalomaniac frenzy…Nuclear weapons could be

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[83]Ejaz Haider, 'Stable Deterrence and flawed Pakistani nuclear Strategy', *The Friday Times*, February 08-14, 2002. www.thefridaytimes.com.
[84] Ibid.
[85] Rodney W. Jones, 'Is stable nuclear deterrence feasible'? *The Friday Times,* February 22-28, 2002. www.thefridaytimes.com.

> used…If Pakistan is threatened with extinction, then the pressure of our countrymen would also be so big that this option, too would have to be considered."[86]

3.5.2 Gradual Maturing of Ideas:

Pakistan's nuclear doctrine seeks to not only counter Indian nuclear threat but also to deter a conventional military aggression by India, thereby using nuclear weapons as an equaliser to nullify the conventional asymmetries stacked in latter's favour. This fact was acknowledged by, former Indian Minister for External Affairs, Jaswant Singh, while addressing a seminar in New Delhi. He said that, "The question that troubles us is that the 1998 nuclear tests by India conferred a kind of parity to Pakistan that it always sought...explaining that this parity had come about as the deterrent quotient had been altered after the nuclear tests."[87] Some analysts however, ascribe another and more sinister objective to Pakistani nuclear doctrine, which is, to pursue a relentless sub-conventional conflict against India. In order to force it to a resolution of the Kashmir dispute, hoping that India will be unable to raise the stakes due to fear of nuclear escalation.

In another public articulation of Pakistan's nuclear doctrinal goals, after the often-cited interview with the Italian scientists, Lieutenant General Khalid Ahmed Kidwai, dealt with the issue in an address at the Centre for Contemporary Conflict at the Naval Postgraduate School at Monterey, California. He stated that, Pakistan's nuclear strategy is defensive, based on credible minimum deterrence and driven by its security concerns, adding that, 'Pakistan's nuclear policy is based on *restraint* and *responsibility* with the following main objectives:-

- Deterrence of all forms of external aggression.
- Ability to deter a counter-strike against strategic assets.
- Stabilisation of strategic deterrence in South Asia.
- [*Employment of a combination of*]Conventional and Strategic deterrence methods.[88]

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[86]Roger Boyes, "Musharraf Warns India He May Use Nuclear Weapons,' *Times Online,* 8 April 2002, available at http://www.nci.org/02/04f/08-06.htm , quoted in Peter R. Lavoy op. cit.
[87]Jaswant Singh, '1998 Tests gave parity to Pakistan', Press Trust of India/Sunday, November 28, 2010. http://www.dnaindia.com/india/report_1998-nuclear-tests-gave-parity-to-pakistan-jaswant-singh_1473590-all
[88] Lieutenant General Khalid Ahmed Kidwai, 'Pakistan's Evolution as A Nuclear Weapons State', address at CCC, 27 October 2006. http://www.nps.edu.

This statement displays greater clarity in terms of the use of appropriate strategic jargon, unambiguously articulates the perceived objectives of the nuclear doctrine and is indicative of a gradual learning process with the passage of time that could be termed as learning through experience and habituation or what Russell J. Leng has termed as 'experiential learning'.[89] However, as pointed out earlier, doctrines are prone to changes owing to changes in the overall security environment, technological developments and in response to changes in adversary's disposition. Likelihood of this happening in South Asia is even greater, due to the turbulent regional security landscape as a result of spill over of the on-going war on terror in Afghanistan and tribal areas of Pakistan, as well as the pervasive influence of the action-reaction syndrome over the India-Pakistan security relationship.

Michael Krepon has identified four underlying principles of Pakistani nuclear doctrine as under:-

- First, they assert that Pakistan's nuclear deterrent is India-specific.
- Second, Pakistan has embraced a doctrine of credible, minimum deterrence.
- Third, the requirements for credible, minimal deterrence are not fixed; instead, they are determined by a dynamic threat environment.
- Fourth, given India's conventional military advantages, Pakistan reserves the option to use nuclear weapons first in extremis.[90]

However, he does not seem to be fully convinced of the first principle arguing that, "Pakistan's nuclear arsenal is not entirely 'India specific.' Pakistani officials have occasionally expressed concerns about Israeli and US designs against their nuclear capabilities – designs that presumably also require deterrence in some fashion."[91]

3.6 India's Espousal of The New Conventional War Doctrine:

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[89] Russell J. Leng, 'Bargaining and Learning in Recurring Crises', Ann Arbor, The University of Michigan Press, 2000.

[90] Michael Krepon, *Pakistan's Nuclear Strategy and Deterrence Stability*, http://www.stimson.org/images/uploads/research-pdfs/Krepon__Pakistan_Nuclear_Strategy_and_Deterrence_Stability.pdf December 10, 2012, p. 7.

[91] Ibid. p. 8.

In 2001-02 India had carried out the largest mobilisation of its military forces since the 1971 war, in response to the terrorist attack on its parliament,[92] triggering a counter mobilisation by Pakistan.[93] This led to a ten month long military stand-off between the two countries, with over a million soldiers facing each other across the India-Pakistan borders. However, India could not undertake any military operation, because, due to lack of territorial depth Pakistan was able to move its forces to the borders in a comparatively shorter time, denying India the advantage of surprise. To preclude a similar situation in future, Indian military came up in 2004, with what has come to be known as the *Cold Start Doctrine*.[94] The doctrine is aimed at cutting down the mobilisation time, by pre-positioning offensive forces to forward locations, reorganising these into smaller more agile battle groups and providing the defensive corps with inherent offensive capability to enable them to launch limited offensive operations. The doctrine is designed to enable the launching of quick but shallow thrusts on multiple axes with a view to denying any prior warning time to Pakistan. The shallow thrusts are meant to avoid crossing Pakistan's nuclear red lines.[95]But it is not clear as to how those red lines would be identified. More recently, Indian officials have in public statements denied the existence of a 'Cold Start Doctrine' explaining that no such doctrine has been officially sanctioned by the Indian government. They have instead been talking about an operational doctrine which has been termed as '*proactive operations.'*[96]The doctrine irrespective of its name carries the same implications and has been tested in large-scale field exercises and war games every year since its inception. This has been viewed in Pakistan, as an attempt by the Indians to find a space

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[92]'The Day India Was Attacked,' *India Today,* December 24, 2001. Available at http://media2.intoday.in/indiatoday/ParliamentAttack.pdf , Harish Khare, 'Suicide squad storms Parliament; 5 militants killed; Army deployed,' *The Hindu,* December 14, 2001 and 'Troop mobilization almost complete,' *The Hindu,* December 31, 2001.

[93]Peter R. Lavoy, 'Islamabad's Nuclear Posture: Its Premises and Implementation', op. cit., p. 132. Available at, http://www.StrategicStudiesInstitute.army.mil/

[94] For a very comprehensive and detailed description of the Cold Start Doctrine, see Walter C. Ladwig, 'A Cold Start for Hot Wars', *International Security*, Vol. 32, No.3, Winter 2007/08, p. 158-92.

[95]Ibid.

[96]Dr. Maleeha Lodhi, 'Pakistan's nuclear compulsions,' *The News International,* November 06, 2012. http://www.thenews.com.pk/Todays-News-9-141314-Pakistan%25E2%2580%2599s-nuclear-compulsions Also see Dhruv C Katoch, 'Future Conflict: Doctrine is the Enabler,' Claws Journal, New Delhi, Spring 2013, p. viii-x http://www.claws.in/images/journals_doc/Future%2520Conflict%2520Doctrine%2520is%2520the%252..., Rajat Pandit, 'Army reworks war doctrine for Pakistan, China,' *The Times of India,* December 30, 2009.http://timesofindia.indiatimes.com/india/Army-reworks-war-doctrine-for-Pakistan-China/artic. And David Slungaard, Revisiting Cold Start – Weighing Strategic Shifts in South Asia, http://csis.org/blog/revisiting-cold-start-weighing-strategic-shifts-south-asia

below Pakistan's nuclear threshold, for a limited conventional war.[97] Pakistan feels that a full blown nuclear response to shallow thrusts into its territory by the Indian ground forces, would be seen as a disproportionate response and would therefore, be less credible.[98] However, one could argue that, the credibility of Pakistan's nuclear deterrence remained intact, even after India's adoption of the Cold Start doctrine and this was amply proven in the aftermath of Mumbai terrorist attacks in November 2008. Though, the Cold Start doctrine was being rehearsed since 2004, India could not actuate it and instead resorted to threatening surgical airstrikes against alleged terrorist training camps in Pakistan. In the end, even that option could not be exercised, due to the ever-present danger of nuclear escalation. However, the Pakistani strategic planners thought otherwise and responded according to their own perception of the threat.

3.7 Pakistan's Response to Its Changing Threat Environment:

On 19th April 2011, Pakistan conducted the maiden test of a newly developed short-range ballistic missile called 'NASR' (HATF-IX) with a range of 60 kilometres. The missile can be fired from a multi-tube launcher mounted on a mobile carrier. A press statement issued by the Inter Services Public Relations Directorate on the occasion, described the missile as a quick reaction weapon, capable of carrying nuclear warheads of appropriate yields. The Director General of Strategic Plans Division who was present at the test site to witness the test stated that, "this test has consolidated Pakistan's nuclear deterrence at all levels of threat spectrum."[99] This statement, apparently indicated, that the new weapon system was intended for employment on the battlefield. The test generated an animated media debate amongst the proponents and opponents of the development. The analysts, supportive of the NASR argued that it was a logical response on Pakistan's part

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[97]Mansoor Ahmed, "Why Pakistan Needs Tactical Nuclear Weapons," *Weekly Pulse,* May 6, 2011. http://www.weeklypulse.org/details.aspx?contentID=563&storylist=9. Also see Usman Ansari, "Pakistan Missile Test Underscores Need for Deterrence," *Defense News,* June 1, 2012. http://www.defensenews.com/apps/pbcs.dll/article?AID=2012306010001 and Dr. Adil Sultan, 'NCA's Full Spectrum Response,' *The Express Tribune,* November 7, 2013.

[98]Adil Sultan, 'Pakistan's emerging nuclear posture: impact of drivers and technology on nuclear doctrine,' *Strategic Studies,* Institute of Strategic Studies, Islamabad, vol. XXXI & XXXII, Winter 2011 & Spring 2012, nos. 4 & 1, p. 163.

[99] Inter Services Public Relations, Pakistan, Press Release No. 94/2011-ISPR. http://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721#pr_link1721

to India's provocative and threatening 'Cold Start War Doctrine.' Senior Pakistani officials have been quoted as saying that 'NASR' was meant to pour cold water over 'Cold Start.'[100]The critics on the other hand viewed it as a destabilising development that would enhance the probability of a nuclear war in South Asia.[101] Irrespective of the view one subscribes to, there is no doubt in the fact that Pakistan has inexorably embarked upon the development of a battlefield usable nuclear weapons capability. At the declaratory level however, Pakistani government spokesmen continue to reiterate Pakistan's policy as 'credible minimum deterrence' which is a form of 'simple punishment' model of deterrence, whereas use of battlefield nuclear weapons is part of 'deterrence by denial' or war fighting model of deterrence. Each one of these models has very different demands in terms of size of arsenals, command and control and battlefield management. However, this apparent dichotomy in the declaratory doctrine and actual force posture is yet to be clarified by Pakistani strategic planners.

The transformation of the Pakistani doctrine, has not escaped the attention of the Indians. In an article in *The Hindu,* former Indian foreign secretary Shyam Saran who is currently the Chairman of India's National Security Advisory Board (NSAB), has commented that:-

> "During the past decade, there have been notable shifts in Pakistan's nuclear doctrine, away from minimum deterrence to second strike capability and towards expanding its nuclear weapons arsenal to include both strategic and tactical weapons. Islamabad has described these developments as consolidating Pakistan's deterrence capability at all levels of threat spectrum."[102]

He goes on to cite, the shift from uranium based weapons to plutonium based weapons, development and testing of short range missiles such as Abdali (180 kilometres) and NASR (60 kilometres), improved accuracy of delivery systems and more reliance on solid fuelled missiles. However, he is reluctant to concede that the 'tactical' nuclear weapons are a response to India's 'Cold Start' doctrine and argues that, Pakistan is using it

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[100]Feroz Khan, Eating Grass, Stanford, Stanford University Press, 2012, op. cit. p. 396.
[101]For a balanced view see, Rodney W. Jones, 'Pakistan's Answer to Cold Start? The Friday Times, Lahore, May 13-19, 2011. Mansoor Ahmed, 'Why Pakistan Needs Tactical Nuclear Weapons', *Weekly Pulse,* 6 May 2011 represents a supportive view. Ejaz Haider, 'Stupidity Goes Nuclear I & II', The Express Tribune, Lahore, 26 & 27 April 2011, typifies the critical views.
[102]Shyam Saran, 'Dealing with Pakistan's brinkmanship', *The Hindu,* December 7, 2012.

as a cover to expand its nuclear arsenal to deal with the proven US capability and its suspected intentions to disable or seize Pakistani nuclear weapons. He also threatens in no uncertain terms, a massive retaliation to even a tactical use of nuclear weapons by Pakistan declaring that:-

> "Whatever sophistry Pakistan may indulge in to justify its augmented arsenal and threatened recourse to tactical nuclear weapons, for India the label on the weapon, tactical or strategic, is irrelevant since the use of either would constitute a nuclear attack against India. In terms of India's stated nuclear doctrine, this would invite a massive retaliatory strike. For Pakistan to think that a counter-force nuclear strike against military targets would enable it to escape a counter-value strike against its cities and population centres, is a dangerous illusion."[103]

Coming from a senior former official and especially due to his influential position as Chairman of NSAB and in the recent past, as India's chief negotiator during the deliberations with the US on India-US nuclear deal, this statement cannot be lightly brushed aside. Such strident rhetoric would, however, serve no purpose other than further vitiating the already tenuous strategic environment in the region. Some Indian analysts have taken into account the catastrophic consequences of a disproportionate response, which would certainly invite a devastating Pakistani strike. They view a massive response to, for instance, a Pakistani nuclear use against Indian forces on its own soil, as disparate and have suggested a more proportionate 'tit for tat' retaliation as an alternative.[104]

Krepon has also noted recent subtle changes in Pakistan's articulation of its nuclear policy, wherein Pakistani officials have added to the usual credible minimum deterrence enunciations, formulations such as, *"full spectrum deterrence"* and "*deterrence at all levels of threat spectrum,"* which in their opinion requires "*flexible deterrence options*."[105]

An important question related to Pakistan's apparent change of course in its approach towards its nuclear doctrine that needs to be addressed is: what compelled Pakistan to alter its earlier views about the need or desirability of battlefield nuclear weapons and to shift its doctrinal emphasis from deterrence by simple punishment to a more exacting deterrence by

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[103]Shyam Saran, op. cit.
[104] Ali Ahmed, 'Tit for Tat: A Nuclear Retaliation Alternative', *Institute for Defence Studies and Analyses, October 3, 2011.* http://www.idsa.in/idsacomments/TitforTatANuclearRetaliationAlternative
[105]Michael Krepon, 'Pakistan's Nuclear Strategy and Deterrence Stability', December 2012, p. 6.http://www.stimson.org

denial strategy? The first and fore-most, is obviously, India's advocacy of a 'proactive' or 'Cold Start' doctrine which has created the perpetual threat of a surprise attack by India. This alone, might possibly have evinced a different approach from Pakistan, as long as it could retain a manageable conventional forces balance with India. The threat has been compounded, both psychologically and physically, by a prolonged commitment of almost 1/3rd of Pakistan's military forces in counter-terror/counter-insurgency operations in the tribal areas along its border with Afghanistan. With no end in sight to that commitment, the thinning of forces from the eastern border with India has created a vulnerability that can be very tempting for India, to exploit in a future crisis. It may be worth pointing out here that during the military crisis with India in 2001-02, Pakistan was compelled to pull out bulk of its forces from the western borders at a very critical time, while the famous 'Tora Bora'[106] operation was underway along the Pak-Afghan border.

In opting for the battlefield nuclear weapons, Pakistan seems to have taken a cue from a very respectable British thinker and practitioner of nuclear strategy, Sir Michael Quinlan. Quinlan has argued on the basis of NATO's reasoning, that wars cannot be fought in 'sealed compartments,' and has suggested that the possibility has to be kept open, that the defender can exercise the option of escalating the conflict to a level not envisaged by the attacker.[107] A Pakistani security analyst Brigadier ® Shaukat Qadir, criticising the escalatory dynamic inherent in the Cold Start doctrine, also made a somewhat similar point, stating that, "Wars, unfortunately, cannot be fought in 'halves' or 'quarters'. That is the basis of opposition to these concepts of punitive strikes and limited wars, terms carefully avoided in the concept [Cold Start] but in fact attempting to actualise them."[108]

Pakistan's development and field testing of Hatf-II (Abdali) and Hatf-IX (NASR) seem to fit well with Quinlan's advice that: "….the range of options available must therefore be an unmistakable continuum without huge gaps. That in turn meant that there had to be nuclear forces, backed by will and doctrine for their possible use, intermediate

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[106]Tora Bora was a complex of caves and tunnels in Eastern Afghanistan where Osama Bin Laden and his Al-Qaeda fighters had taken refuge and were subjected to heavy aerial bombing by US forces. However, Osama along with his close associates managed to escape into Pakistani tribal areas because of thinning out of forces on the Pakistani side.

[107] Michael Quinlan, 'Thinking about Nuclear Weapons – Principles, Problems, Prospects', Oxford University Press, Oxford, 2009, p. 36.

[108] Brigadier ® Shaukat Qadir, 'Cold Start: The Nuclear Side', *Daily Times,* May 16, 2004.

between conventional forces and the ultimate strategic nuclear capability."[109] NATO's political and geographical compulsions in the central European theatre of operations, which constrained its ability to give up any space even for sound operational reasons, forced upon it a forward defence posture not unlike Pakistan's situation. Quinlan argues that, "the only available options, surrender apart, plainly had to envisage the use of nuclear weapons in some way." [110] He is also opposed to, what is commonly termed as, a 'demonstrative use,'[111] because, it will be seen by the adversary as a lack of will and determination, which is an important component of a credible of deterrence.[112] Pakistan can justifiably draw comparison between NATO's compulsions and its own dilemmas and therefore feels compelled to exhibit a high probability of nuclear use in the event of a military conflict with India. Some Pakistani analysts,[113]whose thinking is still rooted in the ideas of the 1960s, suggest a 'demonstrative strike' in an unpopulated desert area to show resolve, but it will be counter-productive precisely for the reason explained by Michael Quinlan.

In by far the most cogent explanation of Pakistan's new nuclear doctrinal thinking, a Pakistani nuclear analyst with a good insight into the thinking of the Pakistani nuclear establishment, has talked of Pakistan's quest for assured deterrence in view of India's doctrinal preference for Cold Start and Pro-active operations. He acknowledges that, introduction of battlefield nuclear weapons will lower the nuclear threshold, and raise the probability of a nuclear war. However, he argues that allowing space for a limited conventional war, is also bound to lead to a nuclear exchange[114] and goes on to explain that:-

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[109] Quinlan, op. cit. p. 36.
[110]Ibid, p. 37.
[111] The idea of using tactical nuclear weapons as 'warning shots' was initially adopted by France in its 1972 Defence White Paper during Pompidou's presidency. However, it was dropped after a review of the French defence policy once Giscard d'Estaing became President in 1974 and it was decided that 'tactical' nuclear weapons would be used in actual battle rather than for demonstrative purposes or the so called 'warning shots.' See Colin McInnes and G.D. Sheffield eds., 'Warfare in the Twentieth Century – Theory and Practice', London, Unwin Hyman, 1988, p. 159.
[112] Quinlan, p. 38.
[113] See for instance, Sardar F.S. Lodhi, 'Pakistan's Nuclear Doctrine', *Defence Journal,* Karachi. http://www.defencejournal.com/apr99/pak-nuclear-doctrine.htm
[114]Adil Sultan, 'Pakistan's Emerging Nuclear Posture: impact of drivers and technology on nuclear doctrine', *Strategic Studies,* Institute of Strategic Studies, Islamabad, vol. XXXI & XXXII, Winter 2011 & Spring 2012, nos. 4 & 1, p. 154.

> "Pakistan's earlier posture of responding massively with nuclear weapons to cause unacceptable damage appeared to be a disproportionate response, especially against limited incursions by the Indian troops. On the other hand, if Pakistan did not respond, it could discredit its nuclear deterrence. From a Pakistani perspective these perceived gaps at the operational and tactical levels therefore, needed to be plugged – to deny India the space to launch limited military operations in the form of CSD. NASR provides Pakistan's National Command Authority additional options during the times of crisis other than retaliating with full force."[115]

His explanation of current Pakistani policy appears to be self-contradictory. His formulation of 'massive response' to cause 'unacceptable damage' is in contravention to Pakistan's pronounced policy of a 'credible minimum deterrence' which has been in vogue since 1998. He seems to have mixed up causing 'unacceptable damage' with 'massive retaliation.' Whereas massive retaliation could cause widespread destruction – similar to assured destruction, unacceptable damage can comparatively be at a much lower scale and can be achieved with a minimal deterrence capability. He goes on to insist that Pakistan is acquiring 'operational' and 'tactical' level deterrence capability in addition to strategic deterrence to achieve what he terms as a "strategy of assured deterrence."[116] One could, however, argue that as war cannot be fought in halves and quarters or compartmentalised into different boxes similarly deterrence should not be divided into tactical, operational and strategic compartments. Deterrence is all encompassing and overarching and casts its long shadow over the whole spectrum of conflict as has been proven in 2001-02 and in the aftermath of the Mumbai attacks in November 2008. There was no reason for Pakistan to lose confidence in the efficacy of its deterrence. This Pakistani reaction has apparently been precipitated as mentioned earlier by the combined effect of the Cold Start Doctrine and the prolonged counter terrorism operations and facilitated by technological success in miniaturisation of nuclear warheads.

To justify Pakistan's emerging nuclear posture, Stephen Cohen's comments, that Pakistan's current nuclear doctrine resembles that of the United States in the 1950s with elements such as possible first use and 'tactical use' of nuclear weapons against attacking

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[115]Ibid, p.159.
[116]Ibid, p. 160.

conventional forces, have been cited.[117] However, this does not accurately depict the reality. First, the above mentioned comments were made by Stephen Cohen in 2004, when Pakistan was neither in possession of battlefield nuclear weapons whether of tactical or operational genre nor was it talking about battlefield use of nuclear weapons. In fact, in the often-cited interview with Italian analysts General Kidwai had ruled out any need for tactical nuclear weapons. Second, there is a significant difference between 'tactical nuclear weapons' and the 'tactical use' of nuclear weapons. Whereas tactical nuclear weapons denote small low yield weapons, tactical use of nuclear weapons is neither dependent on the size nor on the yield of the weapons, as long as these have a direct impact on the battlefield. NATO's analogy may therefore, be misleading in some respects, especially the configurations of weapon systems, as some of the 'tactical' nuclear weapons in NATO's inventory, especially the air delivered gravity bombs, have yields of 200 kilotons or more. It is therefore, a technically flawed argument that NASR is designed to carry low yield or sub-kiloton nuclear weapons for "destroying strong Indian armoured thrusts inside Pakistani territory." [118]

The ability of low yield nuclear weapons to destroy Indian tanks is limited to the extent of being inconsequential and to cause a substantial damage to a well dispersed attacking armoured formation a large number of 15-20 kiloton yield weapons would be required.[119] Any attacking armoured force mindful of a possible nuclear strike by the adversary would disperse its tanks more than the normal spacing except at choke points such as bridges or when they are preparing to break out of a bridgehead. One thing is clear, however, that low yield weapons envisaged to be mounted atop NASR are not likely to make much physical impact unless used in large numbers. Their psychological impact may be out of proportion to their capability but cannot be anticipated.

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[117] Stephen Philip Cohen, 'The Idea of Pakistan', Washington, DC, Brookings Institution, 2004, p. 103 quoted in Adil Sultan, op. cit. p. 160.

[118] Mansur Ahmed, 'Why Pakistan needs tactical nuclear weapons', *Weekly Pulse,* Islamabad, May 6, 2011, quoted in Adil Sultan, op. cit. p. 161.

[119] Two physicists have calculated that a 15 kiloton weapon can destroy 55 tanks, 100 metres apart; if 300 metres apart it would take 8 weapons. They contend that to kill 500 tanks, 100 weapons of 15 kilotont would be needed. Such concentration of tanks is not envisaged in cold start. See A.H. Nayyar and Zia Mian, 'The Limited Military Utility of Pakistan's Battlefield Use of Nuclear Weapons in Response to Large Scale Indian Conventional Attack', *Pakistan Security Research Unit* (PSRU), Brief Number 61, November 11, 2010. Since the study predates the testing of NASR, it has not taken into account the impact of use of low yield weapons.

The emerging Pakistani doctrine of "assured deterrence" and "flexible deterrence options" does not seem to be very different from US and NATO's Strategy of 'Flexible Response,' which was also termed as 'Graduated Response' by the European allies. The US abandoned the strategy in favour of 'Mutual Assured Destruction' after only two years of its inception. However, NATO has clung to it because they saw in it a means of linking the European battlefield with the American strategic nuclear deterrence. They thought that without the battlefield and theatre nuclear weapons it would entail a big jump from the conventional battlefield in Europe to the US strategic deterrence, and the Americans may shy away from using their strategic deterrence without this linkage. The flexible response strategy was flawed because it could only have worked in case the Soviets also agreed to play by the same rules. However, as pointed out by the critics there was nothing stopping the Soviets from going straight to a strategic nuclear response to a battlefield or theatre use of nuclear weapons. Will India be prepared to play the game by the rules stipulated by Pakistan? If 'flexible deterrence options' denote a strategy similar to the US strategy of 'limited nuclear options' adopted during the Nixon presidency in the 1970s it will again be at cross purposes to the 'credible minimum deterrence' since limited nuclear options was a nuclear war fighting strategy entailing a large and diversified nuclear arsenal.

In case India responds proportionately to a Pakistani first use of nuclear weapons claiming the high moral ground by displaying restraint while continuing to press on with its conventional operations, an escalation to a wider nuclear exchange will be inevitable. Pakistani planners seem to have placed the onus on the Indians to prevent further nuclear escalation. They have also argued that, in case India takes counter measures against Pakistani policy of using battlefield nuclear weapons to deter India's cold start or proactive operations, it will destabilise the strategic equilibrium in South Asia.[120] This appears to be an unfair expectation on part of Pakistani planners and they would do better not to bank on this. Pakistan could have and even now should explore other options to respond to India's provocative conventional war doctrine. One option to mitigate the threat would be to negotiate joint mechanisms with India, to stifle as far as possible, the ability of the non-state actors to carry out cross border actions, in return for India's agreement to give up its aggressive cold start or proactive operations doctrines. The second option would be to

[120]Adil Sultan, op. cit. p. 164.

explore 'limited nuclear options'[121] type of nuclear strategy, which could be adopted in conjunction with the first option or by itself.

3.8 Has there been any Doctrinal Learning in Pakistan?

While it will remain a moot point whether evolutionary changes in Pakistan's nuclear doctrinal thinking could be categorised as normative or non-normative, there is sufficient evidence to suggest that a considerable amount of 'simple' learning has taken place. As for the manifestations of this learning, the nuclear factor is now an integral part of the teaching and war-gaming in the curriculum of National Security and War Course at the National Defence University.[122] At the same time, the conventional and nuclear war strategies have been closely integrated[123] through several war games, by the Pakistani military. Requisite command and control arrangements have also been developed for employment of nuclear weapons in war, which would be discussed in detail in the next chapter. As Quinlan has pointed out, NATO's nuclear strategy evolved over an extended period of time exceeding three decades[124] and by that standard India and Pakistan still have some distance to traverse along the nuclear learning curve. He acknowledges though that: "there have clearly been, learning and development processes underway, but published information does not say how far they have gone save in a few limited respects." [125] He further adds that**,** "in both countries strategic affairs communities, both in and out of government, have since the 1998 tests notably deepened their grasp of the issues raised by the possession of nuclear weapons."[126]

Learning in the doctrinal domain may appear to some observers to be moderate or even minimal for obvious reasons. Firstly, Pakistan as a matter of policy has decided not to publicly pronounce its nuclear doctrine and has deliberately maintained ambiguity about its nuclear doctrinal objectives. As a result the detailed contours of the Pakistani nuclear

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[121]'Limited Nuclear Options' also known as the Schlesinger Doctrine was adopted by the Nixon administration in order to enhance the options available to the President other than suicide or surrender. It involved engaging small packages of targets in successive strikes with pauses in between to allow for a negotiated resolution of the crisis.

[122]Author's personal experience of lecturing senior military officers participating in National Security War Course on nuclear strategy and as a faculty member in the Faculty of Contemporary Studies at the National Defence University.

[123]Peter Lavoy,

[124] Quinlan, op. cit. p. 33.

[125] Quinlan, p. 136.

[126]Ibid, p. 141.

doctrine have remained hidden from public view and have been a subject of speculation. Secondly, as is the case with all other nuclear powers the operational parts of the nuclear doctrine including nuclear thresholds and targeting policy are kept as secrets. In view of the limited access to information the evolution in nuclear doctrinal thinking is not traceable and it would therefore, appear that little learning has taken place in this realm. Some analysts would also view the introduction of battlefield nuclear weapons as a case of unlearning given the earlier policy of eschewing the development of such weapons having learnt about their futility from the experience of the Cold War.

Chapter - 4

Pakistan's Nuclear Command and Control

4.1 Introduction:

This chapter will explore how Pakistan's nuclear command and control system has evolved since 1998. It will also highlight the arduous requirements of nuclear command and control, the nature and types of command and control systems in theory and as practised by other nuclear weapon states especially the United States[127] before moving on to trace the administrative, institutional and legislative steps taken by Pakistan to develop a viable nuclear command and control system in the face of substantial technological and financial challenges. An effort will be made to determine whether the development of Pakistan's nuclear command and control system is indicative of a coherent learning process based on trial and error or experience or internalization of experiences of other nuclear powers and in what forms has this learning manifested itself. However, due to the nature of the subject the focus will remain on the physical manifestations of the progressive learning process and it is not possible to delve into the intangibles such as the procedures and the hierarchy of command and control due to the non-availability of information on such aspects in the public domain.

4.2 Background:

An effective and reliable command and control system is essential for optimum utilisation of armed forces for the successful achievement of national objectives. The requirements of a nuclear command and control are far more rigorous and demanding than the conventional command and control arrangements, because the destructive power embodied by these weapons is such that, there is no room for error or failure. The ability of highest decision makers to exercise command and control over nuclear forces is largely dependent on the means of communications that link the national command centres with the forces in the field. These communication links are however, the softest and most vulnerable parts of a nuclear force structure. They are also very costly to build. Paul

[127]The US example has been used due to the availability of sufficient published material on US Nuclear Command & Control.

Bracken while explaining the command and control of US Nuclear Forces states that, "Command and Control as we define it here amounts to a system that brings the individual pieces of a defence system together into a coherent overall structure." [128] Elsewhere, the US nuclear, command, control and communications system has been described as:-

> "Collection of activities, processes, and procedures performed by appropriate military commanders and support personnel that – through the chain of command – allow for senior-level decisions on nuclear weapons employment to be made, based on relevant information and subsequently allow for those decisions to be communicated to forces for execution." [129]

The nuclear battlefield poses unique dangers to the communication systems, which can be seriously damaged or destroyed by conventional attacks, as well as by various effects of a nuclear explosion, such as the blast, radiation and the electro-magnetic pulse (EMP). There is, therefore, a distinct need for not only redundant but hardened and survivable means of communication. According to Desmond Ball, "many C3 systems are inherently susceptible to a wide range of physical and electronic threats, and certain critical nodal points are inevitable. These vulnerabilities impose very severe physical limits to the extent to which a nuclear war could be controlled." [130]

There is also a need to create a very fine balance, between the need to ensure that no nuclear weapon can be fired deliberately by any unauthorised person or mistakenly by an authorised person (the negative control), and the assurance that these weapons would be readily launched when ordered by the competent authority (positive control). This presents the decision makers with a dilemma, which has been termed as the '*Always-Never Dilemma.*'[131] The resolution of this complex problem lends itself to no easy or permanent solutions, and the policy makers have to continuously juggle with it by tilting the balance in one direction or the other, depending on the circumstances.

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[128] Paul Bracken, 'The Command and Control of Nuclear Forces', 1983, Yale University Press, New Haven and London, p. 179.
[129] The Nuclear Matters Handbook, Expanded Edition, Federation of American Scientists, 2011, p. 51. Available at www.fas.org/man/eprint/NMHB2011.pdf.
[130] Desmond Ball, 'Can Nuclear War Be Controlled'? Adelphi Paper – 169, International Institute of Strategic Studies, London, 1981, p. 2.
[131]Peter D. Feaver, 'Command and Control in Emerging Nuclear Nations', International Security, Vol. 17, No. 3. (Winter, 1992-1993), p.163.

Peter Feaver, who is credited with coining this phrase, has explained the always/never dilemma thus:

> "At the heart of nuclear command and control lies the always/never dilemma. Leaders want a high assurance that the weapons will always work when directed and a similar assurance the weapons will never be used in the absence of authorised direction. Weapons must be *reliable*: unlikely to detonate accidentally; and *secure*: resistant to efforts by unauthorised people to detonate them." [132]

Always/never is not the only dilemma faced by nuclear command and control mechanisms, since, there is a constant interplay between sophisticated technology and a large organisation. Neither the organisation nor the technology can be tested under realistic conditions likely to prevail on a nuclear battlefield. The high-technology systems tend to fail often at critical moments and large organisations have their own inherent problems, where weaknesses can often be overlooked or brushed aside.[133]

During the Cold War, the scale and magnitude of the command and control mechanisms built by the two super powers was enormous by any standards, due to the global proportions of their security competition. The United States had established, what was known as the 'World Wide Command and Control System' (WWCCS).[134] The extended deterrence commitments made to the European allies added further complexities. The system had to make provisions for sharing of US nuclear assets with the non-nuclear allies and to accommodate their inputs into nuclear decision making for nuclear operations in the European theatre. The introduction of Intercontinental Ballistic Missiles (ICBMs), as the prime means of nuclear delivery, created the perpetual fear of a surprise 'bolt from the blue' type attack. This compelled both super-powers to maintain their respective nuclear forces on a 'hair-trigger' alert. The fear of a decapitating strike, directly targeting the leadership and command elements, meant that arrangements had to be made to ensure the survivability of at least some elements of the command and control system, to enable the launching of an effective retaliatory strike. This led the US to create airborne command posts based on Boeing-707 jets, nicknamed the *looking glass* aircraft. These aircraft would remain airborne around the clock, with necessary staff headed by a two star general,

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[132]Feaver, op. cit., p. 163.
[133]Ibid.
[134] Desmond Ball, op. cit., p. 3.

equipped with all the necessary codes and means of communications to order a punitive strike, in case the leadership in the National Command Centre on ground was eliminated by a pre-emptive strike.[135] Civilian telephone networks such as AT&T and Bell Telephone[136] were fully integrated with the military communications networks to create redundancy. The multiple communication nodes and alternative links were designed to ensure, that if one or two links were disrupted the communications would automatically be routed through an alternate path.[137] The whole system was supported by, real time surveillance and target acquisition assets. The scale of the problem is by comparison miniscule in case of India and Pakistan, with much smaller nuclear forces and relatively limited theatre of operations. Moreover, neither India nor Pakistan has as yet operationally deployed its nuclear forces. This type of recessed nuclear posture reduces the pressure over the command and control system, due to the built in time buffers.

4.3 Typology of Command and Control Systems:

The command and control systems can be broadly categorised as *'assertive'* or *'delegative.'*[138] A command and control system that is biased in favour of 'negative control' is called the assertive type of control while a command and control system that leans in favour of 'positive control' is termed as delegative type of control.[139] The choice of either type of system is dependent on a number of factors, such as the kind of nuclear doctrine adopted by a particular country and the ability of the opponents to undertake a successful decapitating strike. A decapitating strike is aimed at destroying or seriously degrading the adversary's ability to launch an effective and coordinated retaliatory strike, by targeting its command and control system, leadership elements and the nuclear forces. However, if war termination at some stage, is the ultimate objective, it would be prudent not to target the leadership, which would be needed for intra-war bargaining and negotiations. In the absence of a suitable counterpart to talk to, the war would only end after the complete destruction of both the antagonists. Additionally, once the top leadership is taken out, the control of nuclear forces would shift to multiple lower level decision making centres, operating without any centralised guidance. Keeping these negative

[135] Bracken, op. cit., p. 204.
[136] Ibid, p. 187-190.
[137] Ibid, p.
[138] Feaver, op. cit., p. 168-9.
[139] Ibid.

outcomes in view, most adversaries would avoid targeting leadership and command and control mechanisms. That is why the debate about the desirability of a decapitating strike during the cold war remained inconclusive.

However, the threat of a pre-emptive strike against nuclear forces, distinct from their command elements, cannot be ruled out, and more ominous the threat of a pre-emptive counter-force strike, the greater would be the leaning towards a *delegative* command and control system. If a country adopts a 'first use' nuclear posture, the requirements of the command and control system are greatly simplified, and the decapitation threat is also taken out of the equation. There would, therefore, be no compulsion for hardening the early warning systems and command centres. It would, nevertheless, be advantageous to make the nuclear forces survivable to relieve unnecessary pressure over the decision makers.

On the other hand, if there is a higher level of threat of accidental or unauthorised use or a possibility of theft of weapons by terrorists, the preferred command and control system would be assertive and centralised.[140] The assertive control is achieved, through the employment of Permissive Action Links (PALs)[141] - which are basically electro-mechanical locks, weapon activation codes and the use of two-man rule. Two-man rule is the most basic and low-tech method of exercising assertive control and can be applied in various forms. For instance, it could take the form of a second authorised person confirming the weapon release/ launch orders at every tier of command, or two different people feeding segments of the electronic code needed to activate the weapon systems, or two weapon operators required to near simultaneously turn their respective keys located so far apart, that even the tallest person cannot reach both keys even at full stretch, in order to activate or launch a long range missile.

There are, though, some situations where there are technical barriers to application of centralised control. The prime example is the submarine based nuclear weapons, which, while providing an assured and survivable second-strike capability, pose the most

[140]Pakistan follows an assertive type of command and control. This information was shared with the author during interviews with respondents 'A', 'B' and 'C' - all senior officers in the nuclear chain of command – on 28 July, 06 August and 07 August 2012 respectively.
[141]The US installed PALs on its weapons in 1960s and these were especially important to prevent unauthorized use of battle field and accidental use of strategic weapons.

intractable challenges to the command and control systems. The difficulty of communicating with a submerged submarine means that, a centralised control over these weapons cannot be reliably exercised. The submarine based weapons do not have PALs, and due to the restricted space available in a submarine, it is also not possible to create a geographic separation between the warheads and their delivery systems. That is why sending out of nuclear-armed submarines to their operational stations is, considered to be a serious escalation in crisis situations,[142] because the command and control is automatically ceded to the submarine crew from the centralised authority. There is only a perilous means of control in the form of a periodic signal indicating to the submarine crews that the headquarters was intact and functioning. Any break down of communication or the failure of the headquarters to transmit a timely signal would be understood as delegation of authority to the naval vessel. That is why this type of a system is termed as a 'fail-deadly' system and is not resorted to during peacetime.[143] The other situation, where there are practical difficulties in exercising a centralised command and control, is in the case of battlefield nuclear weapons. The earlier versions of these weapons in the 1950s did not have any electronic safety arrangements, and the field units in custody of these weapons, had the ability to launch these weapons on their own volition. The later versions of US/NATO battlefield nuclear weapons, from the 1960s onwards, were equipped with PALs, but the possibility of a manual override of these safety mechanisms could not be completely ruled out.[144]

Scholars such as Rajesh Basrur have challenged the notion of command and control as it is commonly understood and have argued that 'control' is more important than 'command'. In his view:-

> …"Command and Control is a contestable concept that owes its meaning to Cold War thinking and experience. Its components are contradictory, and must be differently prioritised such that control takes precedence over command. This allows much greater scope for long-term stability than is at present the case…

[142]Bracken, op. cit., p. 229.
[143] Bracken, op. cit., p. 229.
[144]Ibid., p.

> Command has to do with the usability of nuclear weapons and control with the prevention of their use." [145]

Basrur emphasises the importance of control suggesting that an effective command is not critical to achieving deterrence since the possibility of even a small risk of nuclear war would be enough to deter even a powerful adversary. On the other hand he argues that loss of control entails greater risk to oneself and any loss of control could also trigger an unintended nuclear war with catastrophic consequences. It could also result in acts of nuclear terrorism adding that, "If the two must be juxtaposed, 'control and command' would be a more appropriate term." [146]This idea has its own merits but in actual operational environments every state will assign a higher priority to 'command' as an expression of resolve to use the nuclear weapons if there is a need to do so. As Michael Quinlan has suggested the possibility of use of nuclear weapons is necessary for deterrence to be credible.[147]

In the early stages of development of operational nuclear forces, the easiest and the simplest method of enhancing the safety and security, and to maintain 'negative control' is, to store the weapons and their delivery systems separately. This arrangement rules out the possibility of an accidental or unauthorised nuclear detonation. Both the US and the former Soviet Union adopted such systems in the late 1940s.[148] Pakistan is currently known to store its warheads and delivery systems separately.[149] However, when it decides to deploy its weapons in silos and on submarines this separation will not be possible due to technical reasons.

4.4 The Nature of Command and Control System:

The nature of the command and control system is largely influenced by the state of the civil-military relations in a country. In the United States, with an established tradition of civilian supremacy over the military, and a highly professional but autonomous military,

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[145] Rajesh M. Basrur, 'Nuclear Command and Control and Strategic Politics in South Asia', *Contemporary South Asia,* 14: 2, 2005, p. 155-161.
[146] Ibid.
[147] Michael Quinlan, 'Thinking About Nuclear Weapons –Principles, Problems and Prospects, Oxford, Oxford University Press, 2009, p. 26.
[148] Desmond Ball, op. cit., p. 4.
[149]Paul K. Kerr and Mary Beth Nikitin, 'Pakistan's Nuclear Weapons: Proliferation and Security Issues', Congressional Research Service www.crs.gov RL34248, February 13, 2013, p. 15.

the civilians initially retained strict control over the nuclear weapons. The American military was only allowed direct control of nuclear weapons in the early 1950s.[150] The Soviets on their part maintained tight civilian control over the nuclear weapons by keeping the warheads in the custody of the KGB, due to Kremlin's lack of trust of the military. However, as both the countries developed capabilities to launch pre-emptive decapitating strikes against each other and got into a hair-trigger alert mode, the control over the nuclear weapons was gradually transferred to the military in the US. Similarly, in the Soviet Union, the Soviet military also gained greater control over nuclear weapons after the fall of Khruschev from political power in 1964.[151] In the United States nuclear weapons had been completely transferred to military control by the late 1950s and direct command channels had been established between commanders of nuclear forces and the president with the role of the president limited to giving an order to 'Go' or 'No Go'.[152] This system could work with the 'strategy of massive retaliation' but with the adoption of a 'flexible response' strategy in the early 1960s the command and control structure was revamped to allow for the limited nuclear use options and greater involvement of political leaders in the whole process from alerting to firing of nuclear weapons as well as bargaining to bring the conflict to an end.[153] In both US and the Soviet Union the system of control over nuclear weapons evolved from civilian to military control primarily due to operational needs.[154]

4.5 Nuclear Command and Control Challenges for Nascent Nuclear Powers:

The international community generally perceives that the complexities and challenges involved in the setting up of a viable nuclear command and control system are beyond the limited technological prowess and meagre economic resources of countries like Pakistan and India. The deep seated hostility between the two countries and unresolved disputes such as that over the fate of the State of Jammu and Kashmir make the situation look even more worrisome. However, as suggested by Shaun Gregory many of these anxieties are caused by viewing the South Asian situation through the prism of the cold war, whereas the scale of the problem in case of Pakistan is much smaller than that faced

[150]Bracken, op. cit., p. 23.
[151] Bracken, op. cit., p. 183.
[152] Bracken, p. 184.
[153] Ibid, p. 188-9.
[154]Ibid., p. 23-4.

by the superpowers and the other three nuclear weapon states. Shaun Gregory elaborates his point by adding that:-

> ..."The point at issue here is whether a stable nuclear relationship can be constructed in South Asia. Much of the answer to this question rests on whether robust command and control (C2) arrangements can be put in place to meet the requirements of stable deterrence. These are primarily: assured high level (preferably political) control of nuclear forces; the prevention of accidental, irrational or unauthorised use of nuclear weapons; the assurance arrangements for escalation control and war termination. The evidence from the region suggests that these requirements can be met and that many are presently in the process of being met on both sides." [155]

Peter Feaver has argued using the 'vicarious learning curve'[156] hypothesis, that new nuclear states can learn from the practices of the earlier nuclear states, adding, that both Britain and France built on the lessons learnt from the United States and started at an advanced stage of command and control. He believes that, "proliferators in the 1990s would have some fifty years of nuclear experience on which to draw."[157] Shaun Gregory has taken this argument further affirming that:-

> "India and Pakistan have benefited greatly from reflection on the experience of the N-5 powers as they emerged as stable nuclear states in circumstances which in almost all respects were technically inferior to those of late twentieth century India and Pakistan. This reflection encompasses a rich understanding of nuclear deterrence, nuclear doctrines, strategy, posture, command and control arrangements and the role of arms control and confidence-building measures."[158]

Pakistan has adopted a credible minimum deterrence posture in line with its technological and resource limitations. Such a posture makes the task of fashioning a nuclear command and control much easier and simpler. The recessed operational posture,

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[155]Shaun Gregory, 'A Formidable Challenge: Nuclear Command and Control in South Asia', Disarmament Diplomacy, Issue No. 54, February 2001.

[156]'Vicarious learning' involves 'learning through experience' preceded by 'learning by observation.' It essentially means learning from the experiences of established nuclear powers.

[157]Feaver, op. cit., p. 173.

[158] Shaun Gregory, op. cit.

wherein warheads and delivery systems are kept separate from each other[159], reduces the requirements for real time surveillance and tactical warning and also eliminates the possibility of accidental or unauthorised use. However, things can and will change if Pakistan decides to operationally deploy its recently developed battle field nuclear weapons,[160] or proceeds with the deployment of submarine based nuclear weapons. Both the submarine based nuclear weapons and the battlefield nuclear weapons pose serious command and control challenges.

4.6 Pakistan's Internal Dynamics:

In the 1970s and 80s, Pakistani military provided indirect support to the nuclear programme, by way of constructing facilities like the enrichment plant at Kahuta, providing security and preparing the tunnels at 'Chagai' for conducting nuclear tests. This was similar to the role played by the US military in the 'Manhattan Project' and in the early post-WW-II years. The year1993 marks a watershed, when President Ghulam Ishaq Khan, who had been part of the management and oversight arrangements of the nuclear programme since the mid-1970s, was forced to resign over differences with the Prime Minister. Since the Prime Minister had also resigned, it created a serious dilemma of succession of control of the nuclear programme. The outgoing president therefore, handed over the sensitive records and responsibility of coordination of the nuclear programme to the Army Chief.[161]

Since then, the military has been more directly involved, in the development and oversight of the country's nuclear programme. Successive Directors General of the Combat Development Directorate with a select group of officers performed the duty of acting as liaison between the Army Chief and the heads of the strategic organisations and kept the Army Chief briefed on technical and developmental issues. The rest of the Staff in GHQ and commanders in the field were not privy to nuclear related issues.[162]

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[159] Peter R. Lavoy, 'Islamabad's Nuclear Posture: Its Premises and Implementation,' in *Pakistan's Nuclear Future: Worries Beyond War,* Henry Sokolski, ed. Carlisle, PA; Strategic Studies Institute, January 2008, p. 141. Available at www.StrategicStudiesInstitute.army.mil. Also see Paul Kerr and Mary Beth Nikitin, 'Pakistan's Nuclear Weapons: Proliferation and Security Issues,' RL 34248, of June 26, 2012, www.crs.gov

[160] Pakistan…..

[161] Feroz Hassan Khan, 'Pakistan: Political Transitions and Nuclear Management,' Non-proliferation Policy Education Centre, February 27, 2012. See http://www.npolicy.org/article.php?aid=1156&rid=6#_edn37

[162] Ibid.

There is, however, a widespread perception, both within and outside the country, that the political leadership has had a tendency to readily delegate the lead role in managing the nuclear programme to the military, even during the times when civilian governments have been in power in Pakistan. Some politicians are very critical of this tendency[163] while others such as respondent 'V' who has been a long term member of the Senate and has also been a member of the Senate's Standing Committee on Defence and Defence Production from 1988-1991 and again from 2003-2012 disagree. In his view the impression of military dominance of nuclear decision making is usually overplayed and can be attributed to prolonged periods of military rule in Pakistan insisting that the role of politicians/civilians has been critical and that there has been complete harmony between the civilians and the military on the nuclear issues. He argues that normally, the political leadership provides broad policy guidelines, but operational matters are left to the military, which is the common practice in most other nuclear weapon states.[164] However, many respondents (mainly academics and security analysts) interviewed for this research project considered that the civilian role in nuclear policy making is nominal and inconsequential.[165]

There is, also a general perception, that Pakistan follows a 'delegative' type of nuclear command and control system,[166] which is only partially true. Though the control of weapons has been delegated by the civilian leadership to the military, it has not been delegated to the conventional military, but to the Strategic Plans Division (SPD), which acts on behalf of the National Command Authority (NCA). Beyond that level, the command and control system is 'assertive,' to the extent that, even the services strategic force commands, which have the custody of the delivery systems, do not have access to the nuclear warheads, which are centrally controlled by the SPD/NCA. The scenarios conjured

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[163]Author's interview with respondent 'E' at Islamabad on 28 July 2012.
[164]Author's interview with respondent 'V' on 21 January 2013.
[165]Author's interviews with respondents 'H', 'Q', 'T' and 'U' on 14 July, 06 August, 05 September and 11 September 2012 respectively.
[166]Bhumitra Chakma, 'Pakistan's Nuclear Doctrine and Command and Control System: Dilemmas of Small Nuclear Forces in the second Nuclear Age,' *Security Challenges* Volume 2 Number 2 July 2006, p.129-131. Available at http://www.securitychallenges.org.au/ArticlePDFs/vol2no2Chakma.pdfs. Also see Shashank Joshi, 'Pakistan's Tactical Nuclear Nightmares: Déjà vu?' *The Washington Quarterly*, Summer 2013, p. 165-66.

up occasionally by some American think tanks such as the American Enterprise Institute[167] and news media about a 'rogue' corps commander running away with a few nuclear weapons are not in the realm of possibility since the corps commanders and the division commanders do not have access to nuclear weapons. In the existing command and control system the delivery systems are held by the services strategic force commands and though these are under the administrative control of their respective services their operational control rests with the NCA while the warheads are under the direct control of the NCA. The conventional army corps and divisions neither have access to any nuclear weapons or delivery systems nor are they part of the nuclear chain of command.[168] A very highly placed official of the NCA emphasised that:-

> "Pakistan has the unambiguous position that the NCA exercises assertive control over the nuclear capability in all circumstances and situations in a manner that weapons can be employed in pursuit of deterrence in timely manner, yet avoiding accidental or unauthorised use. The transition from crises to operational contingencies would be managed through elaborate and redundant system of command and control. The decision making for deployment, employment, and if it ever comes to that, the use of nuclear weapons rests firmly in the NCA." [169]

The fact that command and communications channels for strategic forces are independent of the command and communications channels for the conventional forces is not widely known. Therefore, after the introduction of short range battlefield nuclear weapon systems,[170]questions have arisen, whether the authority over these weapons would be delegated to commanders in the field. Concerns have also been expressed over the possibility of strained communications networks and the ability of the NCA to maintain an assertive control over the deployed battlefield nuclear weapons.[171] Such questions came up mainly because of lack of information about the existence of separate and independent

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[167] In 2006 and 2007 the American Enterprise Institute and some other think tanks based in Washington, DC held some War Games behind closed doors. The theme of American Enterprise Institute exercise was built around 'a rogue Pakistani Corps Commander, running away with a few nuclear warheads'.

[168]Based on author's personal knowledge of the command and control system and interviews with former and current senior officials at the Joint Staff Headquarters and the Strategic Plans Division in July/August 2012.

[169]Author's interview with respondent 'B' at Rawalpindi, on 07 August 2012.

[170] Inter Services Public Relations, Pakistan, Press Release No. 94/2011-ISPR. http://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721#pr_link1721, and Rodney W. Jones, 'Pakistan's Answer to Cold Start? The Friday Times, Lahore, May 13-19, 2011. Also see Ejaz Haider, 'Stupidity Goes Nuclear I & II', The Express Tribune, Lahore, 26 & 27 April 2011.

[171]Feroz Hassan Khan, "Nuclear Command and Control in South Asia during Peace, Crisis, and War," *Contemporary South Asia,* Vol. 14, No. 2 (June 2005), p. 169.

command and control mechanisms for conventional and strategic forces. Senior officials in the nuclear hierarchy are confident of the viability of systems that are in place, to ensure an assertive centralised control over these weapons, and insist that there would be no pre-delegation.[172] One thing however, is certain that, it will be a challenging task to ensure with a high degree of confidence that, the weapons would be able to perform their time urgent operational role, while maintaining assertive centralised control.

4.7 Evolution of Pakistan's Nuclear Command and Control:

As pointed out in chapter 2 and 3 of the study, Pakistan, owing to the peculiar nature of its nuclear weapons enterprise did not pay much attention, to doctrinal and command and control issues before May 1998. There was lack of clarity on the intricacies, sophistication and rigorous demands of a nuclear command and control system. There was, since late 1980s, an informal decision making arrangement, whereby the President, the Army Chief and senior scientists would decide on the developmental goals for the programme. The Prime Minister was also occasionally involved in decision making. A particular occasion where the Prime Minister was also involved in the decision making process, was the decision in early 1989, to freeze the production of bomb grade enriched uranium. This arrangement has often been called the 'Nuclear Command and Control Authority' by former Army Chief Mirza Aslam Beg,[173] but in reality it was no more than a developmental policy making forum. It had no structures or means for exercising operational command and control.

Towards the end of 1996 then Army Chief General Jehangir Karamat had established an Evaluation Analysis and Research cell (EA&R Cell) in the Army Headquarters. EA&R cell was tasked to do analytical studies on professional issues for the Army Chief. In February 1998, the Director General of the cell (who later rose to become the Vice Chief of Army Staff), called the author in his office for a routine discussion during which the issue of nuclear command and control also came up. The General listened with disbelief that there was no functional nuclear command and control system and that

[172]Author's interviews with senior military officials at the Joint Staff Headquarters and SPD in July/August 2012.
[173]Feroz Hassan Khan, 'Pakistan: Political Transitions and Nuclear Management,' op. cit. Also see Bhumitra Chakma, 'Pakistan's Nuclear Weapons,' Oxford, Routledge 2009, p. 43.

what a former Army Chief had been referring to as 'nuclear command authority'[174] does not even remotely resemble an operational command and control system. He then asked the author to write a concept paper on a proposed strategic command and control system. A thorough study and analysis of the command and control systems of the US, UK and France revealed that, though one could learn some useful lessons and basic principles, none of these systems could not be simply replicated by Pakistan. Accordingly, a proposed structure suited to Pakistani situation and compatible with Pakistan's limited resource base was designed.[175]

The concept paper entitled 'Strategic Command Organisation' was then sent to the Army Chief and subsequently to the Chief of General Staff. In hindsight, it turned out to be a fortuitous break for Pakistan. While the paper was still being studied at various levels in the Army Headquarters, the Indians conducted a series of nuclear tests on 11th and 13th of May 1998 which were followed by Pakistani tests on 28th and 30th of May 1998. On 30th of May the author was invited by the Military Operations Directorate to be part of a very small group of officers to prepare a draft nuclear doctrine and command and control structure. The concept paper written earlier formed the basis of further work on the proposed command and control organisation.[176]

A few weeks later, then Major General Khalid Ahmed Kidwai who had taken over as Director General of EA&R Cell on 30th of May 1998, was nominated by the Army Chief to head the secretariat of the proposed National Command Authority. He was asked to further refine the suggested organisation and elaborate its charter of duties, manpower, equipment and budgetary requirements. The outline plan was presented to General Musharraf, who in the meantime had taken over as the new Army Chief, in February 1999. The Chief of General Staff, the Director General Military Operations and Director General Military Intelligence were also present. The Army Chief approved the plan in principle and asked General Kidwai with a small group of officers to start working as the core group of National Command Authority's Secretariat, pending formal government approval.[177] The

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[174]Feroz Hassan Kahan, *Eating Grass: Making of the Pakistani Bomb,'* Stanford University Press, Stanford, 2012, p. 254.
[175] Based on author's personal experience being part of the EA&R Cell.
[176] Ibid.
[177]The author was part of this core group.

group started working in the General Headquarters in March 1999[178] before moving to the present location near the Joint Staff Headquarters at Chaklala Cantonment near Rawalpindi in July. The blue prints of the intended command and control organisation and the proposed nuclear doctrine were then presented to Prime Minister Nawaz Sharif and some of his cabinet colleagues at the General Headquarters in April 1999. The Prime Minister and his team did not have any serious objections to the proposal but wanted some more time to study it further. Another six months would pass without the receipt of any formal government approval and then in mid-October the military took over the reins of the government.[179]

The military government led by General Pervez Musharraf accorded a high priority to formalisation of nuclear command and control. In February 2000, a joint meeting of National Security Council and the Cabinet formally approved the proposed structure that had already been functioning for almost a year. Though, the government did not consider it prudent at the time to announce the nuclear doctrine the details of the command and control organisation were made public. The detailed text of the announcement released by the official news agency, the Associated Press of Pakistan (APP) is as under:-

> "In accordance with Pakistan's well known nuclear policy of responsibility and restraint as reaffirmed by the Chief Executive on several occasions, and with the objective of creating an institutionalized command and control mechanism, consistent with Pakistan's obligations as a nuclear power, the National Security Council on Feb. 2 approved the establishment of National Command Authority (NCA). The meeting was chaired by the Chief Executive General Pervez Musharraf. NCA will be responsible for *policy formulation*, and will exercise *employment* and *development control* over all strategic nuclear forces and strategic organizations. It will comprise *two committees*, including, *Employment Control Committee* and *Development Control Committee* as well as *Strategic Plans Division* which will act as *Secretariat*. The apex "Employment Control Committee" will be *chaired by* the *Head of the Government* and include Minister of Foreign Affairs (Deputy Chairman), Minister of Defence, Minister for Interior, Chairman Joint Chiefs of Staff Committee (CJCSC), Services Chiefs, Director General Strategic Plans Division (Secretary) and Technical Advisors/others as

[178]Ibid.
[179]Ibid.

> required by the Chairman. The Development Control Committee will also be chaired by the Head of the Government and include CJCSC (Deputy Chairman), Service Chiefs, Director General Strategic Plans Division and representative of the Strategic organisations and scientific community. The Committee will control development of strategic assets. Strategic Plans Division, headed by a senior army officer has been established in the Joint Services Headquarters under CJCSC. It will act as the secretariat for NCA and will perform the functions of planning and coordination in particular for establishing a reliable command, control, communication, computers and intelligence (C4I) network for the NCA."[180]

The Employment Control Committee (ECC), a politico-military committee in its composition, is the main decision/policy making forum, while the Development Control Committee, which can be termed as the military-scientific committee on the basis of its configuration, is responsible for implementing the decisions of the ECC. The second tier is the Strategic Plans Division (SPD), which acts as the permanent secretariat for the NCA. At the third tier are the three services strategic force commands though the press release did not make any mention of this tier. It can also be noted that the Finance Minister was not originally part of the ECC and was included at a later stage. The structure of the NCA and roles and functions of its various components will be discussed later.

The organisation was designed to meet the challenges articulated by the long serving Director General of SPD, Lieutenant General (Retired) Khalid Ahmed Kidwai during an address at the Naval Postgraduate School at Monterey, California in 2006:

> "Following Pakistan's May 1998 nuclear tests, the Pakistani nuclear programme faced three major challenges: (1) the need to manage the nuclear programme in an institutional way, (2) the need to review the range of national security policies and (3) the need for an effective and prudent force development strategy." [181]

Since the establishment of NCA, the SPD had started coordinating and overseeing the activities of the strategic organisations such as Pakistan Atomic Energy Commission (PAEC), Khan Research Laboratories (KRL) and National Development Complex (NDC) and some other organisations such as the Project Management Organisation (PMO), Air

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[180] Press Statement released by Associated Press of Pakistan (APP) on 03 February 2000.
[181] Lieutenant General Khalid Ahmed Kidwai, 'Pakistan's Evolution as A Nuclear Weapons State', address at CCC, 27 October 2006. http://www.nps.edu

Weapons Complex (AWC) and Maritime Technologies Complex (MTC). Many of these organisations were working on overlapping projects and were not cooperating with each other resulting in avoidable expenditures. It was therefore, decided to bring NDC, PMO, AWC and MTC under one umbrella organisation which was named as the National Engineering and Scientific Commission (NESCOM)[182], and Dr Samar Mubarakmand was appointed as its Chairman. On 27 November 2000 the NCA, in a meeting chaired by then Chief Executive General Pervez Musharraf, decided to formally place all strategic organisations under the NCA.[183]

Initially the structure of NCA's permanent secretariat – the SPD, was rather modest and simple. Over the last decade, it has evolved and become more elaborate and more sophisticated as the organisation confronted more complex challenges posed by a hostile security environment both externally as well as internally, a growing arsenal and a gradual move towards operationalization.[184] Since there was no institutional memory or prior experience of dealing with nuclear matters, most of the officers working in the SPD had to undergo a process of on the job learning. The officers were, therefore, allowed extended tenures and an overlap between key functionaries and their successors was ensured to retain the institutional memory and experience. This policy has paid dividends by helping the organisation mature in a relatively short period of time and to firm up procedures and routines.[185]

The original structure of the NCA had as its Chairman the 'Head of the Government,'[186] which in a parliamentary system like that of Pakistan is the Prime Minister. In February 2000, however, when the organisation was formally approved General Musharraf was ruling the country under the title of the 'Chief Executive' and by virtue of that position he became the Chairman of the NCA. After the national elections in October 2002, when a new Prime Minister was elected and Musharraf took over as President, the structure was modified at the top to accommodate both of them. The post of the Chairman was thereafter assigned to the President, while the Prime Minister was

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[182] http://www.nti.org/facilities/586/
[183]Shakil Sheikh, 'Strategic Organisations put under NCA control', *The News*, Islamabad, November 28, 2000.
[184]Author's interview with respondent 'A' at Islamabad on 28 July 2012.
[185]Based on author's personal experience having served in the SPD from March 1999 to October 2005.
[186] Press Statement released by Associated Press of Pakistan (APP) on 03 February 2000.

designated as the Vice Chairman. Even after the 2008 elections and coming into power of a political government the same arrangement continued. However, in 2009, President Zardari voluntarily abdicated his position as the Chairman of NCA leaving the Chairmanship to the Prime Minister.[187]

4.8 The NCA Ordinance 2007:[188]

The NCA was initially established as a result of a decision taken by the Federal Cabinet and the National Security Council, which was essentially an administrative action. There appears to have been no effort to get the decision approved by the parliament when it came into being in the wake of the October 2002 elections. Towards the end of 2007 there was a belated realisation that NCA needs to be provided a legal cover. This may have been prompted by concerns that the new political government may try to change the existing structure of NCA which could unhinge the whole system. There could also be the possibility of legal challenges to the actions of the NCA during the Musharraf regime. Consequently a Presidential Ordinance called the 'National Command Authority Ordinance, 2007' was promulgated on 13th of December 2007.[189] The Ordinance laid down the powers and jurisdiction of the National Command Authority and the Chairman, specified the members of the NCA, named the strategic organisations which come under its purview, the types of offences under the ordinance and the jurisdiction and powers to investigate and punish the offenders. It also provided ex-post-facto legal cover to the NCA since its inception. The manner in which the promulgation of the NCA ordinance was reported by the Pakistani press created an impression that a new command and control structure was put in place. The headlines of two English language daily newspapers would elaborate the point. 'The News' headlined the story as, "25 year jail for national security offenders', National Command Authority Ordinance Promulgated, Ordinance overrides

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[187] 'Zardari Hands Over nuclear powers', BBC News. http://news.bbc.co.uk/go/pr/fr/-/2/hi/south_asia/8384555.stm, accessed on 07 February 2013.

[188] Ordinance No. LXX of 2007; Gazette of Pakistan, Extraordinary, Part-I, dated 13th December 2007, Islamabad. Available at http://www.na.gov.pk/uploads/documents/1302673639_661.pdf

[189] 'President promulgates National Command Authority Ordinance', Associated Press of Pakistan, December 13, 2007. http://www.app.com.pk/en/index.php?option=com, accessed on 07 February 2013. http://www.thenews.com.pk/PrintEdition.aspx?ID=11712&Cat=13

existing laws," while the Daily Times report read, "Musharraf promulgates ordinance to establish NCA."[190]

In actual fact, the Ordinance did not establish the NCA but regularised its establishment that had taken place in February 2000, and provided the authority with necessary legal cover, a fact that section 3 (1) of the ordinance clearly stated: *"The National Command Authority already established by the competent authority shall deem to be the Authority established under this Ordinance."*[191] The salient features of the ordinance were as under:-

- It specified the jurisdiction of NCA vis-à-vis existing laws in the event of a crime committed against it.
- It listed twenty one crimes in Schedule-1 of the ordinance which were liable to be tried under the provisions of the ordinance.
- It stipulated the punishment for such crimes which could be up to twenty five years of imprisonment.
- The procedures and authority for investigation and prosecution were also elaborated.

4.9 National Command Authority Act 2010:

After the coming into power of a political government in 2008, the Supreme Court of Pakistan directed the government to indemnify the ordinances issued by the previous government by placing them before the parliament for approval. The NCA Ordinance was also placed before the parliamentary committee on defence. The draft law was deliberated by the committee and some opposition members proposed some amendments requiring annual reporting by NCA about the safety and security of Pakistan's nuclear assets.[192] However, these amendments were rejected and the draft law was passed as an act of parliament in early 2010 and after receiving the assent of the President it was notified as a

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[190] '25 year jail for national security offenders', National Command Authority Ordinance Promulgated, Ordinance overrides existing laws, *The News International*, Islamabad, December14, 2007 and 'Musharraf promulgates ordinance to establish NCA,' *Daily Times*, Lahore, December 14, 2007. http://.dailytimes.com.pk/default.asp?page=2007\12\14\story_

[191] Ordinance No. LXX of 2007, op. cit.

[192] These amendments were proposed by two parliamentarians Ayaz Amir and Dr. Attiya Inayatullah.

law through Gazette of Pakistan on 11th of March 2010.[193] It was entitled 'National Command Authority Act, 2010.' The act was deemed to have taken effect retroactively on 13 December 2007, the same date on which the NCA ordinance was promulgated.

The contents and substance of the Act generally remain the same as the NCA Ordinance with some subtle and one substantive change. By the time the act was passed by the parliament President Zardari had decided to give up his position as Chairman of the NCA and therefore, the Prime Minister who was hither-to-fore, the Vice Chairman was now designated as the Chairman of NCA. The position of Vice Chairman has been done away with in the new arrangement.

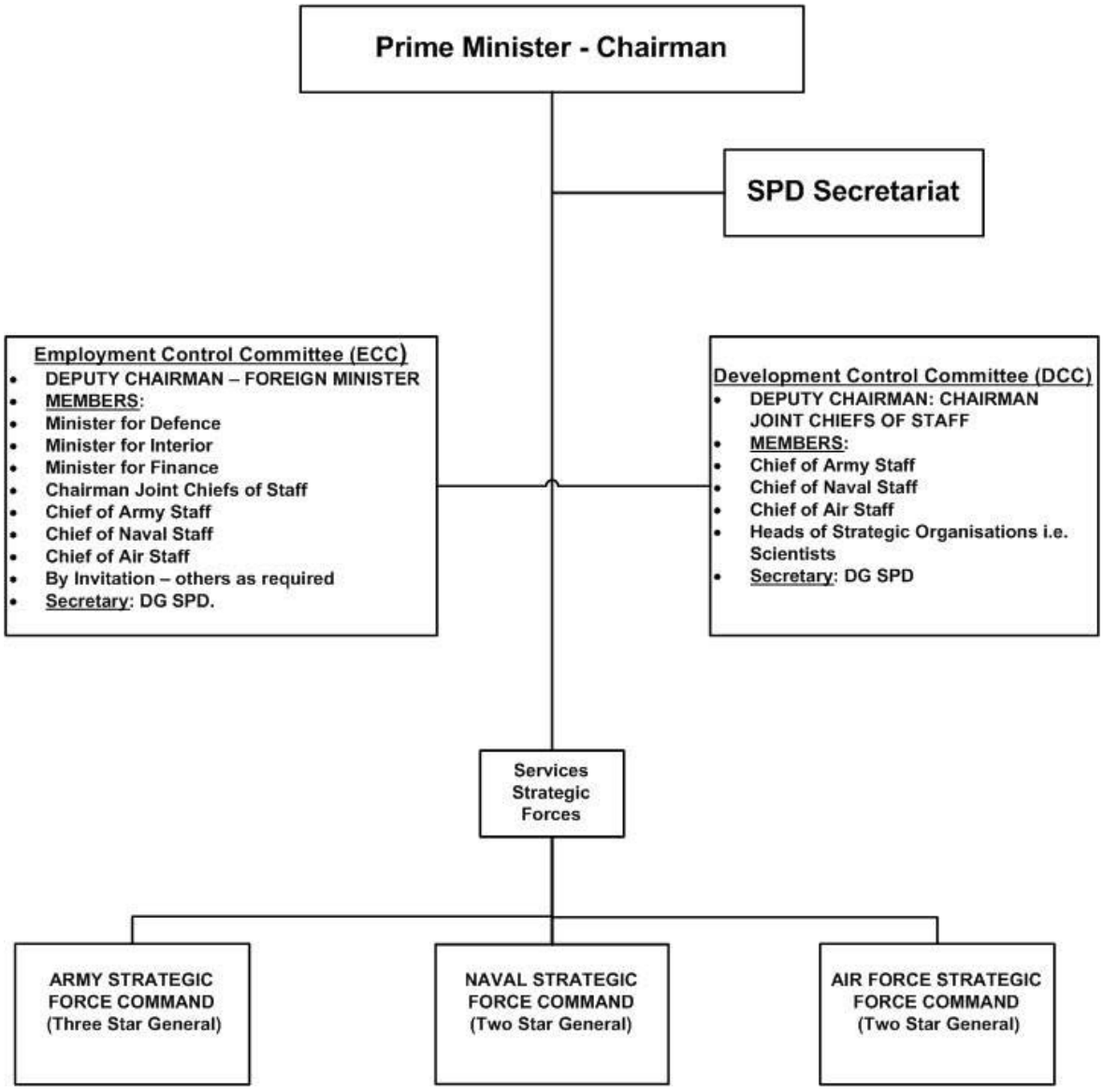
4.10 A Comparison of NCA Ordinance 2007 and NCA Act of 2010:

National Command Authority Ordinance 2007.	**National Command Authority Act, 2010.**
Section 2 (b) "Chairman means the President of the Islamic Republic of Pakistan	"Chairman means the Prime Minister of the Islamic Republic of Pakistan"
Section 3 (4) The Vice Chairman of the Authority shall be the Prime Minister of Pakistan. (5) The other *ex-officio members* of the Authority shall be the:- (a) Minister for Foreign Affairs; (b) Minister for Defence; (c) Minister for Finance; (d) Minister for Interior; (e) Chairman Joint Chiefs of Staff Committee; (f) Chief of Army Staff; (g) Chief of Naval Staff; (h) Chief of Air Staff; and (i) Director General Strategic Plans Division. (6) The Director General Strategic Plans Division shall act as the Secretary of the Authority.	No Vice Chairman (4) The other *members* of the Authority shall be the, (a) Minister for Foreign Affairs; (b) Minister for Defence; (c) Minister for Finance; (d) Minister for Interior; (e) Chairman Joint Chiefs of Staff Committee; (f) Chief of Army Staff; (g) Chief of Naval Staff; (h) Chief of Air Staff. (5) The Director General Strategic Plans Division shall act as the Secretary of the Authority.
Section 4: **Powers of the Chairman**:- All the powers and functions of the Authority shall vest in the **Chairman** who may,	**Powers of the Chairman**:- All the powers and functions shall rest with the **National Command Authority** on whose behalf, the

[193] The Gazette of Pakistan Extraordinary, Islamabad, March 11, 2010.

subject to such limitations as he may specify, **delegate** all or any of these powers and functions to **Director General Strategic Plans Division** or such other person as he may deem appropriate.	Chairman will exercise these powers and functions who may in consultation with National Command Authority and subject to such limitations as he may specify, **delegate** any of these powers and functions to **Chairman Joint Chiefs of Staff Committee** and **Director General Strategic Plans Division,** who may further sub-delegate the same to any employee.
Section 5: Secretariat of the Authority: The Strategic Plans Division shall function as the secretariat of the Authority and shall be headed by a **Director General to be appointed by the Chairman**.	**Section 5: Secretariat of the Authority:** The Strategic Plans Division shall function as the Secretariat of the Authority and shall be headed by a **Director General to be appointed by the Chairman on the recommendation of the Chairman Joint Chiefs of Staff Committee. The Director General shall be a serving Lieutenant General who may continue after retirement for completion of assigned projects.**
No provision for a Standing Committee for investigating proliferation related matters**.**	**Section 12 (4):** In the event of, suspicion regarding matters related to proliferation National Command Authority will appoint a Standing Committee constituted from amongst its members and other individuals as deemed necessary, which will inquire and investigate matters on this account.
Schedule 1 Under section 12 (2) of the NCA Ordinance: Serial 8: Offences under the Defence of Pakistan Ordinance, 1971. [Total offences listed=21]	**Schedule [**See section 12 (2)] Does not include 'Offences under Defence of Pakistan Ordinance 1971. [Total offences listed=20]

4.11 Organisation, Role and Functions of NCA and its Constituents:



[Source: Strategic Plans Division]

4.11(1) Role and Functions of the Employment Control Committee (ECC):[194]

The employment control committee (ECC) is the apex policy making body and performs the following functions:-

[194]Author's interviews with respondents 'W' and 'X' at Rawalpindi on 6-7 August 2012.

(1) Regularly reviews the information related to developments in the adversary's strategic weapons programme.
(2) Provides policy direction during peacetime and has the authority to order and control the movement, deployment and employment of strategic forces during war.
(3) Furnishes guidance for development of appropriate doctrines and employment policy based on own technical capabilities and assessment of threat.
(4) Is responsible for establishing hierarchy of command and policy for delegation of authority for employment of nuclear weapons.
(5) Stipulates guiding principles and procedures for an effective command and control system to prevent any accidental, unauthorised or mistaken use of nuclear weapons.

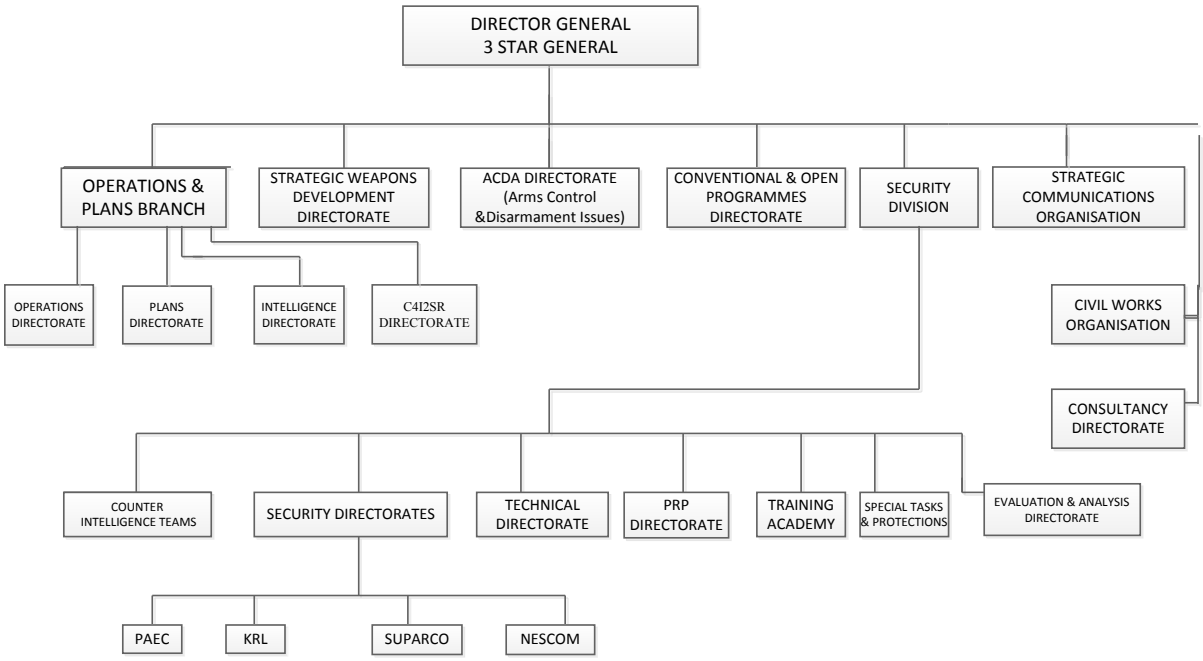
4.11(2) Role and Functions of Development Control Committee (DCC):[195]

DCC is the subordinate committee of the ECC and most of its members are also members of the ECC. DCC is basically responsible for converting the decisions of the ECC into specific developmental goals and oversees the implementation of these by the strategic organisations. It performs the following functions:-

(1) Exercises technical, financial and essential administrative control over the strategic organisations. The respective Chairmen however, enjoy full autonomy in the internal administration and management of their organisations.
(2) Supervises the orderly development of strategic weapons programmes in accordance with the developmental strategy approved by the ECC.
(3) It has the power to establish new facilities/organisations or to combine existing ones in line with laid down objectives.

[195]Ibid.

ORGANISATION – STRATEGIC PLANS DIVISION



[Source: Strategic Plans Division]

4.11(3) Role and Functions of the Strategic Plans Division (SPD):[196]

SPD was headed since its inception in March 1999 until early 2014, by General Kidwai, initially as a two star, then a three star general and later as a retired three star general. That prolonged tenure helped in solidifying the operating procedures and norms, advancing the operational planning and preparedness and completing key developmental projects. The first transition in the top leadership of the SPD took place in early 2014 and the process was completed at the beginning of March 2014 when a serving three star general formally assumed charge as the new DG SPD.[197] The NCA Ordinance of 2007 did not elaborate the rank of the DG SPD or the procedure for his appointment except that, "SPD shall be headed by a Director General to be appointed by the Chairman [NCA]."[198] However, the NCA Act of 2010 elaborated the procedure further by stating that DG SPD

[196]Author's interviews with respondents 'W' and 'X' at Rawalpindi on 06-07 August 2012.
[197] 'Lt Gen Hayat takes charge as SPD DG,' *Daily Times*, March 01, 2014. See http://www.dailytimes.com.pk/national/01-Mar-2014/lt-gen-hayat-takes-charge-as-spd-dg. For background information see'New chief to oversee SPD,' *The Express Tribune,* December 19, 2013, *http://tribune.com.pk/story/647579/new-chief-to-oversee-spd/* , 'Change of Guard in SPD,' The Hindu, January 12, 2014; http://www.thehindu.com/news/international/south-asia/change-of-guard-in-spd/article5569697.ece , 'Major reshuffle in army hierarchy,' *The Dawn,* December 24, 2013.
[198]Ordinance No. LXX of 2007 op. cit.

will be appointed by the Chairman NCA (Prime Minister) on the recommendation of Chairman Joint Chiefs of Staff Committee. It also explained that SPD will be headed by a serving three star general but with the proviso that he could continue in retirement to complete the ongoing projects.[199] SPD represents the permanent secretariat of the NCA and is assigned the responsibility to manage all aspects of the national nuclear capability on its behalf. It works directly under the Prime Minister through the Chairman Joint Chiefs of Staff. SPD has officers from all three services on its staff. It performs the following main functions[200]:-

(1) Prepares the agenda for NCA meetings and provides secretariat and administrative support for convening and holding of regular NCA meetings.
(2) Formulates recommendations with regard to country's nuclear policy, nuclear strategy and nuclear doctrine and presents these for approval by the NCA.
(3) Devises short and long term development strategies and force goals for the three services' strategic forces, within the ambit of the policy parameters approved by the NCA, keeping in view constraints imposed by available resources and international regimes, and oversees their implementation.
(4) Formulates strategic and operational plans for the movement, deployment and employment of strategic forces in the light of policies approved by the NCA.
(5) Articulates the chain of command/authority and pre-delegation on behalf of the NCA.
(6) Implements short and long term measures for the safety and security of strategic assets through the Security Division.
(7) Exercises control over strategic organisations and oversees their budgetary, technical, developmental and administrative affairs on behalf of the Prime Minister and the Chairman Joint Chiefs of Staff.
(8) Furnishes military inputs to the Foreign Office and Pakistani mission at Conference on Disarmament at Geneva on arms control and disarmament related issues.
(9) Coordinates the establishment of Strategic Command, Control, and Communications, mechanisms for the NCA for exercising command and control

[199] See Section -5 of NCA Act 2010, notified vide The Gazette of Pakistan Extraordinary, Islamabad, March 11, 2010.
[200] Based on author's interviews with respondents 'W' and 'X' at Rawalpindi on 06-07 August 2012.

over strategic assets, and maintains real time communication links with the three services and strategic forces.

(10) It also coordinates Chemical Weapons Convention (CWC) related routine inspections in conjunction with the national authority in the Ministry of Foreign Affairs and organises training and dissemination of information to all stake holders.

(11) SPD officials also participate in multilateral arms control and disarmament forums as part of the Pakistani delegations as well as in bilateral dialogue on strategic issues with friendly countries. They also form part of the official delegations during expert level talks on nuclear CBMs with India.

(12) Senior SPD officers deliver lectures on nuclear policy related issues at both military and civilian higher institutions of learning.

(13) SPD arranges briefings on nuclear policy for members of parliamentary committees on defence and national security as and when required in addition to holding briefings for participants of National Security Workshops.

(14) SPD officers regularly share their experiences and knowledge as practitioners of nuclear policy with students of related disciplines at University Departments.

4.11(4) Security Division:

Security Division headed by a two star army general with over 25,000 specially trained and equipped personnel is an important organisation within the NCA structure. It is responsible for physical security, personnel security as well as counter-intelligence and directly reports to DG SPD. Its detailed roles and functions will, however, be discussed in the chapter-5 (Nuclear Safety and Security).

4.11 (5) Role and Functions of the Strategic Force Commands:[201]

Strategic Force Commands have been created in each of the three military services. The most recent being the Naval Strategic Forces Command, which was established in 2012.[202]The services strategic force commands are responsible for custody and maintenance of nuclear delivery systems as well as training of weapon crews. The services retain training, technical and administrative control over their respective strategic forces.

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[201]Interviews with respondents 'W' and 'X' at Rawalpindi on 06-07 August 2012.

[202] "Naval Chief Inaugurates Naval Strategic Force Headquarters," Inter Services Public Relations, May 19, 2012.

The operational planning and control remains with the NCA under overall military direction of the Chairman Joint Chiefs of Staff. SPD is responsible for coordinating all related details with the services headquarters. The Army Strategic Forces Command (ASFC) is headed by a three star general officer while the Air Force Strategic Forces Command (AFSC) and Naval Strategic Forces Command (NSFC) are headed by two star generals respectively.

4.12 Indian Nuclear Command and Control:

It may be pertinent here to provide a brief overview of the Indian Nuclear Command and Control which has also evolved parallel to that of Pakistan. India announced its Draft Nuclear Doctrine on 17th August 1999. The draft doctrine only mentioned maintenance of 'robust command and control' as one of the requirements for India's nuclear deterrence at section 2.6[203] but did not elaborate the structure of the prospective command and control. Then on 4th January 2003, more than four and a half years after declaring itself a nuclear weapons power and almost three years after Pakistan's announcement of the establishment of its nuclear command and control, a press release by India's Cabinet Committee on Security made public the broad outline of India's nuclear command and control.[204] The statement mentioned a two tiered structure called Nuclear Command Authority (NCA), comprising a Political Council, chaired by the Prime Minister and an Executive Council to be chaired by the Prime Minister's National Security Advisor. The Cabinet Committee also approved the appointment of a tri-service strategic force command[205] unlike Pakistan which has three separate strategic force commands for the three services. The Executive Council would provide inputs to the Political Council for decision making and also oversee the implementation of decisions taken by the Political Council,[206] a role somewhat similar to SPD in Pakistan but with less elaborate organisational structure. As explained by Raja Mohan, the statement did not reveal the 'actual composition' of either the Political Council or the Executive Council. The statement also talked of approval of a chain of command to cater for the eventuality of incapacitation of the Prime Minister during an emergency. However, it did not explain how

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[203]P.R. Chari, Sonika Gupta and Arpit Rajain, eds., 'Nuclear Stability in Southern Asia,' New Delhi, Manohar, 2003, p. 186.
[204]C. Raja Mohan, 'Nuclear Command Authority Comes into Being,' *The Hindu,* January 5, 2003.
[205]Ibid.
[206]Ibid.

this succession down the chain of command will take effect nor did it identify the Prime Minister's successors.[207]

A well-known Indian strategic analyst Bharat Karnad, who was also a member of the NSAB that authored India's Draft Nuclear Doctrine has expressed his dissatisfaction over the state of affairs in India's nuclear command and control system while highlighting the need for a 'Dedicated Nuclear Cadre'. According to Karnad:-

> "I have argued in my books and other writings, Pakistan SPD's professionalism and competence in nuclear strategic matters is principally the result of painstaking and rigorous efforts over a long period of time to seed and nurture a force manned by a specialist cadre, and this is no bad thing for our SFC (Strategic Force Command) and the nuclear cell in the PMO (Prime Minister's Office) to emulate. It will be an improvement on what presently exists." He goes on to add that, "The Central point about the success of the SPD and every other nuclear force is that the nuclear secretariat is run by a corps of officers with real expertise – top to bottom, who are recruited after intensive tests and psychological profiling, including their ability to handle extreme stress."[208]

4.13 Analysis:

At the end of May 1998 in the immediate aftermath of the nuclear tests Pakistan was faced with the challenge of setting up an effective command and control mechanism to establish its credentials as a responsible nuclear power both internationally as well as domestically. Such an overarching structure was deemed essential to enhance safety and security of sensitive installations, materials and personnel working in sensitive areas of the nuclear and missile programmes. An efficacious command and control was also necessary for credibility of its nuclear deterrence and to operationalize the nuclear capability. Important tasks such as development of a nuclear doctrine, operational planning, estimation of the size of the nuclear arsenal, number and type of delivery systems and development of necessary means of communication between the NCA and the strategic

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[207] Ibid.

[208] Bharat Karnad, 'Dedicated Nuclear Cadre,' posted on the blog 'Security Wise on 16 August 2012, file:///F:/Dedicated%20Nuclear%20Cadre%20_%20Security%20Wise.htm. Originally published on 16 August 2012 as "INS: Indian Nuclear Service" in the Asian Age at www.asianage.com/columnists/ins-indian-nuclear-service-094 and in the 'Deccan Chronicle' at www.deccanchronicle.com/comunists/bharat-karnad/ins-indian-nuclear-service

forces had to be undertaken. The urgency of all these undertakings meant that it could not develop various segments sequentially but had to commence work in all these areas simultaneously. However, Pakistan's severe resource constraints would mean that various tasks would have to be prioritised. Since, communication networks are very costly and time consuming to establish and their real need arises when weapons and requisite delivery systems become operationally ready, it was decided to undertake this job in a phased programme spread over a decade in order to distribute the financial costs into convenient portions.[209]

A decade and a half later, there is a worldwide recognition that Pakistan has put in place a viable, comprehensive and effective command and control system.[210] According to Bruno Tertrais, "There is every reason to believe that Pakistan takes good care of its nuclear weapons. It sees them as the ultimate guarantee of its survival. And it knows that it cannot afford to make a mistake…"[211] Peter Lavoy has also expressed similar confidence explaining that, "Since the AQ Khan affair, the Strategic Plans Division has gone to great lengths to improve the country's command and control infrastructure…"[212] Along the way many additions have been made to the structures and organisations initially conceived and set up. This significant movement up the learning curve can be attributed to '*experiential learning'* as well as '*inferential learning'* and in some cases there may have been instances of what could be termed as '*unlearning*.' It is, however, extremely difficult to distinguish between learning and adaptation due to non-availability of empirical data in the public domain. In terms of 'experiential learning' a critical mass of professional expertise and institutional memory has been built. In the domain of 'inferential learning' evidence from

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[209] Based on interviews with respondents 'A' and 'R' author's personal knowledge of the process..

[210] See for instance, Bharat Karnad, 'INS: Indian Nuclear Service' op. cit., Lawrence J. Korb, "The Security of Pakistan's Nuclear Arsenal," Bulletin of the Atomic Scientists, May 19, 2009, http://www.thebulletin.org/web-edition/features/the-security-of-pakistans-nuclear-arsenal. See "President Obama's 100th-Day Press Briefing," The New York Times, April 29, 2009; General David H. Petraeus, interview with Chris Wallace, Fox News Sunday, Fox, May 10, 2009, http://www.realclearpolitics.com/articles/2009/05/10/fox_news_sunday_david_petraeus_96429.html; "Pak Nukes Safely Guarded, Says Narayanan," Press Trust of India, December 16, 2007, http://indiatoday.intoday.in/story/Pak+nukes+safely+guarded,+says+Narayanan/1/2524.html. and Paul K. Kerr and Mary Beth Nikitin, 'Pakistan's Nuclear Weapons: Proliferation and Security Issues,' Congressional Research Service, 7-5700, www.crs.gov RL 34248.

[211]Bruno Tertrais, 'Pakistan's Nuclear Programme: Status, Evolution and Risks,' EU Non-Proliferation Consortium, Non-Proliferation Papers No. 19, July 2012 at http://www.nonproliferation.eu

[212] Peter R. Lavoy, Islamabad's Nuclear Posture: Its Premises and Implementation, in Henry D. Sokolski ed., 'Pakistan's Nuclear Future Worries Beyond War, January 2008, http://www.StrategicStudiesInstitute.army.mil/

statements issued after the NCA meetings, missile tests and at diplomatic forums suggests that there is a better and more sophisticated understanding of the nuances of nuclear policy, strategy, and diplomacy. The officials also exhibit greater degree of self-assurance and self-confidence. However, critics point out that there have been some instances of 'unlearning' as well. They consider Pakistan's earlier decision to eschew the so called 'tactical' or battlefield nuclear weapons as a wise decision based on lessons correctly learnt from the experience of US/NATO and the erstwhile Soviet Union and believe that Pakistan has actually unlearnt those useful lessons by its recent move to develop and field battlefield nuclear weapons. Yet another instance of unlearning is cited as the recent tendency to discourage dialogue and interaction with outsiders which would only encourage 'group think' by insulating the organisation from alternative viewpoints. This they consider as a retrogressive step after the relatively open and transparent approach during the earlier years.[213]

The existing structure of the NCA looks evenly balanced on paper in terms of civilian and military representation, though sceptics consider that the civilian presence in the NCA is only symbolic and they simply endorse the policy decisions taken by the military brass.[214] Others think that the job of the civilians is to provide broad policy guidelines and it is military's job to carry out operational planning and handle other technical issues and that is the usual practice in most countries with nuclear weapons.[215] Another point of view is very critical of former President Zardari's decision to dissociate himself from the NCA and handing over the responsibility of chairing the NCA to the Prime Minister. This critique is based on the argument that President is constitutionally the supreme commander of the armed forces and represents the federation, whereas the Prime Minister represents a political party and since nuclear weapons are national assets he should not have abdicated his position.[216]

Moreover, given the volatility of Pakistani politics and the perpetual friction between the government and the higher judiciary other complications of more practical

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[213]Based on author's interviews with respondents 'H' at Islamabad on 14 July 2012 and with respondent 'R' at Bangkok on 9 September 2012.
[214] This was a common perception amongst academics and security analysts during interview conducted by the author in Pakistan during July/August 2012.
[215]Author's interview with respondent 'V' via e mail on January 21, 2013.
[216]Author's interview with respondent 'E' at Islamabad on 28 July 2012.

nature can arise. In the recent past an incumbent Prime Minister was removed from his post by the Supreme Court on contempt of court charges and orders were issued for the arrest of his successor for his alleged involvement in a corruption case. These episodes amply highlight the fragility of parliamentary democracy in Pakistan where one chairman of NCA was summarily dismissed and another narrowly escaped dismissal. In the current hierarchy of NCA the position of the Vice Chairman has been abolished but given the tenuous position of the prime ministers, it may be prudent to amend the law to reinstate the appointment of a Vice Chairman of NCA who could take over as acting chairman in case the incumbent chairman is unable to continue in his job for whatever reasons. Restoring the appointment of the Vice Chairman of NCA could, however, open a debate as to who should be designated as Vice Chairman. Should he be from amongst the civilians or military members of the NCA? One option could be to designate the foreign minister, who is, already deputy chairman of the highest decision making body, the ECC in the NCA. Alternatively, it could be the Chairman Joint Chiefs of Staff who is currently deputy chairman of the DCC. The third option could be to have two Vice Chairmen wherein both the Foreign Minister as well as the Chairman Joint Chiefs of Staff could be nominated. This issue will have to be tackled sooner or later and cannot be ignored for long because it can have adverse impact on the credibility of Pakistan's nuclear deterrent.

The foundations for Pakistan's nuclear doctrine and institutional structures for nuclear command and control were laid in the early days of General Musharraf's military led government. These structures evolved and matured during the next eight years of his rule. In a way it was a blessing in disguise because decision making channels were short and direct and devoid of any bureaucratic hurdles. DG SPD had easy access to the president through the Chairman Joint Chiefs of Staff Committee. The strategic programme was accorded high priority throughout this period and all its demands were met expeditiously. In fact, the inclusion of the Finance Minister in the NCA was also aimed at facilitating and expediting the allocation of financial resources for developmental programmes.

The political government that came into power in 2008 also accorded priority to the needs of the strategic programmes despite economic difficulties mainly for the reason that they did not want to be accused by the political opposition and the public of undermining

the nuclear capability. One thing though did not seem to have been given careful consideration and that is the assignment of ministerial portfolios. The ministries seemed to have been allocated on the basis of political considerations and expediencies of coalition politics without giving much thought to the fact that some of these ministers are also going to be part of the NCA. Appointing people lacking credentials to fulfil the responsibilities that accrue from being a member of the NCA or those with tainted reputations is bound to adversely affect not only the credibility but functioning of the institution as well. This is an area where there is still a lot of room for learning.

When the Nawaz Sharif government took office in June 2013 it was expected that it would improve upon the performance of its predecessor in this regard. However, the new government's handling of this issue has raised several new questions. For instance, the Prime Minister also retained the portfolios of Foreign Affairs and Defence which meant that the representation of civilian members in the NCA was reduced by two. Later on under compulsion of a court case the Prime Minister relinquished the charge of Defence Minister and appointed a new incumbent as Minister of Defence but he continues to hold the charge of Minister for Foreign Affairs. Since the Minister of Foreign Affairs is also designated as the Deputy Chairman of the main policy making body of NCA i.e. the Employment Control Committee it leaves a gap in the hierarchy of nuclear command and control especially when there is no Vice Chairman in the NCA's organisation. Prime Minister's Advisor on Foreign Affairs and the Special Assistant to the Prime Minister on Foreign Affairs, who have attended the NCA meetings on special invitation, cannot despite their high credentials fill in the positions specified by the NCA Law. Apparently, there seems to be no concern on this anomaly in any quarters and even the usually noisy Pakistani media has also remained silent on it.

In contrast to nuclear doctrine Pakistan has been far more open about sharing information about its nuclear command and control structures as is evident from the February 2000 press release. Later on, the NCA Ordinance and the NCA Law also elaborated the organisation, role and functions of the nuclear command and control organisation. It is obvious therefore, that learning in this domain would be relatively more pronounced. However, due to sensitive nature of information about chain of command and procedures for pre-delegation of authority have not been made public. However, learning

about their role in the nuclear command and control structure on part of the political leadership has not been up to the desired levels. Learning in this domain can, therefore, be graded as somewhere between moderate and extensive.

Chapter-5

Nuclear Safety and Security Arrangements

5.1 Background:

The sceptics in the international community as well as within Pakistan have perpetually raised questions and concerns about the safety and security of Pakistan's nuclear weapons and materials. There are others who are more assured of the viability of existing nuclear safety and security mechanisms instituted by Pakistan.[1] This chapter will review the administrative, institutional and legislative measures implemented by Pakistan to address the challenges to its nuclear safety and security. It will also explore the internal as well as external factors that have driven the learning process in this particular domain and how this learning has manifested itself in the form of organisational and institutional responses and brought about changes in the security culture within the nuclear establishment.

5.2 The Theoretical Foundation:

The immense destructive power of nuclear weapons and the potential for widespread damage resulting from an accidental or unauthorised nuclear detonation make nuclear technology one of the most hazardous technologies developed by modern science. Spread of chemical, biological and radiological materials due to an accident can also cause significant loss of life though not comparable to an intended or unintended nuclear explosion. The subject of nuclear safety and security, both in the civilian as well as military applications therefore, attracts utmost attention. In general terms safety relates to the vulnerability of either the nuclear weapons or nuclear reactors to accidents, security

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[1]For favourable views see, Feroz Hassan Khan, 'Nuclear Security in Pakistan: Separating Myth From Reality,' *arms control Today,* July/August 2009; Ken Luongo and Brig. Gen. (Ret.) Naeem Salik, 'Building Confidence in Pakistan's Nuclear Security,' *Arms Control Today*, December 2007. Christopher Clary, 'Thinking about Pakistan's nuclear Security in Peacetime, War and Crisis,' IDSA Occasional Paper No. 12, Institute for Defence Studies and Analysis, New Delhi, September, 2010. For skeptical views see, Rolf Mowatt Larssen, 'Nuclear Security in Pakistan: Reducing the Risks of Nuclear Terrorism,' *Arms Control Today,* July/August 2009, Seymour Hersh, 'Defending the Arsenal,' *The New Yorker,* November 16, 2009, Shaun Gregory, 'The Terrorist Threat to Pakistan's nuclear Weapons,' *CTC Sentinel,* July 2009, Vol. 2, Issue 7, United States Military Academy, West Point.

stands for physical security of nuclear weapons storage sites, nuclear installations and materials against external threats and is organised in the form of perimeter fences, intrusion barriers and various kinds of sensors and detectors. As per the IAEA's Glossary of Concepts and terms 'safety' in the nuclear domain has been explained as under:-

> "Safety is the achievement of proper operating conditions, prevention of accidents and mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards… Safety concerns both risks under normal circumstances and risks as a consequence of incidents, as well as other possible direct consequences of a loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or any other source of radiation."[2]

While nuclear security has been defined by the IAEA in following terms:-

> "Nuclear Security is the prevention and detection of, and response to theft, sabotage, unauthorised access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities."[3]

IAEA also recognises the existence of complementarity and synergy between safety and security and observes that it is difficult to clearly distinguish safety from security. As the above definitions would indicate actions taken to enhance safety also help increase the security. For instance, the reactor containment vessels are made of steel and then placed inside a concrete dome to prevent any leakage of radiation to ensure the protection of humans and the environment. The same strong structure also prevents malicious acts against the reactor thereby enhancing security. Similarly, emergency response plans help in mitigating the effects of a normal accident during operations and at the same time providing the ability to reverse the effects of any unauthorised access or action carried out with malicious intent.[4] It is, therefore, evident that in the literature dealing with nuclear safety and security where the term safety is used alone it invariably denotes both safety and security related issues. A case in point is Scott Sagan's book entitled '*The Limits of Safety – Organisations, Accidents and Nuclear Weapons.*'[5] He has used the framework of organisation theory to analyse the experiences of US Strategic Air Command (SAC)

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[2] IAEA Safety Glossary and terms – Nuclear Safety and Security, http://www-ns.iaea.org/standards/concepts-terms.asp
[3] IAEA Safety Glossary and terms – Nuclear Safety and Security, http://www-ns.iaea.org/standards/concepts-terms.asp
[4]Complementarity of Safety and Security, http://www-ns.iaea.org/standards/concepts-terms.asp
[5] Scott D. Sagan, 'The Limits of Safety – Organizations, Accidents and Nuclear Weapons', New Jersey, Princeton University Press, 1993.

and other elements of nuclear command and control through the month long heightened nuclear alert during the October 1962 Cuban Missile Crisis. According to the study, though there was no accident involving nuclear weapons, there were several close calls and 'near misses,' which could have potentially resulted in catastrophic accidents. Sagan suggests that, "In the large and very complex organisations that control hazardous technologies in our society, one should expect that the unexpected will occur, that unimaginable interactions will develop, that accidents will happen."[6] He, however, concedes that, "The safety record seems quite extraordinary, however, with the most hazardous technology of all: nuclear weapons. There has never been an accidental or unauthorised detonation of a nuclear weapon, much less escalation to an accidental nuclear war."[7]

The study has pitched against each other the arguments proffered by two competing schools of thought within the organisation theory literature, to help explain various aspects of the issue and to draw relevant conclusions. These two schools of thought have been termed by Sagan as the 'high reliability theory' representing an 'optimistic' view point and the 'normal accidents theory' that represents the relatively more 'pessimistic' interpretation of the issue. In his view, the protagonists of high reliability school believe that extremely hazardous technologies can be handled with high levels of confidence using suitable organisational structures and management procedures, while the advocates of normal accidents theory are convinced that accidents are bound to occur sooner or later in the operations involving extremely complex high technology systems. A recapitulation of the gist of arguments of these two contending schools will provide the basis that will facilitate the identification of key issues, which in turn will help put into perspective Pakistan specific nuclear safety and security issues. This will enable us to review and analyse the organisational structures and operational procedures and practices developed by Pakistan since 1998 to determine whether any learning has taken in Pakistan in this particular area.

5.2.1 The High Reliability Theory:

The arguments of the high reliability school have been outlined in three important studies. The first, a joint study, by Joseph Marone and Edward Woodhouse, is entitled

[6]Ibid., p. 3.
[7]Ibid., p. 4.

'Averting Catastrophe: Strategies for Regulating Risky Technologies' that covers a whole gamut of issues ranging from toxic chemicals to nuclear power and DNA research in the United States. The authors contend that, "given the challenges posed by modern technologies, the record is surprisingly good: despite dire warnings, no catastrophes have occurred in the United States."[8] They argue that this is, "a systematic product of human actions – the result of a deliberate process by which risks are monitored, evaluated and reduced,"[9] adding that the strategies employed clearly indicate all the ingredients of a comprehensive system to prevent the occurrence of catastrophes.[10]

The second major study was conducted by scholars from Berkeley University such as Geoffrey Gosling, Todd R. La Porte and Karlene H. Roberts etc. who argue that, "we have begun to discover the degree and character of effort necessary to overcome the inherent limitations to securing consistent, failure free operations in complex social organisations."[11]

The third significant study representing the high reliability school is Aaron Wildavsky's *Searching for Safety'* which is aimed at developing a theoretical framework that could rationalise the high level of safety achieved in modern societies.[12] The study concentrates on what the author has termed as two 'universal strategies' for enhancement of safety. The first of these is "anticipation" which as the name suggests means foreseeing and precluding the accidents even before they happen, while the second is called "resilience" which covers the efforts to mitigate the dangers after an accident has happened.[13]

The common strand that runs through the arguments of high reliability theorists is their confidence in the viability of appropriately designed and run organisations which compensate for the limitations and weaknesses of individual human beings and are far more rational and efficient than individual actors. High reliability organisations act rationally and have clearly defined goals aimed at achieving accident free operations.

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[8] Joseph G. Marone and Edward J. Woodhouse, 'Averting Catastrophe: Strategies for Regulating Risky Technologies', Berkeley, University of California Press, 1986, quoted in Sagan, op. cit., p. 14.
[9] Ibid.
[10] Ibid., p. 14-15.
[11] Todd R. La Porte, letter to Scott Sagan, September 29, 1991, quoted in Sagan, op. cit., p. 15.
[12] Aaron Wildavsky, 'Searching for Safety', New Brunswick, N.J., Transaction Books, 1988, quoted in Sagan, op. cit., p. 16.
[13] Ibid.

According to Scott Sagan, the high reliability theory fits in well with the concept of a "closed rational system" propounded by W. Richard Scott. Such organisations are characterised as "closed systems" because of the fact that they go to great lengths to insulate the system as far as possible from the influence of extraneous factors.[14] Carrying forward the same argument scholars such as La Porte and Consolini have argued that, high reliability organisations have clearly defined objectives adding that:

> "Those in the organisations carry on intensive efforts to know the physical and dynamic properties of their production technologies, and they go to considerable pains to buffer the effects of environmental surprises. In most regards, the organisations come close to meeting the conditions of closed rational systems, i.e., a well buffered, well understood technical core requiring consistency and stability for effective, failure-free operations."[15]

In essence the arguments of high reliability theorists revolve around four causal factors: "the prioritisation of safety and reliability as a goal by political elites and the organisation's leadership; high levels of redundancy in personnel and technical safety measures; the development of a 'high reliability culture' in decentralised and continually practical operations; and sophisticated forms of trial and error organisational learning."[16]

If the leadership both at the political and the organisational level is not fully committed to safety and is not willing to set aside sufficient resources for the purpose there will be a greater probability of accidents. Similarly, according to the high reliability theory protagonists the need for redundancy cannot be overemphasised. The redundancy relates to both personnel as well as safety equipment. They are convinced that redundancy plays a critical role in the functioning of all complex organisations and is especially vital for safe running of nuclear reactors which require duplicate independent power sources, redundant instrumentation and surplus cooling channels.[17] They also stress the importance of delegation of decision making especially related to safety functions to ensure quick responses by individuals to deal with emergency situations. This would however, require induction, training and socialisation of individuals to inculcate a robust culture of safety

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[14] W. Richard Scott, 'Organisations: Rational, Natural and Open Systems', Englewood Cliffs, N.J., Prentice Hall, 1987, quoted in Sagan, op. cit., p. 17.
[15] La Porte and Consolini, "Working in Practice but Not in Theory", quote in Sagan, op. cit., p. 17.
[16] Sagan, op. cit., p. 17.
[17] Ibid., p. 19-20.

and reliability. Development of this culture leads to commonality of assumptions and premises that underpin the decision making.[18] Militaries have an advantage over their civilian counterparts in this regard due to intense socialisation and cultural integration of their members.

The high reliability school also lays emphasis on the importance of 'organisational learning' which is critical for the safe operation of organisations dealing with hazardous technologies. They emphasise the importance for a high reliability organisation to adapt and amend its operating procedures, based on a continuous process of 'trial and error,' that helps identify the procedures which enhance safety and those which do not. This gradual learning process and course correction helps eliminate potentially dangerous practices through a process of elimination. Wildavsky has highlighted the importance of trial and error thus:

> "Trial and error is a device for correcting small dangers in order to avoid or lessen the damage from big ones…Because it is a discovery process that discloses latent errors so we can learn how to deal with them, trial and error also lowers risk by reducing the scope of unforeseen dangers. Trial and error samples the world of as yet unknown risks; by learning to cope with risks that become evident as the result of small-scale trial and error, we develop skills for dealing with whatever may come our way from the world of unknown risks." [19]

Simulation of probable scenarios can also help learn lessons as an alternative strategy to trial and error. This simulation can take the form of table top exercises, crisis simulation exercises and military war games. High reliability theorists are convinced that an appropriately structured and efficiently managed command and control system with built in practices of learning, adaptation and adjustments based on the experiences gained either through trial and error or simulation can assure the desired levels of reliability and safety.[20]

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[18]Ibid., p. 22-3.
[19]Wildavsky, quoted in Sagan, op. cit., p. 26.
[20]Sagan, op. cit., p. 26, 28.

5.2.2 Normal Accidents Theory:

In contrast to the optimistic view of the high reliability theorists the proponents of *normal accidents theory* take a far more pessimistic view of the issue of safe operation of dangerous technologies. While acknowledging the strenuous efforts on part of any complex organisation to ensure safety and reliability, they believe that serious accidents are a 'normal' outcome of the systems dealing with hazardous technologies. They concede the fact that serious accidents in organisations handling dangerous technologies are a rare occurrence but are convinced that such accidents are bound to happen sooner or later.[21]

Normal accidents theorists argue that often there are conflicting interests within the organisations themselves while they are also vulnerable to external influences. Some theorists from this school have built on an approach termed as the "garbage can model" contending that decision making in complex organisations takes place in anarchic environment rather than in a rational manner as propounded by high reliability theorists. Calling complex organisations "organised anarchies," they base their reasoning on three characteristics exhibited by complex organisations. First, the organisations usually have "inconsistent" and "ill-defined" priorities and that various individuals in an organisation may have incompatible objectives and that these individual preferences are also subject to change. Second, while it is a fact that such organisations operate highly complex technologies, which may work efficiently, the personnel involved in running these systems are not always well versed with the intricacies of the technological processes. Similarly, the causal relationship between various actions and their consequences is also not fully understood. Third, neither the decision makers in complex organisations remain constant nor do they exhibit a uniform level of interest or competence.[22]

The *garbage can* model combines all the possible failings and weaknesses in the functioning of complex organisations and takes an extremely pessimistic and negative view of the situation. In reality, however, all these negative factors will not co-exist at the same time, and as the authors of the model have themselves conceded, such dire

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[21]Ibid., p. 28.

[22]Michael D. Cohen, James G. March and Johan P. Olsen, *"A Garbage Can Model of Organisational Choice,"*in March, 'Decisions and Organisations'. Also see James G. March and Johan P. Olsen, *"Garbage Can Models of Decision Making in Organisations,"* in James G. March and Roger Weissinger-Baylon, eds., *'Ambiguity and Command: Organisational Perspectives on Military Decision Making,'* Marshfield, Mass., Pitman, 1986, quoted in Sagan, op. cit., p. 29.

circumstances are not likely to prevail at all times in every organisation.[23] The Fukushima disaster involving a Japanese nuclear power complex on March 11, 2011 was an exceptional event where a combination of a powerful earthquake, the resulting Tsunami and flaws in the construction and management of the nuclear plants resulted in failure of the cooling system. That in turn led to a meltdown of the reactor core and leakage of radiation. There have been no cases of deaths or radiation sickness but over a hundred thousand people had to be evacuated.[24]

One of the leading proponents of normal accidents theory Charles Perrow has employed a modified version of the garbage can theory in his 1984 book entitled *Normal Accidents: Living with High Risk Technologies,*[25] to analyse the safety hazards in systems such as the commercial airlines, nuclear power plants, international shipping, petro-chemical industry and nuclear weapons. He represents a rather pessimistic view that is in clear contrast with the far more positive outlook of the high reliability theorists asserting that, "serious accidents are inevitable, no matter how hard we try to avoid them."[26] According to Sagan, the normal accidents theory is comparatively more structured and is also more political as compared to the high reliability theory. In his view Perrow has not only identified structural peculiarities of highly complex organisations operating hazardous technologies, but has also paid attention to the competing interests within the organisation itself, as well as the conflict of interests between the organisation and the political influentials outside the organisation. He has highlighted two salient features of organisations managing hazardous technologies as "interactive complexity" and "tight coupling." According to Perrow, "complex interactions are those of unfamiliar sequences, unplanned and unexpected sequences and are either not visible or not immediately comprehensible."[27] He cites the example of a nuclear power plant as a system which symbolises high interactive complexity, and since critical assemblies are kept within a confined space inside the nuclear plants, there is always a possibility of undesirable

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[23] Ibid.
[24]Fukushima Accident, World Nuclear Association; http://www.world-nuclear.org/info/safety-and-security/safety-of-plants/fukushima-accident/
[25] Charles Perrow, *'Normal Accidents: Living with High-Risk Technologies,'* New York, Basic Books, 1984; quoted in Sagan, op. cit., p. 31.
[26] Ibid.
[27]Ibid.

interactions. Due to tight coupling failure of one component can lead to the failure of other closely interconnected parts thus leading to a serious accident.[28]

Perrow points out, that for successful functioning of a tightly coupled system, it is imperative to have centralised decision making, strict adherence to laid down procedures, unqualified submission to orders by the individuals and quick responses to any unforeseen event. He believes that the remedy offered by the high reliability theorists in the form of strong organisational culture is not easy to realise especially in the free democratic societies. He elaborates his point by arguing that:

> "It calls for a wartime military model in a peacetime civilian operation. A military model reflects strict discipline, unquestioning obedience, intense socialisation and isolation from normal civilian life styles…..Efforts to extend this model to industry in the 19th and early 20th centuries failed; it was too incompatible with American social values and culture."[29]

However, due to this narrow focus on US culture and values he seems to have overlooked the possibility that in many other societies, people would show greater readiness, to accept such restrictions, for the sake of ensuring safe operations of hazardous technologies especially in countries like China, North Korea, Iran and Pakistan etc. The normal accidents theorists would find it hard to explain the successful operation of the US nuclear command and control system and the absence of an accidental nuclear war. The remarkable safety record of nuclear weapons management in fact fits in well with the precepts of the high reliability theorists. This flawless record has forced even Perrow to accept the viability of the safety systems designed to prevent an accidental nuclear war. There seems to be a consensus between him and the high reliability theorists on the need for insulation from society, intense socialisation, and strict discipline of organisation members, as is the case with the military model, for reliable and safe handling of nuclear weapons[30] though scholars like Scott Sagan continue to see the military control of nuclear weapons as problematic.

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[28]Ibid., p. 32.
[29]Ibid., p.41.
[30] Sagan, op. cit., p.50.

5.3 Nuclear Safety and Security in Pakistan:

In Pakistan's case some academics representing the anti-nuclear lobby are critical of the military's control over its nuclear arsenal[31] while others, among them some senior academics and security analysts view the civilian presence in the NCA as cosmetic and think that military plays the dominant role, but do not consider it as a negative factor per se.[32] However, the younger academics, military officers, civilian bureaucrats and some political representatives think that there is a healthy balance between civilian and military representation in the NCA, though military plays the lead role in planning and management of nuclear assets.[33] Given the fact that most of the analysts belonging to both the high reliability and normal accidents schools agree that the military model is best suited for safe and reliable handling of nuclear weapons, the Pakistani military's domineering role in nuclear command and control should not be seen as a weakness of the system. However, scholars like Scott Sagan remain sceptical and believe that militaries are not only inclined towards pre-emptive strategies but also show little capacity to learn from past mistakes and therefore, military control of nuclear weapons remains problematic in their view. For instance, Donald Kerr, Principal Deputy Director of National Intelligence speaking to a Washington audience said that, "the Pakistani military's control of the nuclear weapons is a good thing because that is an institution in Pakistan that has, in fact, withstood many of the political changes over the years."[34] A former Pakistani Professor of Physics however, thinks that despite expenditure of huge amounts of money the security organisation is capable of dealing with only a few security threats and doubts its ability to deal with all possible contingencies, especially if an adversary was to launch a multi-pronged attack.[35] However, he did not elaborate this contingency which can only be launched by a resourceful and well trained military and is beyond the currently known capabilities of the extremist groups in Pakistan. If he is alluding to an attack by a hostile country it will be considered an act of war and the response will not remain limited to the nuclear security forces but will involve the whole security apparatus of the country.

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[31]Interviews via email with two retired Physicists and known anti-nuclear lobbyists on 05 & 11 September 2012 respectively.
[32]Interview by the author with respondents 'G', 'Q', and 'S' at Islamabad on 02 August, 06 August and 08 August 2012 respectively.
[33] Interviews by the author with respondents 'A', 'B', 'E', 'I', 'J','L', 'M', 'O', in July/August 2012.
[34] Paul K. Kerr and Mary Beth Nikitin, 'Pakistan's Nuclear Weapons: Proliferation and Security Issues', Congressional Research Service www.crs.gov RL34248, February 13, 2013, p. 16.
[35]Interview with respondent 'T' via email on 11 September 2012.

Pakistan is also known to keep its weapons and delivery systems in de-mated form which essentially means that warheads and delivery vehicles are stored separately though some analysts have speculated that even the warheads are also kept in disassembled form.[36] However, senior officials in Pakistani nuclear establishment do not agree with this characterisation and made it clear in their comments to the author that they have only talked of geographical separation between warheads and delivery systems.[37] The current arrangement adds to the safety by eliminating the possibility of an accidental, unauthorised or mistaken nuclear detonation.

In terms of the safety of civilian nuclear installations such as nuclear power plants and research reactors Pakistan has an enviable record of accident free operations spread over decades.[38] Most of the concerns expressed by the media with regard to weapons falling in the hands of extremist elements or threat of attack by TTP on Pakistani nuclear sites are related to physical security rather than safety. However, as discussed at the beginning of this chapter there is an overlap between the two terms and they are frequently used interchangeably. It would be appropriate to list here and elaborate the concerns and criticisms related to Pakistan's nuclear safety and security, analyse these in the light of alternative views and then explain in some detail the arrangements for safety and security put in place by Pakistan since the May 1998 nuclear tests.

5.4 Nature of Concerns about Pakistan's Nuclear Safety and Security:

The 9/11 incidents and the ensuing war in neighbouring Afghanistan as well as terrorist attacks by Tehrik-i-Taliban Pakistan (TTP) across the country, including targeted attacks on sensitive military installations, have given rise to heightened concerns about safety and security of Pakistan's nuclear weapons and sensitive nuclear materials. Almost every attack on or near a military base is portrayed by international media as an attack on a nuclear installation and questions are raised both in the national as well as international media about the ability of the Pakistani security forces to guard nuclear assets and conversely over the ability of the terrorists to attack sensitive installations at will.[39] The

[36]Paul Kerr and Mary Beth Nikitin, op. cit.
[37]Interviews with a retired four star officer and a very senior officer in SPD on 28 July and 07August 2012 respectively.
[38]Zahid Malik, 'Gilani charms Obama Brings US nuclear energy close to Pakistan,' http://pakobserver.net/detailnews.asp?id=26646
[39]See Declan Walsh, "Pakistani Air Force Base with Nuclear Ties Is Attacked," *The New York Times*, August 15, 2012. See Shaiq Hussain, "Militants Storm Pakistan Air Base," *The Washington Post*, August 16, 2012; Kelsey Davenport,

second recurring theme is the fear of 'Islamist' take-over of government in Islamabad, either through the electoral process or some unconstitutional means. Linked to this, is the rather exaggerated concern about the growing influence of radical Islamist elements within the military and other security forces, citing sporadic incidents of alleged 'insider' help to terrorists.[40] Third concern is an outgrowth of the AQ Khan's proliferation episode, implying that if it could happen in the past a repeat of similar activities of leakage of sensitive technologies cannot be ruled out in the future. In this regard, the story of the two retired Pakistani scientists, who were running a charity in Afghanistan and reportedly met Osama Bin Laden in Kandahar, is also frequently mentioned.[41] The AQ Khan incident was partly due to a flawed export controls regime and partly due to weaknesses in the security system. Since there was no independent security oversight and the officers deputed for security at KRL were answerable to AQ Khan himself who was also their pay master it was too much to expect of these security personnel to report against their own boss even if they noticed any irregularities. Moreover, the orientation of security was towards dealing with the external threats and insider threat was not given due attention. Due to the covert nature of the programme before 1998 'secrecy' took precedence over 'security.'[42] Finally, some analysts have expressed fears, that if Pakistan decides to disperse and deploy its nuclear weapons in the midst of a crisis with India, these would become vulnerable to theft or attacks by terrorists.[43]

5.4.1 Adverse Views:

Professor Shaun Gregory, who in recent years, has been one of the most fervent critics of nuclear safety and security in Pakistan while conceding that, "Pakistan has

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"Militants Attack Pakistani Base," *Arms Control Today*, September 2012. Also see Jane Perlez, "Pakistan Army Under Scrutiny After U.S. Raid," *The New York Times*, May 5, 2011; Zahid Hussain, Matthew Rosenberg, and Jeremy Page, "After Raid, Confused Response," *The Wall Street Journal*, May 9, 2011.

[40]Insider involvement in an assassination attempt against President Musharraf on 24 December 2003 and the attack on Mehran Base in May 2011 are usually cited as cases in point.

[41]The two retired scientists Sultan Bashir-ud-Din Mahmood and Chaudhry Abdul Majeed were arrested by the Pakistani security agencies on the American request and were interrogated both by Pakistani officials as well as FBI/CIA investigators. However, no evidence was found of their involvement in any WMD related activities. See Sultan Bashir-ud-Din Mahmood, Interview with WAQT TV in Urdu language on July 23, 2009. Available at http://www.youtube.com/watch?v=UvwmnYsTmIA

[42]Author's firsthand knowledge of the AQ Khan investigations in 2004 and interview with respondents 'A' and 'P' 0n 28 July and 07 August 2012 respectively.

[43] Robin Fernandez, 'South Asia Nuclear Safety in fallible hands: US Expert,' *The Express Tribune,* May 23, 2011.

established a robust set of measures to assure the security of its nuclear weapons,"[44] claims that, "empirical evidence points to a clear set of weaknesses and vulnerabilities in Pakistan's nuclear safety and security arrangements."[45]His critique has been built around following themes:-

a) In view of the Indian threat Pakistan has to keep its nuclear weapons away from the eastern border with India and the conclusion he draws is that many of the Pakistani nuclear sites are therefore, located in the north west of the country, in close proximity to the areas dominated by the Taliban and Al-Qaida elements. In his view TTP and Al-Qaida have the capability to launch attacks in these areas and even in and around the capital Islamabad. [46]
b) The physical security of nuclear weapons across the weapons cycle may not be robust enough to withstand determined terrorist assault. As an example he mentions a series of attacks that have taken place on 'suspected' nuclear weapons facilities including a "nuclear missile storage facility" at Sargodha, "nuclear airbase at Kamra," and a Taliban suicide attack at an entry points to one of the armament factories at the Wah cantonment, which he considers to be one of Pakistan's main nuclear weapons assembly sites.[47]
c) Among the estimated 70,000 people with access to the nuclear weapons cycle, some may be willing to collude in various ways with terrorists.
d) The threat extends beyond terrorists gaining access to complete and workable nuclear weapons to their gaining access to fissile material, nuclear weapons components, or penetrating nuclear weapons facilities that would have serious political and security implications.
e) A strong element exists within the army and the ISI with strong anti-West and especially anti-US sentiments as well as Islamist tendencies.[48]
f) There is a possibility of collusion between the 'Islamist sympathisers' within the security forces and the nuclear establishment and the Al-Qaida or Taliban.

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[44]Shaun Gregory, 'The Terrorist Threat to Pakistan's Nuclear Weapons', *CTC Sentinel*, July 2009, Vol 2.Issue 7, United States Military Academy, West Point, p.1.
[45]Ibid., p.2.
[46] Ibid.
[47]Ibid., p. 3.
[48] Ibid.

g) Finally, the Pakistan Army as an institution may decide to transfer nuclear weapons to a terrorist group as suggested by Philip Bobbit in *Terror and Consent* that states can become "pressurised" or "incentivised" to transfer nuclear weapons to terrorist groups in response to threat from external powers.[49]

Shaun Gregory has also claimed that:

> "On October 10, 2009, Tehrik-i-Taliban Pakistan (TTP) and Lashkar-i-Jhangvi militants staged an audacious attack on the Pakistan Army's GHQ in Rawalpindi…housing within its sprawling campus not only the chief of army staff, but also many of Pakistan's most senior military commanders, including the director general of the Strategic Plans Division (SPD)[50] and the 'director general'[51] of the Strategic Forces Command (SFC) – Pakistan's two most senior operational nuclear commanders."[52]

Other analysts, such as a former CIA official Bruce Riedel and journalists David Sanger, Jobby Warrick and Seymour Hersh, have also expressed more or less similar concerns from time to time.[53]Hersh, in fact, went a step further by suggesting on at least two occasions that US Special Forces have rehearsed plans to take possession of Pakistani nuclear assets in case of danger of these falling into wrong hands.[54] Some Pakistani analysts among them a senior International Relations professor and two former Physics professors have also expressed scepticism about Pakistani nuclear safety and security arrangements in the course of interviews with the author.[55] In the aftermath of US

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[49] Ibid, p. 3-4.

[50]DG SPD's office is not located in the GHQ premises and SPD has its own office complex near the Joint Staff Headquarters.

[51]The correct designation is Commander Army Strategic Force Command. He is also not located in GHQ and operates from his own headquarters in the suburbs of Rawalpindi.

[52]Shaun Gregory, 'Terrorist Tactics in Pakistan Threaten Nuclear Weapons Safety,' *CTC Sentinel*, US Military Academy, West Point, June 2011, Vol. 4, Issue 6.

[53] See Bruce Riedel, 'Pakistan and the Bomb,' *The Wall Street Journal*, May 30, 2009. Joby Warrick, "U.S. Has Concerns over Security of Pakistan's Nuclear Weapons," *The Washington Post*, November 11, 2007; David Sanger and William Broad, "U.S. Secretly Aids Pakistan in Guarding Nuclear Arms," *The New York Times*, November 17, 2007 and Seymour M. Hersh, 'Defending the arsenal,' *The New Yorker,* November 16, 2009. Available at http://www.newyorker.com/magazine/2009/11/16/defending-the-arsenal?printable=true

[54]See Seymour M. Hersh, 'Defending the arsenal,' *The New Yorker,* November 16, 2009. Available at http://www.newyorker.com/magazine/2009/11/16/defending-the-arsenal?printable=true

[55]Interview with respondent 'Q' at Islamabad on August 06, 2012 and e mail interviews with respondents 'T' and 'U' on 05 and 09 September 2012 respectively.

operation in May 2011 at Abbottabad in Pakistan, which resulted in the killing of Osama bin Laden, a fresh debate was generated at home and abroad about the threats to Pakistan's nuclear security. This debate revolved around Pakistan's ability to successfully ward off these threats and whether countries like India and the US could attack and destroy Pakistan's nuclear weapons.[56]

5.4.2 Favourable Views:

Despite the lingering negative perceptions, many positive comments on Pakistani nuclear security have also been made by responsible officials and leaders from around the world to inspire sufficient confidence in the system. These include many senior US civilian as well military officials who have on different occasions expressed their confidence in the viability and effectiveness of Pakistan's nuclear security system. Deputy Secretary of State John D. Negroponte in testimony to Congress on November 7, 2007, said he believed that there is "plenty of succession planning that's going on in the Pakistani military" and that Pakistan's nuclear weapons are under "effective technical control."[57] M.K. Narayanan, then Indian National Security Advisor, termed Pakistan's nuclear arsenal as "safe" and with "adequate checks and balances" in place.[58] Similarly, former British Foreign Secretary, David Miliband stated in 'Charlie Rose Show' in December 2008, that, "Islamabad's nuclear weapons are under pretty close lock and key."[59] DIA Director Maples stated on March 10, 2009, that Islamabad "has taken important steps to safeguard its nuclear weapons," although he pointed out that "vulnerabilities exist." [60] General Petraeus, said in an interview on May10, 2009, that, "with respect to the nuclear weapons and sites that are controlled by Pakistan … we have confidence in their security procedures and elements and believe that the security of those sites is adequate."[61] Defence Secretary

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[56]Ansar Abbasi, 'FO casts doubt on Pakistan's security,' *The News International,* May 04, 2011. See 'Pak nukes safe but matter of concern, Nato', *The News International,* May 25, 2011 and Pentagon confident of Pak ability to protect nuclear assets, *The News International,* May 26, 2011. Also see Jane Perlez, "Pakistan Army Under Scrutiny After U.S. Raid," *The New York Times*, May 5, 2011; Zahid Hussain, Matthew Rosenberg, and Jeremy Page, "After Raid, Confused Response," *The Wall Street Journal*, May 9, 2011.
[57]House Foreign Affairs Committee Hearing on Democracy, Authoritarianism and Terrorism in Contemporary Pakistan, November 7, 2007.
[58] 'Pak Nukes Safely Guarded, says Narayanan,' *The Press Trust of India,* December 16, 2007, quoted in Kerr and Nikitin, op. cit., p. 17.
[59]Ibid.
[60] Ibid.
[61] Interview with General David Petraeaus, *FOX News Sunday*, May 10, 2009. http://www.foxnews.com/story/0,2933,519696,00.html. Quoted in Paul Kerr and Mary Beth Nikitin, Pakistan's Nuclear Weapons; Proliferation and Security Issues, February 13, 2013, p. 17.

Robert Gates stated in a January 21, 2010 interview that the United States is "very comfortable with the security of Pakistan's nuclear weapons."[62]

Several other international leaders have also expressed their confidence in Pakistan's nuclear security regime. For instance, Erard Corbin de Mangoux, Director of the French General Directorate of External Security, said in a spring 2010 interview that, "Pakistan's military and civilian leaders have a sense of responsibility to maintain control over the country's nuclear weapons; these leaders know that the international status to which they aspire depends directly on their ability to exercise complete control over such an instrument of power."[63] President Obama, in a meeting with Prime Minister Yusuf Raza Gilani on the eve of the Nuclear Security Summit at Washington D.C. in April 2010, "expressed full satisfaction over the safeguards applied by Pakistan for the security of its nuclear material and assured that US has no sinister designs on Pakistan's nuclear programme."[64] A few weeks later, Under Secretary of Defence Michele Flournoy said at an April 29, 2010 congressional hearing that, "we believe that Pakistan has a very solid command and control system for their nuclear weapons," adding that, "they have made great deal of investment in the security of their nuclear arsenal."[65]James Clapper, Director of National Intelligence, told the House Intelligence Committee on February 10, 2011 that, "our assessment is that the nuclear weapons in Pakistan are secure."[66] Responding to the questions being raised about Pakistan's nuclear security after the Bin Laden killing, Prime Minster Gilani in a May 25, 2011, statement said, that the country's "strategic assets are well protected and our capability to defend our sovereignty, territorial integrity and liberties of our people, is very much in place."[67]

Feroz Hassan Khan cautioning against unnecessary hype on nuclear 'insecurity' in Pakistan, argues that an exaggerated perception of threat in the West could lead the US to devise inappropriate policies to deal with it. Moreover, the persistent media focus on the issue, feeds into Pakistani misgivings about the US intentions. He has characterised the

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[62] Kerr and Nikitin, p. 17.
[63]Ibid., p.17-18.
[64]Zahid Malik, 'Gilani charms Obama Brings US nuclear energy close to Pakistan,' Pakistan Observer; http://pakobserver.net/detailnews.asp?id=26646
[65] Ibid.
[66] Kerr and Nikitin, op. cit., p. 17.
[67]Press Information Department, "Prime Minister Gilani's Opening Statement at the Defence Committee of the Cabinet," Pakistan Official News, May 25, 2011.

Western concerns about security of Pakistani nuclear assets as ranging from 'legitimate' to 'bizarre.' As an example of the bizarre scenarios he cites the fear that either the Pakistani military and intelligence agencies could become collaborators of Taliban in their attempts to gain control of Pakistani nuclear assets or the Pakistani state could be taken over by Taliban due to the inability of the Pakistani military to defeat them. Pakistan's Chairman Joint Chiefs of Staff Committee, however, termed such scenarios as *plain mischievous* which needed to be *contemptuously dismissed*.[68]

5.4.3 Addressing the Concerns:

Christopher Clary, in his monograph entitled, '*Thinking about Pakistan's Nuclear Security in Peacetime, War and Crisis,'* while cautioning against complacency, has expressed the view, that threats to Pakistan's nuclear arsenal have been "exaggerated."[69] Clary has recounted the often-expressed concerns about nuclear security in Pakistan and has then proceeded to systematically analyse each of these. In his view, Shaun Gregory's unequivocal conclusion that, "empirical evidence points to a clear set of weaknesses and vulnerabilities in Pakistan's safety and security arrangements," is too strong, because there is no evidence yet to suggest that those posing a threat to the nuclear facilities are capable of getting through and overcoming the defensive arrangements in place.[70]

Clary argues that, "In both the Sargodha and Kamra cases, an attack on a bus outside the facility – a soft target – is not the same thing as an attack on the base itself, which is protected by layers of security." [71]The Wah attack was a suicide attack at the main entrance of one of the armaments factories, causing large number of casualties. The Wah Complex widely known to be Pakistan's main production facility for conventional munitions consists of over a dozen factories and employs over 20,000 people. It is, however, hard to identify which of these factories – if at all - is involved in nuclear related work and thus became the target of a suicide attack.[72]

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[68]Feroz Hassan Khan, 'Nuclear Security in Pakistan – Separating Myth from Reality', *Arms Control Today,* Arms Control Association, July-August 2009.
[69]Christopher Clary, 'Thinking About Pakistan's Nuclear Security in Peacetime, War and Crisis', IDSA Occasional Paper No. 12, Institute for Defence Studies and Analyses, New Delhi, September 2010, p. 5.
[70]Ibid., p. 21.
[71]Ibid., p. 20.
[72] Clary, p. 19-20.

Unrelated incidents are sometimes invoked to make a case for uncertain state of nuclear security in Pakistan. In this regard, much was made out of the assassination attempts on former President Musharraf. It was argued that if the personal security of the Pakistani President could be threatened the same would be true for the nuclear weapons. Clary has opined that, "Both heads of state and nuclear weapons receive the most intensive security that a country can provide. The analogy is, however, a weak one on the grounds that different services perform the two different security missions. Moreover, the Presidents must interact with the public, but nuclear weapons can be kept locked behind gates…" [73]

In late 2008 and early 2009, when Taliban had occupied parts of Swat valley in North Western Pakistan, some analysts argued that since the Taliban are merely 60 miles away from Islamabad Pakistan's nuclear assets are under threat[74]in full knowledge of the fact that the nuclear weapons are not likely to be stored in the Pakistani capital. Similarly, in the aftermath of an October 2009 attack, on Army Headquarters at Rawalpindi, questions were raised about Pakistan's nuclear security. Undoubtedly, the attack on the General Headquarters was a serious security lapse and indicated growing audacity of militant attacks, but it had no causal relationship with nuclear security. By virtue of its nature, as a static installation located in the midst of a populated area, and its high visibility, the army headquarters was a relatively easier target. On the other hand, nuclear storage sites are located in isolated areas, in secret locations, neither easily identifiable nor easy to attack because of multiple layers of sensors and physical defences.[75]

5.5 Measures Instituted by Pakistan for Nuclear Safety and Security:

As mentioned in the previous chapter, Pakistan proceeded apace after the May 98 nuclear tests to set up an effective command and control system. All the strategic organisations which had hither-to-fore been functioning autonomously were placed under

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[73] Clary, op. cit., p. 24.
[74]See Bruce Riedel, "Pakistan and the Bomb," *The Wall Street Journal*, May 30, 2009; Bryan Bender, "Pakistan, US in Talks on Nuclear Security," *Boston Globe*, May 5, 2009, www.boston.com/news/nation/washington/articles/2009/05/05/pakistan_us_in_talks_on_nuclear_security/ and Mark Thompson, 'Does Pakistan's Taliban Surge Raise a Nuclear Threat,' The Time Magazine, April 24, 2009.
[75]Author's interviews with respondents 'A', 'B', and 'P' on 28 July, 07 August and 07 August 2012, respectively.

the NCA.[76] A system of external audit was introduced to keep an eye on the handling and accounting of sensitive materials. Later on, more sophisticated Material Protection Control and Accounting (MPC&A) system was implemented.[77]Even before the implementation of the personnel reliability programme (PRP), the ISI, Military Intelligence and Civilian Intelligence Bureau carried out background checks and cleared technical as well as security personnel for assignments at sensitive nuclear sites. During the bilateral exchanges on nuclear security with the US in 2002 and 2003 the US side gave detailed briefings on their PRP programme to the Pakistani experts. The American PRP regulations were suitably adapted and a comprehensive PRP was instituted in 2004.[78] Moreover, many technical as well as physical security measures have been implemented. For instance, Pakistani nuclear weapons require an electronic code to be fed into them before they could be armed and these codes are centrally held by the NCA.[79] Other procedural controls such as the 'two-man rule' are also employed and strict secrecy is maintained about the location of nuclear weapons' storage sites. As Chris Clary has explained that, "to preclude any possibility of inadvertent or unauthorised use of nuclear weapons, Pakistan has developed physical safety mechanisms and firewalls both in the weapon systems themselves and in the chain of command. No single individual can operate a weapon system, nor can one individual issue the command for nuclear weapons use."[80]

To ensure the safety of civilian nuclear installations in Pakistan an autonomous Nuclear Regulatory Authority was established in January 2001.[81] Though this authority does not have access to the military nuclear facilities, it has provided a check list of internationally acceptable safety standards to be complied with and heads of these

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[76]Shakil Sheikh, 'Strategic Organisations put under NCA Control,' *The News,* Islamabad, 28 November, 2000.

[77]Sharing of information on MPC&A was part of bilateral exchanges with the US and consequently the existing system in Pakistan was improved, beginning in 2004, in the light of information and training received from the US.

[78]Author's personal experience being part of the bilateral exchanges and interview with respondent 'P' at Rawalpindi on 07 August 2012.

[79] Dr Samar Mubarakmand, explained in response to a question about the possibility of some terrorist group stealing and detonating a Pakistani nuclear weapon during an interview with Geo Television in April 2004, that even if the hypothetical scenario of theft of a weapon is accepted it would be impossible for the terrorists to detonate it due to the fact that that electronic codes are built into the weapons and unless the codes are fed into it the weapon cannot be armed or exploded. This was also confirmed during the interviews conducted by the author with respondents 'A' and 'B' on 28 July and 07 August 2012 respectively.

[80] Chris Clary, op. cit. p. 16.

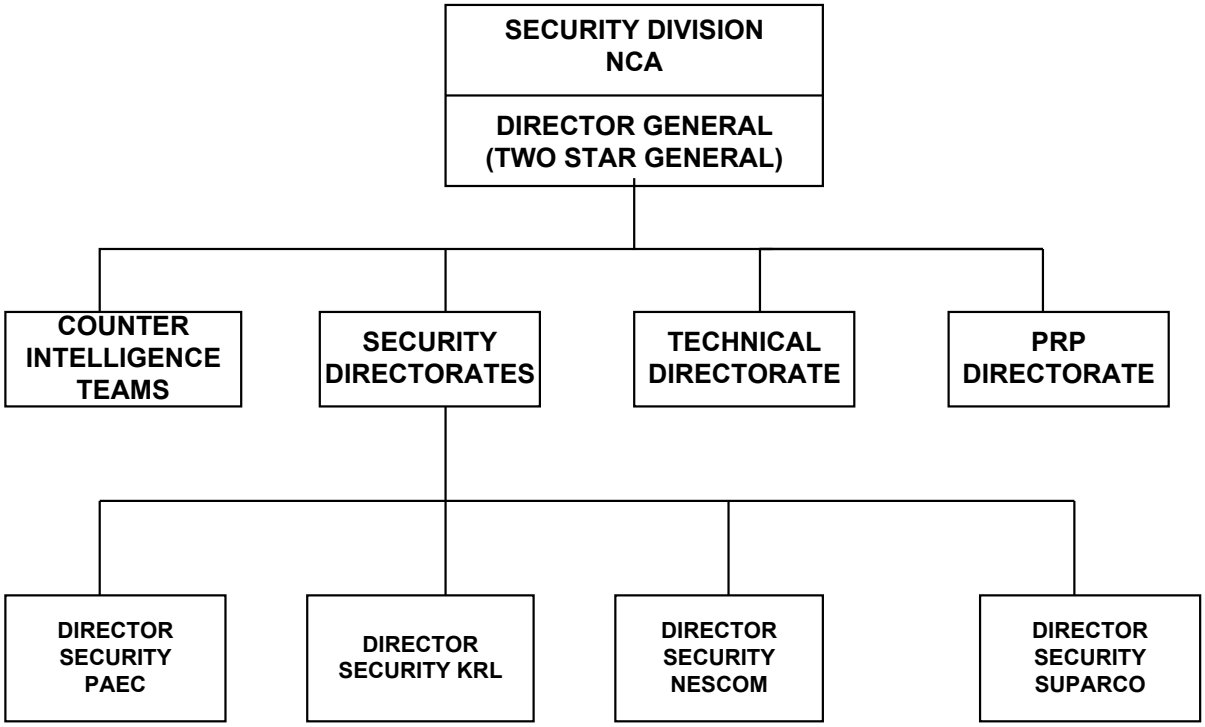
[81]The Gazette of Pakistan, Extraordinary, (Registered No. M-302/L-7646), Published in Islamabad on January 22, 2001.

installations as well as the SPD periodically check the safety at these facilities according to these standards.[82] The organisation, role and functions of the Pakistan Nuclear Regulatory Authority (PNRA) will be discussed in detail in chapter 7. The institution responsible for the safety and the physical security of the military segment of the nuclear programme is the Security Division of NCA.

Initially, when the command and control system was set up in early 1999, a brigadier was designated as 'Advisor Security NCA' with a few dozen serving and retired military personnel under his command.[83] Additionally, there were some regular infantry battalions loaned from the Army to provide physical protection at sensitive sites and installations.[84] It was soon realised however, that this particular component of the organisation would need to be expanded and the deteriorating security environment after 9/11 introduced greater urgency. The discovery of the AQ Khan network followed, which gave further impetus to the process. Overtime the small segment of the NCA dealing with security transformed into 'Security Division' of NCA headed by a two star general with exponential increase in its manpower.[85] It would be pertinent here to describe in some detail the organisation, role and functions of the security division of Pakistan's NCA because of its central role in ensuring security of Pakistan's nuclear assets.

[82]Author's interview with respondents 'A', 'B' and 'K' on 28 July, 07 August and 02 August 2012 respectively.
[83]Major General Mahmud Ali Durrani, 'Pakistan's Strategic Thinking and the Role of Nuclear Weapons,' Cooperative Monitoring Center Occasional Paper 37, Sandia National Laboratories, July 2004, p. 50.
[84]Interview with a very senior officer in the Security Division on 07 August 2012.
[85] Ibid.

5.6 Security Division of NCA – Organisation, Role and functions:



As mentioned in the preceding paragraphs, the security division of NCA is headed by a serving two star general officer who currently has 25,000 security force personnel under his command and this figure is projected to be raised to 28,000 in the next 2-3 years.[86] Each of the major strategic organisations such as the PAEC, KRL, NESCOM and SUPARCO has a serving brigadier designated as Director Security with requisite manpower. These directors are responsible for security in their respective organisations and report directly to DG Security. In the period before the establishment of the NCA, the officers responsible for security within these organisations used to report to the heads of their respective organisations which was a serious drawback.[87] In addition to these security directorates the security division has counter intelligence teams, which constitute the outermost perimeter of security and are meant to guard against external threats, espionage and internal subversion threats etc. These teams are spread all over the country and are the eyes and ears of the DG Security. There is also a technical directorate that employs all

[86]Author's interview with a senior officer of Security Division at Rawalpindi on 07 August 2012.
[87]Ibid., and author's personal knowledge of the system.

available technical means to augment security at nuclear installations and to detect possible threats.

An important part of the security division is the Personnel Reliability Programme (PRP) Directorate.[88] This directorate is responsible for the implementation of the PRP programme for the selected individuals within the nuclear establishment who are dealing with the most sensitive parts of the programme. The number of individuals covered by the PRP in strategic organisations, strategic forces and SPD itself is around 150,000. These personnel undergo strict psychological, medical, social and intellectual scrutiny at the time of recruitment and remain under a continuous oversight regime as long as they work in sensitive areas of the programme.[89] The directorate is responsible for organising initial and periodic psychological, medical and character evaluations as well as surprise checks and keeps a constant eye on the activities of the personnel covered by the PRP. Any infringement of PRP regulations by any employee renders that individual liable to disciplinary action which results in his decertification and removal from the sensitive job. The exact number of personnel removed from sensitive duties for violation of PRP obligations has not been made public by the security division. However, senior officers in the organisation insist that several cases of violation of rules have been detected at very early stages and actions have been taken accordingly.[90]

Traditionally, personnel employed for security duties at various nuclear installations were mainly recruited from amongst the retired military soldiers and officers. However, recognising the sensitivity of the job, and the exacting physical and professional standards required to fulfil the challenging duties, in the backdrop of the prevailing terrorist activity in the country as well as the external threats, a new approach has been adopted. Since January 2004 the security division has been recruiting its own personnel. To begin with these men were selected from among the ex-servicemen. However, with effect from 2010 it started its direct induction from the civilian volunteers, with much higher physical and IQ standards than the standards laid down for regular army soldiers. These recruits, trained in various regimental training centres of the army, now form the

[88]The PRP Directorate was established in 2004 after the briefings and workshops attended by relevant SPD officials in the US in 2003 and 2004.Author's interview with respondent 'P' at Rawalpindi on 06 August 2012.
[89]Based on information received from a senior official through e mail on 19 September 2014.
[90]Author's interview with a senior officer of the Security Division on 07 August 2012 at Rawalpindi.

bulk of the force and would gradually replace all the old retired personnel in a phased programme, in the near future.[91] In this regard, the NCA decided to establish a specialised training academy for imparting training to the security force personnel. The academy is built on the model of the National Nuclear Security Administration (NNSA) Academy at Albuquerque, New Mexico in the United States.[92] This state of the art training facility was inaugurated by General Khalid Shamim Wynne, Chairman Joint Chiefs of Staff Committee (CJCSC) on April 13, 2012. Speaking on the occasion the CJCSC stated that, "highest standards of safety and security in the nuclear field have always been and shall remain the hallmark of Pakistan's strategic programme." While expressing his satisfaction on the establishment of the SPD Training Academy he called it, "a very significant milestone in Pakistan's continued efforts towards strengthening nuclear safety and security. Adding that, "the training facility has only recently been offered for training to the international community under IAEA auspices, by the Prime Minister of Pakistan at the Nuclear Security Summit at Seoul."[93]The academy spread over a vast area provides training on the pattern of special-forces training to the officers and men of the security force. It will also house a mock nuclear facility, which is being built by Pakistan Nuclear Regulatory Authority (PNRA) with assistance from the IAEA. The academy has been turned into a Centre of Excellence that will provide realistic and high quality training environment for trainees from Pakistan as well as foreign countries.[94]

Besides creating a specially trained and equipped force, the security division has also established an Emergency Response Centre, at its headquarters in Rawalpindi, with an elite rapid reaction force capable of reaching, the scene of any untoward incident at a nuclear facility anywhere in the country, in a short span of time. It carries out regular war games and field exercises to identify weaknesses and to sharpen the skills of its forces.[95] Furthermore, the security division has also installed radiation detection portal monitors at critical entry and exit points in the country.[96] More importantly, in addition to institutional

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[91]Based on information received from a senior official through e mail on 19 September 2014.
[92]A team of officers including the author had visited the NNSA Academy at Albuqurque in December 2003 and were briefed on training programmes and procedures as well as the PRP programme. The SPD Academy was built with US financial assistance replicating the model of the NNSA Academy.
[93] Inter Services Public Relations Press Release, No PR84/2012-ISPR, Rawalpindi, dated April 13, 2012.
[94]Author's visit to the SPD Academy and briefing by a senior official on 08 August 2012. The IAEA has announced to run its regional course on 'Radiation Security' for the year 2014 at the SPD Academy.
[95]Author's interview with a very senior officer in the Security Division at Rawalpindi on 07 August 2012.
[96] Ibid.

and administrative measures, a need was felt to inculcate a 'security culture' within the various organs of the NCA and in the strategic organisations. This was a challenging task given the general lack of security consciousness compared with more advanced countries. However, over the last decade or so this security culture is becoming more and more evident at least in the NCA Secretariat, Security Division and various strategic organisations.[97]

Critics both within and outside Pakistan have raised concerns over the presence of Islamists or Islamist sympathisers within the nuclear establishment and have expressed doubts about the effectiveness of the PRP. To support their arguments they cite the fact that the PRP has supposedly not caught any offenders so far. In response the Pakistani officials argue that there is a general tendency to equate religiosity with extremism and a readiness to label any bearded person as an extremist. They concede that there are quite a few bearded persons amongst the scientists, engineers and even the security forces but this is indicative of religiosity and conservatism, rather than widespread religious fanaticism. They also alluded to a policy not to publicise cases of people found to be contravening the PRP regulations, though they are removed from sensitive positions in case of any infringement of rules. In an interview with the author a very senior official responsible for security asserted that the monitoring system works in 3-4 stages and many cases are detected and actions are taken pre-emptively before any actual mischief could have occurred.[98]

The small but vocal anti-nuclear lobby in Pakistan is also sceptical of the security measures instituted by the government arguing that, "religious conservatism gripping the applicant pool [for jobs in the nuclear establishment] makes it too difficult to discern potentially dangerous zealots."[99] In practice, however, all potential recruits have to undergo extensive background checks and their credentials are independently verified by at least four different intelligence agencies before they could be cleared for induction. These agencies include the security division of NCA, Inter-Services Intelligence (ISI), Military Intelligence and the Intelligence Bureau and the process is very time consuming usually

[97] During visits to some of these institutions by the author in July-August 2012 a discernible improvement in security culture and practices was seen in the form of walk through gates, electronic code controlled doors, electronic ID badges, and thorough checking/identification of visitors.
[98] Author's interview with a senior officer of the Security Division in August 2012 at Rawalpindi.
[99] Ibid.

taking from 6-12 months.[100] The newly inducted individuals are subjected to psychological and medical tests and a fresh security screening is carried out every two years. There is also a system of random surprise checks, as well as a 'peer reporting' system.[101]

In a Pakistani academic's opinion, "Pakistan's 'urban Taliban', rather than illiterate tribal fighters, pose a nuclear risk. There are indeed more than a few scientists and engineers in the nuclear establishment with extreme religious views."[102] The officials, however, contend that the system has adequate mechanisms to take care of such individuals. In a rare sharing of information on the functioning of the PRP system a senior security official informed a Wall Street Journal correspondent, that an employee was expelled from the nuclear programme for distributing pamphlets of a religious party amongst his colleagues and trying to persuade his co-workers to attend a religious rally at a local mosque. The general explained that, "We don't mind people being religious, but we don't want people with extreme thoughts."[103] This clearly indicates that not only the system has very little tolerance for radical ideologies and practices it is also capable of detecting and acting in case of any violations of the code of conduct.

5.7 Bilateral Security Cooperation with the United States:

In October 2002, on the eve of US attack on Afghanistan, Secretary of State Colin Powell visited Islamabad and conveyed American concerns about the security of Pakistan's Nuclear weapons. The Pakistani leaders on their part expressed their confidence in the viability and effectiveness of the security arrangements in place. Secretary Powell explained that he was neither interested in knowing how many weapons Pakistan had, nor in knowing their locations or the type of security arrangements in place while offering to share United States' vastly greater experience in securing nuclear weapons.[104] The Pakistani side laid down clear red lines for this cooperation which included complete non-intrusiveness, and Pakistan's right to pick and choose the areas of cooperation.[105] In any case due to limitations imposed by the US legal obligations accruing out of its membership

[100]Interview with respondent 'P' at the Security Division at Rawalpindi on 07 August 2012.
[101]Ibid. Also see Bruno Tertrais, 'Pakistan's nuclear programme: a net assessment', Recherches and Documents No. 4/2012, Fondation pour la Recherche Strategique, Paris, www.f r s t r a t e g ie.o r g
[102]Clary, op. cit. p. 22.
[103] Peter Wonacott, op. cit.
[104]Author's interview with respondent 'A' at Islamabad on 28 July 2012.
[105]Author's personal experience as part of the Pakistani team at the bilateral negotiations and as a member of the experts' group.

of the Non-proliferation Treaty and Pakistan's legitimate concerns about the possibilities of rigging or bugging the technology the scope of the bilateral cooperation has remained limited to a few mutually agreed areas. These include sharing of best practices related to protection of fixed installations, convoys transporting sensitive nuclear materials, MPC&A, export and border controls and personnel reliability programmes.[106] In 2003, a group of Pakistani experts visited the US to witness demonstrations and attend workshops on training of security forces and personnel reliability programme. The US also provided training to selected security personnel from Pakistan at the NNSA Academy with a view to creating a core of instructors who could then impart training to other personnel in Pakistan. The establishment of the SPD Academy is also an outcome of this bilateral cooperation.[107]

There have been some speculative stories in the press about the nature of this cooperation and questions have also been raised about the utility of this cooperation. Sceptics in Pakistan have expressed concerns that in the garb of this security cooperation the United States might have made ingress into sensitive areas of Pakistani nuclear programme, while those in the US seem to be concerned about whether the assistance has been appropriately used and whether it has produced any positive results. But such speculations have no relationship with reality to say the least.[108] One thing is certain, however, that this mutual interaction has raised the confidence level of senior US government officials in the efficacy of Pakistan's nuclear security. The official Washington has always been more confident of Pakistan's nuclear security than the media and think tank analysts. The obvious reason is that the officials have greater access to information and knowledge about the steps taken by Pakistan to enhance security on its own volition as well as with the help of technical assistance and information sharing by the United States. For instance, Admiral Michael Mullen, then Chairman of the Joint Chiefs of Staff remarked in May 2009 that, "the United States, have invested fairly significantly over the last three years, to work with them [Pakistan], to improve that security. And we are satisfied, very satisfied with that progress."[109] In a similar vein Richard Armitage, former Deputy Secretary of State said, "We have spent considerable time with the Pakistani military, talking with them and working with them on the security of their nuclear

[106]Ibid.
[107] Ibid.
[108]Ibid.
[109] Clary, op. cit. p. 16.

weapons. I think most observers would say that they are fairly secure. They have pretty sophisticated mechanisms to guard the security of these."[110]

It is also worth mentioning that the cooperation between the US and Pakistan was in the security domain, which relates to the installations and transportation of sensitive materials rather than safety, that is directly linked with the weapons due to the reasons already explained. In this regard there have been suggestions that US should provide Permissive Action Links (PALs), which are essentially electro-mechanical locks, to be installed on Pakistani weapons for safety purposes, but this is impracticable due to restrictions imposed by US laws as well as Pakistani concerns about secrecy and confidentiality.[111] It may be pointed out that PALs are purpose built mechanisms based on the designs of particular weapon systems. Since Pakistan was not willing to compromise the technical parameters of its weapons even if the US would have offered to provide such technology there was no scope of cooperation in this area. Moreover, senior Pakistani officials have claimed that Pakistan has already developed its own version of the PALs.[112]

The bilateral cooperation on nuclear security between the US and Pakistan however, continues to be a subject for speculation and insinuation by some journalists. In an article published in the New Yorker on November 16, 2009, Seymour Hersh, a well-known investigative journalist made some startling claims. He averred that, "current and former officials said in interviews in Washington and Pakistan that [the Obama] Administration has been negotiating highly sensitive understandings with the Pakistani military. These would allow specially trained American units to provide additional security for the Pakistani arsenal in case of a crisis," adding that, "the Pakistani military would be given money to equip and train Pakistani soldiers and to improve their housing and facilities."[113]Michael Krepon, a well-known expert on South Asian nuclear affairs, has characterised Hersh's assertions as 'headline grabbing' and has questioned his claims remarking that:-

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[110] Ibid.
[111]Mark Thompson, 'Does Pakistan's Taliban Surge Raise a Nuclear Threat,' The Time Magazine, April 24, 2009.
[112] Lieutenant General (Retired) Khalid Ahmed Kidwai, Director General of Strategic Plans Division made this assertion during a talk at the Naval Postgraduate School at Monterey, California in October 2006.
[113] Seymour Hersh quoted in Seymour Hersh and Pakistan's Nukes by Michael Krepon in ArmsContrlWonk.com.

> "There are many reasons to seriously doubt Hersh's headline, and the sources he relied upon to reach this conclusion, explaining that, First, Pakistan's military establishment doesn't need to provide access to its most sensitive nuclear sites in order to receive money for equipment and training from the United States. Second, there is wide trust deficit at present between Pakistan and the United States. Pakistan's military does not trust the United States to get up close and personal with its crown jewels, which is why offers to provide help along these lines have been rebuffed in the past. If special units of the US military were to visit nuclear-related facilities in Pakistan, it is highly unlikely that they would be served tea and treated as guests. Third, the very few individuals in Pakistan who know truth from fiction regarding nuclear safety and security don't speak to journalists about particulars."[114]

Krepon's views were echoed by General Tariq Majid, then Chairman Joint Chiefs of Staff Committee, in remarks to Pakistani media saying that, "There is absolutely no question of sharing or allowing any foreign individual, entity or state any access to sensitive information about our nuclear assets. Our engagement with other countries…..to learn more about international best practices for security of such assets is based on two clearly spelt out red lines – non-intrusiveness and our right to pick and choose."[115]

5.8 Pakistan and the Global Nuclear Security Efforts:

Pakistan has been actively participating in the nuclear security summit process initiated by President Obama with a meeting of a selected group of countries and concerned international organisations at Washington, DC in April 2010. The second summit was held at Seoul in 2012, the third has been held at Hague in March 2014 and another is scheduled to be held at Washington, DC in 2016. The main purpose of these summits is to sensitise the highest level leadership of key countries about the significance of nuclear security and to jointly advocate the need for measures to be taken by every country to enhance nuclear security. Leaders attending these summits have endorsed important measures to maintain effective nuclear security over all nuclear materials in their respective countries. These included President Obama's goal of securing all nuclear materials within four years – a goal which has been partially met so far, as well as the need

[114] Michael Krepon, Sy Hersh and Pakistan's Nukes, ArmsControlWonk.com, posted on November 19, 2009 under krepon-shoebox, Pakistan by Michael_krepon.
[115] Ibid.

for converting nuclear reactors running on highly enriched uranium (HEU) to low enriched uranium. The summits have also underlined the importance of the implementation of International Convention on Suppression of Acts of Nuclear Terrorism and the Convention on the Physical Protection of Nuclear Materials and its additional protocol of 2005. Additionally, they have supported the effective implementation of UNSC Resolution 1540, which requires all countries to promulgate laws to prevent the proliferation of Weapons of Mass Destruction (WMDs) and their delivery systems. The nuclear security summits have also supported the initiatives such as the Global Initiative to Combat Nuclear Terrorism (GICNT), disposal of surplus nuclear materials and reduction of the use of HEU in civilian nuclear activities.[116]

Pakistan has fulfilled its international obligations by submitting comprehensive reports to the 1540 committee.[117] It has been actively participating in the GICNT activities, which include nuclear forensics and efforts to improve detection of nuclear and radioactive materials. Pakistan, though endorsing the recommendations of the security summits, did not make any national commitments at the Washington summit. However, at the Seoul summit, it made a commitment to establish a nuclear security training centre and signed the Joint Statement on Nuclear Security Training and Support Centres.[118] The centre, referred to earlier as the SPD Training Academy, is designed to become a regional and international facility for nuclear security training, to be organised under the IAEA's auspices. Pakistan had also promised to deploy portal monitors for detection of radiological materials to prevent illicit trafficking of such materials. These portal monitors have already been deployed at critical entry and exit points by the Security Division. These are in addition to those being deployed by the Pakistan Nuclear Regulatory Authority.[119]

Pakistan informed the Seoul summit, that it has taken a number of measures to strengthen its export controls, protect radiological sources and block nuclear smuggling. In this regard it has revised and improved its control lists associated with its export control

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[116]Nuclear Security Summits, US Department of State, http://www.state.gov/t/isn/nuclearsecuritysummit/
[117]Pakistan's Reports to the 1540 Committee can be viewed under the 'National Reports' available at http://www.un.org/en/sc/1540/national-implementation/national-reports.shtml
[118]Michelle Canne, "2010 Nuclear Security Summit National Commitment Implementation," U.S.-Korea Institute at SAIS, March 2012, http://uskoreainstitute.org/wp-content/uploads/2012/03/USKI_NSS2012_Cann.pdf.
[119]Ibid., Naeem Salik and Kenneth N. Luongo, 'Challenges for Pakistan's Nuclear Security,' *Arms Control Today*, March 2013.

legislation and has fabricated mobile laboratories to assist the first responders and other law enforcement agencies in the event of a radiological incident. Pakistan is also undertaking the improvement of physical security of eleven nuclear medical centres as part of its National Nuclear Security Action Plan initiated in 2006.[120] It may be pointed out that:-

> "Pakistan has taken a number of actions related to nuclear security and safety beyond those it pledged at the summits. It has intensified collaboration with the IAEA by joining 'collaborating centres', which are designed to standardise technology, disseminate information, and facilitate research and learning on a range of issues related to IAEA activities, including nuclear safety and security. It is also participating in the development of the IAEA Nuclear Safety Action Plan."[121]

Pakistan has also taken steps to improve nuclear safety. In an address to the IAEA's annual General Conference in Vienna in September 2012, Dr Ansar Pervez, Chairman of Pakistan Atomic Energy Commission stated that, "Pakistan had been actively engaged in absorbing lessons from the March 2011 accident at the Fukushima nuclear reactor complex in Japan. The PAEC has identified a comprehensive set of safety retrofits that are in various stages of implementation."[122]

The Nuclear Threat Initiative (NTI's) Nuclear Materials Security Index released in January 2014 has declared that, "amongst nuclear-armed states Pakistan is most improved through a series of steps to update nuclear security regulations and to implement best practices, though it ranks 22nd overall."[123] Pakistan has improved its position by three points since the last index published in 2012 and has overtaken India. On 12th of March 2014, the IAEA Director General Yukiya Amano visited Pakistan's Centre of Excellence for Nuclear Security. The visiting dignitary acknowledged Pakistan's record of safe and secure operations of its nuclear plants and assured IAEA's full cooperation in this regard.[124] The IAEA has decided to run its Regional Nuclear Security Course for 2014 at

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[120]Naeem Salik and Kenneth N. Luongo, op. cit., p. 17-19.
[121]Ibid., p. 18.
[122]Ibid., p. 17.
[123]NTI Nuclear Security Index, Second Edition, available at http://www.nti.org/analysis/reports/2014-nti-nuclear-materials-security-index-report/
[124] 'DG IAEA Visits Nuclear Centre of Excellence', *The News International*, Islamabad, March 13, 2014.

Pakistan's Centre of Excellence which is seen as recognition of Pakistan's efforts in the realm of nuclear security and the internationally acceptable standards of its training institutions.

5.9 Conclusion:

In conclusion it is important to address two basic questions related to nuclear safety and security in Pakistan. The first is whether there is a nexus between 'Political Instability' and 'Nuclear Security' in Pakistan and the second, relates to whether there is any clear evidence of learning on part of Pakistan in relation to nuclear safety and security. If the answer to the first question is in the negative and the answer to the second question is in the affirmative most of the concerns often expressed about nuclear security in Pakistan would have been addressed.

Pakistan has frequently experienced political instability, partly due to weak political institutions, several breakdowns of politicalorder and replacement of democratic governments by military dispensations and is partly due to its location in a very turbulent neighbourhood. The fragility of Pakistani system of governance has been widely commented upon in the past decade due to rampant acts of terrorism in many parts of the country mostly as a spill over of the counter terrorism operations astride its western border against Al-Qaida and Taliban elements. However, Pakistan has a seasoned civilian bureaucracy, a pro-active and functioning judiciary, an independent media, an active civil society and a large professional military though Pakistan's overall record of governance has been poor. Concerns about an imminent takeover of power in Islamabad by religious extremists or Taliban, are, however, unrealistic. First, a forcible takeover of government by the extremists can only happen in case there is a total breakdown of the state structures and complete melt down of its military, which is highly unlikely. Second, extremists' assumption of power through ballot is also far-fetched given the historical record of Pakistani elections, wherein, even the relatively moderate mainstream religious political parties have never won more than 5-7 per cent of the votes in any national elections. Statements such as that by then IAEA Director General Mohammed Al-Baradei,

expressing fears of a radical regime taking over power in Pakistan and consequently gaining control of nuclear weapons are, therefore, divorced from reality.[125]

Since the inception of Pakistan's nuclear weapons programme, the country has experienced many serious crises. In July 1977, the government of Z.A. Bhutto was toppled by General Zia-ul-Haq. Zia himself died in an air crash in August 1988 and despite the serious nature of the crisis, a smooth transition of power took place, without any tinkering with the authority overseeing the nuclear programme. There were four transitions of political government during the decade of the 1990s, before General Musharraf's military take-over in October 1999, with no discernible impact on the system of controls over the nuclear programme. Since then, there has been a transition to civilian rule in 2008 and the transfer of power to the next elected government in 2013, without any disruption of nuclear command and control and safety and security systems.

An overview of the evolution of the institutions directly responsible for keeping Pakistan's nuclear arsenal safe and secure and the implementation of legislative and administrative measures besides development of rules and procedures governing both the conduct of personnel assigned for security duties as well as handling of sensitive materials and technologies, makes it clear that discernible progress has been made. The security division's exponential growth from a few dozen people, without any specialised training, to 30,000 specially recruited, trained and equipped personnel, is a significant achievement. The mechanisms that have been developed to oversee the personnel working in sensitive areas of the programme and handling sensitive materials and to keep a constant eye on the threats that may be brewing within the system or emanating from external sources indicate a clearly charted road map. There are no half measures and the system is subjected to a constant review, tested through war games and continuously improved. The growth and refinement of the security system over the last decade clearly indicates a positive and fairly steep learning curve that has been consolidated through institutionalisation of the lessons learnt.

Pakistan has invested the greatest effort in terms of human as well as financial resources to augment its nuclear safety and security rightly assessing the threat posed to its

[125]"AlBaradei to AlHayat," *Dar Al Hayat,* English Edition online, January 10, 2008, http://english.daralhayat.com/Spec/01-2008/Article-20080110-639032eb-c0a8-10ed-01ae-81ab2ea588db/story.html.

nuclear assets by non-state actors operating within the country as well as the historic perception of outside threat to its nuclear infrastructure. Though there are still gaps in the dissemination of information about the developments in this domain the available information is enough to suggest that learning in this particular area has been extensive.

Chapter – 6

Pakistan's Nuclear Export Controls Regime

This chapter will examine Pakistan's efforts since 1998 to constitute a comprehensive nuclear export controls regime. An effort will be made to highlight the significance of the international nuclear export controls regime and its various components and then contextualise Pakistan's efforts to reform and strengthen its nuclear export controls system to bring it at par with the international standards. Pakistani efforts to improve upon its pre-1998 export controls system through legislative, administrative and institutional measures will then be traced. This insight will enable us to evaluate the learning in this domain by relevant state institutions over a period spanning more than a decade. The visible manifestations of this learning are in the form of establishment of new institutions and enactment of nuclear export control laws through inter-ministerial and parliamentary processes as well as appropriate administrative actions. This will also help us identify the domestic and /or international pressures and compulsions and enabling factors that helped to move the learning process forward in this particular area.

6.1 A Brief Introduction to Nuclear Export Controls:

Export Controls in the nuclear context are criteria instituted and employed to keep a check on the transfer of sensitive materials, equipment and technology from one country to another or diversion of imported materials from peaceful areas of the nuclear programme to the weapons oriented activities within a country. These measures include national legislation and regulations, international obligations accruing from multilateral treaties or specific United Nations Security Council Resolutions, and informal arrangements amongst industrially developed countries, with actual or potential capability to export sensitive materials and technologies.

An effective export control system is designed to 'cause delay' and 'increase the costs' of acquisition of nuclear weapons capability even if it cannot ultimately prevent a determined state from achieving its objectives. It also 'deters' potential proliferators by the prospects of negative consequences in the form of sanctions. However, the deterrent will only be effective if there are efficient detection measures and the penalties of violations outweigh the gains for both the supplier and the recipient of technology. The export controls increase the chances of detecting illegitimate trade

in sensitive materials and technologies and thus create an opportunity to closely monitor such activities in the future by the state or states involved. Mechanisms devised to implement export controls yield useful information about the covert nuclear programmes being pursued by countries of concern. If the export control systems are unable to detect any illegal activity there is a high degree of assurance that states suspected of involvement in surreptitious nuclear programmes are not involved in secret nuclear activities. The export control lists which are also known as 'trigger lists' facilitate export decision by states and help them in furnishing requisite information to the International Atomic Energy Agency (IAEA). Finally, the export controls enable the states to monitor the activities of their citizens as well as commercial entities thereby helping them fulfil their obligations accruing from article III of the Non-proliferation Treaty (NPT) and the terms of the export control groupings of which they may be members. [1]

There is a close nexus between nuclear non-proliferation regime and nuclear export controls. According to Dr Hans Blix, Director General Emeritus of International Atomic Energy Agency (IAEA), "export control is an important component in the efforts to prevent further nuclear proliferation. This was underlined in the consensus statement of 31 January 1992 by the United Nations Security Council in which the Council inter alia, underlined the importance of effective export controls."[2]While the regime based on multilateral treaties provides the legal foundations for the non-proliferation efforts the export control mechanisms play an important complementary role due to the fact that access to nuclear technology and materials is limited to a small number of countries. By exercising control over the trade in specialised technologies, equipment and substances efforts by non-nuclear weapons states to acquire nuclear weapons can be curbed or at least substantially delayed.

Most of the existing export control agreements have more or less similar membership comprising mainly Western industrialised countries including the five recognised nuclear weapons states (as would be clear from the table below). This factor alone causes concerns amongst less developed countries, which view these groupings as 'cartels' created by more advanced countries to perpetuate the division between the haves and have-nots and thus raise questions on their legitimacy.

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[1] ISIS, 'Key Elements of an Effective Export Control System', Institute of Science and International Security, 2003, http://exportcontrols.info/print/key_elements.htm

[2] Dr Hans Blix, 'Keynote Speech' at International Seminar on the Role of Export Controls in Nuclear Non-Proliferation, held at Vienna International Centre, Vienna, 7-8 October 1997.

MEMBERS OF ZANGGER COMMITTEE & NSG

ZANGGER COMMITTEE	NUCLEAR SUPPLIERS GROUP (NSG)
1)Argentina	1)Argentina
2)Australia	2)Australia
3)Austria	3)Austria
4)Belarus	4)Belarus
5)Belgium	5)Belgium
-	6)Brazil
6)Bulgaria	7)Bulgaria
7)Canada	8)Canada
8)China	9)China
9)Croatia	10)Croatia
-	11)Cyprus
10)Czech Republic	12)Czech Republic
11)Denmark	13)Denmark
-	14)Estonia
12)Finland	15)Finland
13)France	16)France
14)Germany	17)Germany
15)Greece	18)Greece
16)Hungary	19)Hungary
-	20)Iceland
17)Ireland	21)Ireland
18)Italy	22)Italy

19)Japan	23)Japan
20)Kazakhstan	24)Kazakhstan
21)Republic of Korea	25)Republic of Korea
-	26)Latvia
-	27)Lithuania
22)Luxemburg	28)Luxemburg
-	29)Malta
-	30)Mexico
23)Netherlands	31)Netherlands
24)New Zealand	32)New Zealand
25)Norway	33)Norway
26)Poland	34)Poland
27)Portugal	35)Portugal
28)Romania	36)Romania
29)Russian Federation	37)Russian Federation
-	38)Serbia
30)Slovakia	39)Slovakia
31)Slovenia	40)Slovenia
32)South Africa	41)South Africa
33)Spain	42)Spain
34)Sweden	43)Sweden
35)Switzerland	44)Switzerland
36)Turkey	45)Turkey
37)Ukraine	46)Ukraine
38)United Kingdom	47)United Kingdom
39)United States	48)United States

It was realised in the very early days of the nuclear era that the unbridled spread of nuclear technology with its immense destructive potential would pose a very grave threat to international security as is evident from the 'Baruch Plan' presented by the United States at the United Nations wherein it was proposed to set up an International Atomic Development Authority which should exercise:-

1. Managerial control or ownership of all atomic-energy, activities potentially dangerous to world security.
2. Power to control, inspect, and license all other atomic activities.
3. The duty of fostering the beneficial uses of atomic energy.
4. Research and development responsibilities of an affirmative character intended to put the Authority in the forefront of atomic knowledge and thus to enable it to comprehend, and therefore to detect, misuse of atomic energy. To be effective, the Authority must itself be the world's leader in the field of atomic knowledge and development and thus supplement its legal authority with the great power inherent in possession of leadership in knowledge.[3]

In the words of Dr Hans Blix, "from the beginning of the nuclear era export controls and export restrictions have been seen as indispensable."[4] As early as 1943, the United States, the UK and Canada had reached a secret agreement at Quebec not to share any information, technology or sensitive materials with any other country without mutual consent. The 'Baruch Plan,'[5] presented by the United States in the nascent United Nations Organisation in June 1946, through President Truman's representative, Bernard Baruch, was the first attempt to bring nuclear technology under international controls. The Soviets, who had not acquired nuclear capability at the time, suspected it as an American ploy to perpetuate their monopoly over nuclear power and deny it to others.

Later, on 8 December 1953, President Eisenhower unveiled his famous 'Atoms for Peace' programme[6] aimed at sharing the benefits of peaceful nuclear technology with countries that did not have access to nuclear technology. To implement

[3]'The Baruch Plan,' Available at http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml
[4] Dr Hans Blix, op. cit.
[5] The Baruch Plan (Presented to the United Nations Atomic Energy Commission, June 14, 1946). http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml
[6]President Eisenhower's "Atoms for Peace" Speech, December 8, 1953.Before the General Assembly of the United Nations on Peaceful Uses of Atomic Energy.http://www.atomicarchive.com/Docs/Deterrence/Atomsforpeace.shtml

Eisenhower's plan necessary changes were incorporated in the US Atomic Energy Act to allow exports of nuclear technology and materials on the condition that the countries receiving such assistance would make a commitment not to utilise this technology for production of nuclear weapons. Under the auspices of the Atoms for Peace Programme selected countries were provided training, technical information and assistance in setting up research reactors.[7] Peter Lavoy has argued that, the programme inadvertently helped the rapid spread of nuclear technology around the world, some of which was later misused. In his view, "optimism in the ability of US technology to deliver prosperity and peace to the world did not abate until India's 1974 nuclear explosive test demonstrated the dangerous potential of 'peaceful' nuclear technology."[8]

This collaboration in peaceful uses of nuclear technology, however, was deemed to be regulated through international oversight arrangements, to ensure that technology shared for peaceful purposes was not misused by the recipients for any military purposes. This led to the creation of the International Atomic Energy Agency (IAEA) in 1954. The role of the IAEA was, to prevent the diversion of the imported nuclear technology to any purpose other than its peaceful uses, through a system of inspections and safeguards. The safeguards system however, was not very effective and many bilateral transactions between countries, in the era before the entry into force of the nuclear non-proliferation treaty (NPT) in 1970, were carried out merely on the basis of good faith rather than any binding obligations. Some of these agreements were later abused by the beneficiary countries. The Canadian supplied research reactor to India known as 'CIRUS' is a case in point. The US supplied the heavy water for the reactor. The reactor was supplied with the good faith understanding that it would be used only for peaceful research. However, India used the plutonium extracted from this reactor to conduct its first nuclear test in 1974. Canada felt betrayed but there was no legally binding agreement that would have prevented this abuse.[9]

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[7] Peter Lavoy, 'The Enduring Effects of Atoms for Peace', *Arms Control Today*, Arms Control Association, December 2003.
[8] Ibid.

[9]Raja Ramanna, the former director of India's nuclear program, speaking to the press trust of India on October 10th, 1997, said: "The Pokhran test" - that is the 1974 explosion - "was a bomb, I can tell you now. An explosion is an explosion. A gun is a gun, whether you shoot at someone or shoot at the ground. I just want to make clear that the test was not all that peaceful." See 'The US-India Nuclear Cooperation Deal: A Critical Assessment,' Arms Control Association Press Briefing Wednesday, February 15, 2006. Available at http://www.armscontrol.org/events/20060215_India_Transcript

6.2 NPT, IAEA Safeguards and the Origins of the Zangger Committee:

When the Non-proliferation Treaty (NPT) entered into force in 1970, it did not have any inherent institutional structure to monitor its implementation. IAEA was, therefore, asked to carry out this function through its safeguards system. It may be pertinent here to reproduce the formulation of Article III of the NPT:-

> 1. *Each non-nuclear –weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the IAEA and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under the treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedure for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.*
> 2. *Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, or use or production of special fissionable material, to any non-nuclear weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article.*

However, Article III.2 did not define the source or special fissionable materials nor did it elaborate the especially designed or prepared equipment or materials. The Treaty seemed to have left the task of licensing of exports of sensitive nuclear materials at the discretion of the individual states, while IAEA safeguards were meant to verify any such transactions. Consequently, in 1971, a committee was formed under the chairmanship of Claude Zangger of Switzerland to prepare a list of: (a) source or special fissionable materials, and (b) equipment or materials especially designed or prepared for the processing, use, or production of special fissionable materials.[10]The objective of the

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[10]Zangger Committee, http://www.nti.org/treaties-and-regimes/zangger-committee-zac/

committee was to regulate the trade in nuclear technology in accordance with Article-III of the NPT. The Committee compiled a list of goods and elaborated the licensing procedures for nuclear exports. This list is called the 'Trigger List' because of the fact that any export of items listed in it would automatically trigger the application of IAEA safeguards. The purpose was to ensure that, nuclear related goods exported for peaceful purposes as envisaged in the NPT, would not be used for military purposes. The Zangger Committee's Trigger List was published in September 1974, as an IAEA Information Circular 209 (INFCIRC/209).[11]

The initial Zangger Committee list included items directly related to nuclear technology, such as reactors, reactor components and special nuclear materials. Later on, the lists were successively revised and updated to include dual use items as well. Dual use items are those materials and equipment that have uses in nuclear technology but at the same time these have legitimate non-nuclear applications as well. A prime example is 'high speed inverters' which are used both in gas centrifuge uranium enrichment plants as well the textile industry. Similarly, high grade aluminum and Maraging steel are used both in nuclear and non-nuclear industries. Computers with very high processing speeds also commonly known as 'super computers' and high speed x-ray machines also fall under this category. Membership of the Zangger Committee is on voluntary basis and entails no formal commitments to enforce the guidelines. Members of the committee meet biannually for information sharing and updating/revision of its list of controlled items.[12]

In 1991 after the first Gulf War the full extent of Iraq's illicit nuclear activities, wherein Iraq was involved in secretly developing uranium enrichment capability, was revealed through UN mandated inspections carried out by the IAEA.[13] This combined with North Korea's activities at its Yongbyon reactor involving separation of plutonium from spent fuel rods for weaponisation purposes,[14] exposed the limitations of the existing safeguards system of the IAEA. The biggest flaw in the safeguards arrangements in effect at the time was that, the IAEA inspectors could only verify the facilities declared by the member states, and there was no provision to check undeclared and clandestine facilities. Therefore, in 1993, the IAEA initiated an effort to close this

[11] Dr Fritz W. Smith, Chair Zangger Committee, 'The Role of the IAEA in Nuclear Export Controls', speech made at International Seminar on the Role of Export Controls in Nuclear Non-Proliferation, held at Vienna International Centre, Vienna, 7-8 October 1997.
[12] Sharon Squassoni, op. cit.
[13] Iraq: A Chronology of UN Inspections, *Arms Control Today,* October 2002. www.armscontrol.org
[14] See 'Timeline on North Korea's Nuclear Programme,' *The New York Times*, August 6, 2013.

loophole and make the safeguards mechanisms more effective. This initiative was known as the '93+2' plan as it was envisaged to be implemented by 1995. The new programme had two components i.e., a technical component and a legal component. In terms of technical innovations new measures such as 'environmental sampling', 'short-notice inspections' of declared facilities and 'remote monitoring and analysis' were adopted. The environmental sampling was first adopted as a means to augment the application of IAEA Safeguards in 1996. It is based on the assumption that every nuclear process releases small quantities of materials in the environment. This material settles down on nearby equipment, buildings, vegetation and soil, or can mix into water or air. Swipes taken from these structures are used as samples for analysis, while air samples collected from the area around a nuclear facility help in the Wide Area Environmental Sampling (WAES).[15]

In the legal domain agency's mandate was to be extended through the adoption of an additional protocol by NPT member states to augment their existing safeguards agreements with the agency. The IAEA adopted a 'Model Additional Protocol' in May 1997 for voluntary acceptance by non-nuclear weapon states parties to the NPT.[16] As for the nuclear weapons states parties to the NPT, they could individually negotiate country specific protocols with the IAEA. However, India, which is neither a nuclear weapon state as per the NPT stipulation, nor is an NPT state party, was allowed to negotiate a 'country specific' protocol with the IAEA – a privilege that is only available to the five nuclear weapon states recognised by the NPT. The protocol was approved by the IAEA Board of Governors by consensus on 01 August 2008.[17] Such exceptionalism is detrimental to the credibility of the non-proliferation regime and undermines confidence of other states in the regime itself.

6.3 The Nuclear Suppliers' Group (NSG):

Alarmed by India's explosion of a nuclear device in May 1974, using nuclear technology, explicitly provided for peaceful uses, the US initiated efforts to develop a mechanism to curb the unbridled commerce in nuclear technology. The discussions which began in 1975 amongst seven nuclear supplier countries including Canada,

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[15] See E. Kuhn, D. Fischer, M. Ryjinski, 'Environmental Sampling for IAEA Safeguards: A Five Year Review', International Atomic Energy Agency, IAEA-sm-367/10/01, available at http://www-pub.iaea.org/MTCD/publications/PDF/ss-2001/PDF file

[16] 'The 1997 IAEA Additional Protocol at a Glance', *Arms Control Today*, December 2012, Arms Control Association, available at http://www.armscontrol.org/factsheets/IAEAProtocol.

[17] Wade Boese, 'U.S – Indian Nuclear Deal Reaches NSG Brink', *Arms Control Today*, Arms Control Association, September 2008.

France, West Germany, Japan, the Soviet Union, the United Kingdom and the United States, led to an agreement on guidelines to control nuclear exports. These guidelines, however, remained confidential. In 1978, the group of nuclear exporters known at the time as the London Suppliers' Club (LSC) inducted new members and announced a common nuclear exports policy. While the Zangger Committee's 'Trigger List' included items of direct use in nuclear weapons development, the NSG guidelines were far more stringent and included dual-use items, with legitimate non-nuclear civil and military applications as well. The group's guidelines called upon the suppliers to exercise restraint in the export of uranium enrichment and plutonium reprocessing technologies. They also asked for adequate physical security arrangements for imported technology and put restrictions on retransfer of technology by the recipient countries. As an informal arrangement the NSG has no permanent institutional structure, no legal authority nor any mechanism to enforce its decisions.[18]

The original guidelines, however, did not include the acceptance of 'full scope safeguards'[19] by the recipient countries as a condition of supply, despite strong US lobbying, since France, which was not an NPT state party then, was not amenable to a demand for full scope safeguards. However, when the NSG members formally met in March 1991, for the first time since 1978, they agreed to the expansion of the dual-use commodities list. They also agreed on a requirement for acceptance of full-scope safeguards as a pre-condition for all nuclear exports in January 1992. This meeting and agreement on expansion of dual use items list and requirement for full scope safeguards was facilitated by the weaknesses highlighted in the existing system by the revelations of Iraq's secret acquisition of sensitive technologies and materials and the decision by France – which had been strongly resisting the application of full scope safeguards - to join the NPT.[20]

The NSG currently has 48 members while the EU participates in its deliberations as an observer. NSG'S list of proscribed items is divided into Part-1, dealing with nuclear transfers, and Part-2, dealing with nuclear related dual-use

[18] Sharon Squassoni, op. cit., p. 21-2 and Ian Anthony, Christer Ahlstrom and Vitaly Fedchenko, 'Reforming Nuclear Export Controls – The Future of the Nuclear Suppliers Group, Oxford University Press, 2007, p. 3.

[19] 'Full scope safeguards agreement' is an agreement between the IAEA and a country 'importing' nuclear technology, which obliges the recipient country to open all its existing nuclear facilities and materials to IAEA inspections and to make a commitment that any facilities built in future would also come under safeguards.

[20]France eventually acceded to the NPT in August 1992 though the decision had been made sometimes in 1991. See 'Non-proliferation Treaty (NPT) Chronology,' http://fas.org/nuke/control/npt/chron.htm

materials, equipment, technology and software. The lists are constantly reviewed and updated and are published by the IAEA in the form of its information circular (INFCIRC) known as INFCIRC/254.[21]

NSG guidelines for nuclear transfers include the following basic principles:-[22]

- "Prohibition on nuclear explosives": Suppliers should seek firm assurances from recipients that items being transferred to them would not be used for production of any nuclear explosive device.
- "Physical Protection": The facilities where the imported equipment or materials are to be used should have physical protection arrangements meeting international standards.
- "Safeguards": Suppliers should only transfer trigger list items to a non-nuclear weapon state if the state concerned has agreed with the IAEA to bring all its existing and future peaceful nuclear activities involving special fissionable materials under IAEA safeguards. This type of safeguards agreement is commonly known as the 'Full Scope or Comprehensive Safeguards Agreement.'
- "Special Controls on sensitive exports": Suppliers should exercise special care and caution in exporting enrichment and reprocessing technologies and should encourage the recipients to accept multinational participation in running such plants. In a speech at the National Defence University in February 2004, President Bush went a step further by asking NSG member states to out-rightly 'refuse' to sell reprocessing and enrichment related equipment and technology to any country that does not already have a fully operational reprocessing or enrichment facilities.[23]
- "Special Controls on export of enrichment facilities, equipment and technologies": In case of transfer of an enrichment facility or related equipment the recipient state should make a commitment not to use that facility or any other facility replicated on that design for enrichment of uranium beyond 20% without agreement of the supplier state. As per the IAEA glossary of terms low enriched uranium is enriched to less than 20% while highly enriched uranium suitable for bombs is over 90% enriched but theoretically uranium enriched to over 20% can be considered as highly enriched uranium.[24]

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[21] Ibid.
[22] Guidelines for Nuclear Transfers, INFCIRC/254/Rev.9/Part.1 November 2007.
[23]Wade Boese, 'Bush Outlines Proposals to Stem Proliferation', *Arms Control Today,* Arms Control Association, March 2004.
[24]http://www.iaea.org/ns/tutorials/regcontrol/intro/glossaryu_v.htm

- "Controls on supplied or derived material usable for nuclear weapons or other nuclear explosive devices": In order to promote the cause of nuclear non-proliferation the suppliers are required to include specific clauses in the agreements to make it obligatory for the recipient to consult the supplier before undertaking any reprocessing, storage, modification, use or retransfer of any material that could be used for production of nuclear explosive devices.
- "Controls on retransfer": Suppliers are obliged to obtain assurances from the recipient that it will demand same assurances, as it has given to the supplier, from the recipient of a retransfer of material or equipment. It should also agree to consult the supplier before entering into any retransfer agreement.
- "Non-proliferation Principle": In addition to fulfilling the provisions of the NSG the suppliers need to satisfy themselves that the exported items would not be used for any clandestine nuclear weapons programme or used for acts of nuclear terrorism.

NSG also has a 'no under-cut' clause to make sure, that if an NSG member country denies export of any item to a particular recipient country, no other member of NSG would supply that item to that particular country at the cost of commercial interest of the country denying export licence in the first place. For this purpose the country turning down the request of a recipient country also informs other members of the group of its decision through regular information exchange mechanisms. Ironically, the US which played the leading role in the formation of the NSG in response to India's 1974 nuclear test, in a major policy reversal pressurised the other NSG members to grant a waiver to India in September 2008. The waiver allows India to import nuclear materials and equipment from NSG member states without having to accept full scope safeguards over its nuclear programme.[25]The waiver has, subsequently, enabled India to enter into nuclear trade agreements with countries such as France, the Russian Federation, Japan, Canada and Australia for import of nuclear power plants and nuclear fuel. Negotiations are also underway with the US, to pave the way for US companies to enter into similar agreements with India. The two countries are currently trying to remove some of the misgivings and concerns created by India's controversial 'Civil Liability for Nuclear Damage Bill' passed by the Indian parliament in 2010.[26]

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[25] Wade Boese, 'NSG, Congress Approve Nuclear Trade with India', *Arms Control Today*, Arms Control Association, October 2008. Available at http://www.armscontrol.org

[26] Eric Auner, 'India Passes Nuclear Liability Bill', *Arms Control Today*, Arms Control Association, October 2010. Available at, http://www.armscontrol.org . Also see 'Defective law on nuclear liability; India walks alone on nuclear jurisprudence', *The Economic Times,* New Delhi, December 20, 2012.

6.4 The United Nations Security Council Resolution – 1540:

In April 2004, the United Nations Security Council passed resolution -1540. The work on the resolution was initiated on the urging of President George W. Bush in 2003. In a speech at the UN General Assembly on September 23, 2003, "President Bush warned that "[t]he deadly combination of outlaw regimes and terror networks and weapons of mass murder is a peril that cannot be ignored or wished away." He called on states to "adopt tighter export controls, stronger legislation, and better border security to prevent the illicit transfer of materials and offered U.S. support to any country that needed help devising such programs." [27] UNSCR-1540 is a part of a series of resolutions passed by the UN Security Council in the aftermath of 9/11 to counter international terrorism. The resolution is based on Chapter VII of the UN Charter, which confers powers to the Security Council to take actions necessary for the maintenance of international peace and security including the use of force.[28] The resolution was specifically aimed at plugging a serious gap that existed in the international treaties regime as well as national legislations. That gap was related to the activities of non-state actors, which did not fall in the purview of treaties such as NPT, Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC). According to NTI:

> "The revelations of the A.Q. Khan nuclear trafficking network in 2004 highlighted the need to counter illicit trafficking activities. To counter these types of proliferation networks and provide support for counter-proliferation efforts such as the Proliferation Security Initiative (PSI), the United Kingdom, the United States, and other countries put forward what was to become UNSCR 1540, and urged the UN Security Council to take action to halt the illicit trade in WMD-related materials."[29]

The resolution calls upon states to adopt "appropriate, effective measures to account for and secure WMD related items in production, use, storage or transport and to maintain appropriate effective physical protection measures of said items."[30] The resolution basically sought for the first time to address, the lack of export control

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[27]Christine Kucia, 'Bush Calls on UN to Curb Proliferation,' *Arms Control Today,* Arms Control Association, October 2003. Available at https://www.armscontrol.org/act/2003_10/PresidentBushsSpeech

[28]See http://www.un.org/en/documents/charter/chapter7.shtml. Also see 'UN Security Council Resolution 1540 at a Glance,' https://www.armscontrol.org/factsheets/1540 updated October 2012.

[29]UNSCR 1540 Resource Collection, http://www.nti.org/analysis/reports/1540-reporting-overview/

[30] Scott Jones, 'Resolution 1540: Universalising Export Control Standards?' *Arms Control Today,* Arms Control Association, May 2006.

arrangements conforming to the internationally accepted standards in most member states and therefore, can be seen as the most comprehensive international effort in the realm of export controls. International export controls can be likened to a 'link chain' wherein the strength of the chain is determined by the weakest link in the chain and there were many weak links even some missing links in that chain. The existing export control arrangements including the NSG, the Australia Group, the Wassenaar Arrangement and the Missile Technology Control Regime (MTCR) have limited membership and majority of the states that are not part of these regimes can defeat the purpose of these arrangements, since they are not obliged to meet their standards.

Resolution 1540, has laid down the key components of an effective export control system, by calling upon states to enact 'effective" laws to control transfers of WMD related materials in consonance with their respective national legislative procedures. The resolution also calls upon states to prepare national control lists and develop enforcement mechanisms to effectively oversee the transfer of sensitive materials and equipment. It also requires states to "develop and maintain appropriate effective border controls and law enforcement efforts to detect, deter, prevent and combat including through international cooperation when necessary, the illicit trafficking and brokering in such items in accordance with their national legal authorities and legislation and consistent with international law."[31] For many states that are outside the current export control groupings, export controls are an uncharted territory and they have generally viewed the multilateral export control regimes as "supplier cartels" designed to deny access to high technology to developing countries. The resolution provided for the creation of a committee consisting of the security-council representatives and selected outside experts. The committee known as the 1540 Committee was initially given a mandate for two years, but its mandate has since been extended several times.[32] The committee has also suggested that the Security Council may consider developing a 'model export control legislation' to assist the states in fulfilling their obligations in this regard.[33] The resolution could form the basis of universally accepted export control standards and could also facilitate sharing of expertise and best practices in 'licencing and enforcement 'amongst states.[34]

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[31] Ibid.
[32] Scott Jones, op. cit.
[33] Ibid.
[34] Ian Anthony, Christer Ahlstrom and Vitaly Fedchenko, op. cit., p. 123.

Pakistan participated in the deliberations for the formulation of UNSCR-1540, as a non-permanent member of the Security Council at the time. Pakistan's Permanent representative to the UN, Munir Akram raised several questions on the justification as well as scope of the resolution stating that:

> "The first question was whether the Council had the right to assume the role of prescribing legislative action by member states…The Council where five states retained nuclear weapons and had the right of veto, was not the appropriate body to be entrusted with oversight responsibilities over non-proliferation and disarmament. Secondly, there were discrepancies between the draft's stated objective and its provisions…Thirdly, there was no justification for adopting the text under Chapter VII… Legitimate fears arose as to the use of authority under chapter VII to justify coercive actions, including the use of force…the scope of the resolution could be enlarged beyond non-state actors…Fifth, the creation of the council committee mentioned in operative paragraph 9 was unnecessary."[35]

Pakistan provided an initial report to the 1540 committee on October 27, 2004 and then an expanded report of one hundred and twenty five pages based on the matrix provided by the committee. It has since forwarded two more reports in the form of additional information.[36] It has also offered to provide assistance to other countries that may need help in developing their export control legislation and implementation mechanisms under the UNSC auspices.[37]

6.5 A Brief Historical Overview of Pakistan's Export Control Regime:

Pakistan has traditionally employed a combination of laws, ordinances and statutory regulatory orders (SROs) to implement its export control policies. In the nuclear realm, these measures were designed to curb the export of sensitive nuclear materials and also identified the designated authorities which could provide licences for such exports. There was, however, a lack of clarity and the penalties for any violations

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[35] http://www.un.org/News/Press/docs/2004/sc8070.doc.htm

[36] http://www.un.org/en/sc/1540/national-implementation/national-reports.shtml

[37] See http://www.nti.org/analysis/articles/pakistan-1540-reporting/ and Author's interviews with respondents 'L' at Islamabad on August 7, 2012 and with respondent 'W' at Rawalpindi on August 6, 2012.

were not clearly specified. It was expected that this bits and pieces system will somehow work, since all the entities having access to nuclear materials or technology are state owned, and unlike the western industrialised nations, the private sector is not involved in nuclear commerce. A brief summary of some of the relevant legal and administrative measures is as under:-[38]

1) **Import and Export (Control) Act, 1950; (Act No. XXXIX of 1950):**

This is a broad based law not specifically meant for nuclear materials but has a much wider application. It gives authority to the Federal Government to prohibit, restrict or control the import/export of goods and regulate related practices and procedures.

2) **Pakistan Nuclear Safety and Radiation Protection (PNSRP) Ordinance, 1984 and PNSRP Regulations, 1990:**

These nuclear specific regulations provide for control of import and export of nuclear and radioactive materials. Pakistan Atomic Energy Commission was identified as the licensing authority for any import or export activity related to such materials.

3) **Statutory Notification No. SRO-782 (1), 1998:**

This notification specifically prohibits the export of fissionable materials. This SRO was issued after the nuclear tests in May 1998 and constituted the earliest post-nuclearisation effort to augment the export controls over nuclear substances.

4) **Pakistan Nuclear Regulatory Authority (PNRA) Ordinance 2001:**

This law established an autonomous regulatory body responsible for maintaining nuclear and radiation safety and to regulate the activities of nuclear operators which in Pakistan's case is the Pakistan Atomic Energy Commission (PAEC). It also gives the PNRA the authority to issue no objection certificates (NOCs) for import and export of any radio-active materials or sources. The details of role and functions of the PNRA are covered in Chapter-7 of this study.

[38] Pakistan: Dual-use export control system; http://archives.sipri.org/contents/expcon/pakistandu.html

5) Export Control Act on Goods, Technologies, Material and Equipment related to Nuclear and Biological Weapons and their Delivery Means, 2004:[39]

Recognising the weaknesses and incoherence in the existing export control laws especially those related to nuclear substances and technology Pakistan started a reappraisal of the laws with a view to formulating comprehensive and all-encompassing nuclear export controls legislation in line with the internationally accepted standards. As an interim measure internal export control guidelines for the strategic organisations were prepared by the SPD in September 2000[40] to regulate the export of conventional weapons and equipment such as Laser Range Finders, night sights for small arms, anti-tank and anti-aircraft guided missiles produced by PAEC, KRL and air Weapons Complex. In 2000 an inter-ministerial committee comprising representatives of the Ministries of Foreign Affairs, Defence and Commerce, PAEC, and SPD was constituted to prepare a draft export control law. The Ministry of Foreign Affairs was the lead agency and the overall coordinator. The original draft was revised a few times and an agreed draft was ready by the end of 2002. However, instead of further processing, the Ministry of Foreign Affairs held it back for reasons best known to them.[41]

After the initiation of the bilateral US-Pakistan cooperation on nuclear security related issues in 2002, export controls and border controls were identified as areas of potential cooperation.[42] Consequently, a number of exchanges took place in bilateral as well as multilateral settings and officials from the Ministry of Foreign Affairs, SPD, PAEC, PNRA, Federal Board of Revenue and Customs attended several workshops dealing with various aspects of an effective export control system. The experience and information gained through these exchanges helped in refining the draft legislation and especially in the preparation of control lists.[43]Discussions were also held with countries such as Japan for exchange of ideas and experiences. In early 2004, after the unearthing of the AQ Khan-network, weaknesses of the existing export control system in checking illicit exports of sensitive technologies became apparent and an urgent need was felt to put in place effective export control mechanisms. The draft law prepared in 2002 was, therefore, revisited and finalised along with the related control lists. It was then

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[39] Chemical Weapons and related means of delivery were not included in the legislation since those are covered by the 'Chemical Weapons Convention (CWC) Implementation Ordinance, 2000 (Ordinance No. LIV of 2000).

[40]Kenneth N. Luongo and Brigadier General (Ret) Naeem Salik, 'Building Confidence in Pakistan's Nuclear Security,' *Arms Control Today,* December 2007.

[41]Author's personal experience as part of the inter-ministerial group.

[42]As already explained in Chapter 5 under Bilateral Cooperation with the US.

[43]Author's personal knowledge of the process, having participated in some of these events.

processed through the Ministry of Law for legal and technical opinion. Initially, it was proposed to be issued in the form of a Presidential Ordinance, however, since the parliament was in session it was decided to introduce it as a bill in the parliament.[44] It was finally approved by both houses of the parliament in September 2004 and was promulgated after the assent by the President on 23rd of September 2004.[45]

As mentioned in the preceding paras work was already underway since 2000, to formulate comprehensive export controls legislation. However, there can be no doubt in the fact that the revelations of the AQ Khan network and the passage of the UNSC Resolution-1540 injected the necessary sense of urgency in the process. In a letter addressed to the Director General of IAEA on 4th November 2004, Pakistan's permanent representative at Vienna forwarded a copy of the legislation with a request to circulate it among the members as an INFCIRC. The same was duly circulated as IAEA's INFCIRC/636 dated 23 November 2004.[46]

- **Salient Features of the Export Control Legislation:**
  (a) Wide Jurisdiction: The jurisdiction of the act covers the whole of Pakistan and is applicable to:
    (1) "Every citizen of Pakistan or a person in the service of Pakistan within and beyond Pakistan or any Pakistani visiting or working abroad;
    (2) Any foreign national while in the territories of Pakistan; and
    (3) Any ground transport, ship or aircraft registered in Pakistan wherever it may be."
  (b) Covers intangible transfers as well, as is evident from the definition of technology which says, "any documents including blueprints, plans, diagrams, models, formulae, tables, engineering designs or specifications, manuals or instructions, necessary for the development and production of nuclear or biological weapons and their delivery systems, including on-the-job training, expert advice and services"…
  (c) Authorises the Federal Government to make necessary rules and regulations for effective implementation of the law and specifically calls upon the government to:

[44]Author's personal experience being part of the process in his capacity as Director Arms Control and Disarmament Affairs at SPD at the time.
[45] The Gazette of Pakistan, [812 (2004)/Ex. Gaz.], Islamabad, Monday, September 27, 2004.
[46] IAEA INFCIRC/636 dated 23 November 2004. Available at http://www.iaea.org/Publications/

(1) Set up a government authority to administer export controls contained in this act.

(2) Designate the concerned agency or agencies authorised to enforce the act.

(3) Establish an Oversight Board to monitor the implementation of the act.

(d) Control Lists of goods and technologies subject to the licencing requirements under the act, to be notified separately, shall be maintained by the Federal Government.

(e) Federal Government shall be responsible to prepare and notify the licences required along with the procedures for approval or rejection of the same.

(f) Record keeping has been made mandatory for all exporters.

(g) Relevant Courts of Law authorised to try offences under the act have been designated.

(h) Any offence under the act entails severe punishments which include a prison sentence extending up to 14 years or a fine of five million rupees or both. On conviction an offender's property and assets could also be confiscated.[47]

The control list was subsequently published by the government of Pakistan in the form of Statutory Regulatory Order No. 1078 (1) 2005. The list includes all the items that are part of the *NSG, Australia Group and Missile Technology Control Regime (MTCR)* lists and is therefore, in conformity with the universally accepted international standards. EU's classification system has been used to identify various items on the list. Pakistan's permanent mission at Vienna through a letter addressed to the DG IAEA dated 19 January 2006 notified the lists to the IAEA. These were subsequently circulated as IAEA's INFCIRC/669 of 20 February 2006.[48] The lists were later reviewed, updated and published as a Statutory Regulatory Order S.R.O. 669 (1)/2011 and IAEA was informed of the same vide a communication from the permanent mission of Pakistan dated 17 October 2011. The amended lists were circulated by the IAEA as INFCIRC/832 dated 30 November 2011.[49] The national control lists were revised through an inter-agency review process to incorporate the amendments and changes

[47] The Gazette of Pakistan, [812 (2004)/Ex. Gaz.], Islamabad, Monday, September 27, 2004. Also see, Gabrielle Kohlmeier, 'Pakistan Introduces Export Control Bill', *Arms Control Today,* Arms Control Association, September 2004 and Gabrielle Kohlmeier and Miles A. Pomper, 'Pakistan Advances Export Control', *Arms Control Today,* Arms Control Association, October 2004. http://www.armscontrol.org

[48] IAEA INFCIRC/669 dated 20 February 2006. Available at http://www.iaea.org/Publications/

[49] IAEA INFCIRC/832 dated 30 November 2011. Available at http://www.iaea.org/Publications/

made by NSG, MTCR and Australia Group in their respective lists since the issuance of Pakistani lists in 2005[50] to keep abreast with the international standards and practices.

To fulfil the requirement of Article 3 of the Export Control Act, the Government of Pakistan set up a Strategic Export Control Division (SECDIV) within the Ministry of Foreign Affairs, which is the lead ministry in this regard. The SECDIV, which includes experts from the Ministry of Foreign Affairs, Federal Board of Revenue, PAEC, PNRA and SPD, is responsible for preparing and enforcing necessary rules and regulations for the implementation of export controls besides acting as the licensing authority.[51] Amongst the measures taken by the SECDIV was the promulgation of "Export Control (Licensing and Enforcement) Rules" in 2009, which laid down detailed procedures specifying that export of any items mentioned in the Export Control Act and Control Lists has to follow the registration and licensing mechanisms laid down by the SECDIV.[52] Moreover, to facilitate the enforcement of the export controls, detection equipment has been deployed at important entry and exit points in the country, in addition to training the personnel of concerned departments, to raise the awareness and enhance coordination between various agencies.[53]

Earlier, on 7 August 2007, Pakistan had communicated to the IAEA, the establishment of a high powered 'Oversight Board' envisaged in the export control act of 2004, to monitor implementation of the act as well as the formation and functioning of Strategic Export Control Division (SECDIV) which was also stipulated under the terms of the export control act.[54] The Oversight Board is chaired by the Secretary Ministry of Foreign Affairs and includes ten other senior government bureaucrats as its members, including the DG of the SECDIV, and secretaries of the ministries of Defence and Interior and senior officials of the Board of Revenue, Cabinet Division, National Command Authority and the PNRA. [55] The main functions of the Oversight Board are as under:-

- Monitor implementation of relevant laws on export controls that fall under the ambit of the SECDIV.

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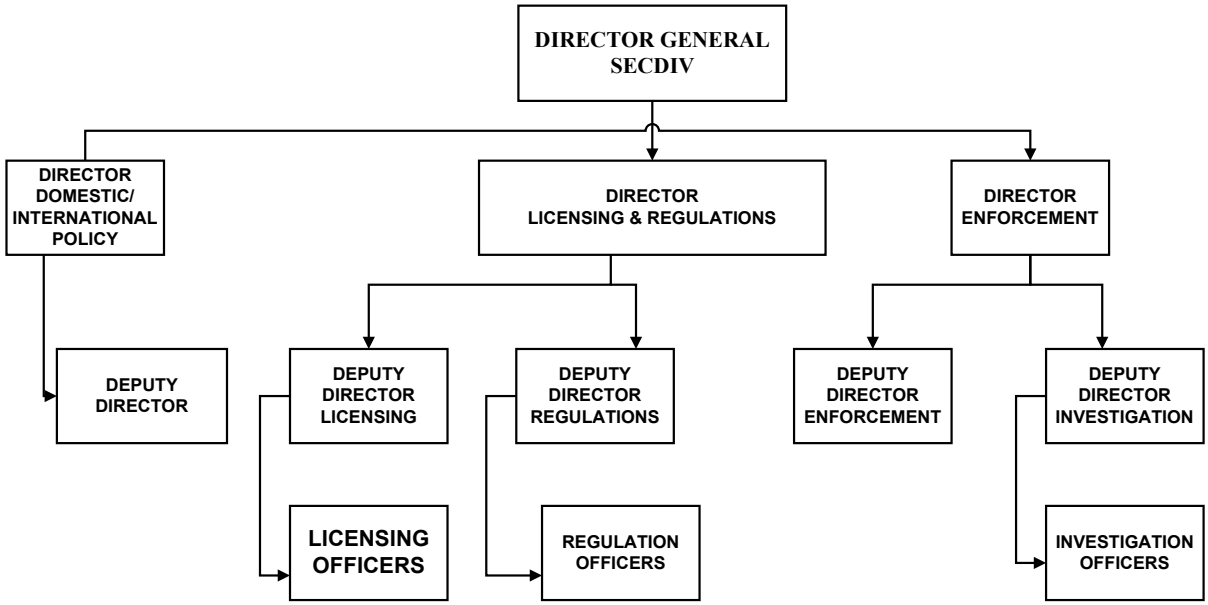
[50] Ibid.
[51] Ibid. Also see http://www.mofa.gov.pk/secdiv/content.php?pageID=secdiv
[52] Ibid.
[53] IAEA INFCIRC/832 op. cit.
[54] IAEA INFCIRC/712 dated 06 September 2007. Available at http://www.iaea.org/Publications/
[55] S.R.O. 693(I)/2007 published vide Gazette of Pakistan, [633(2007)/Ex. Gaz.], Islamabad, July 13, 2007.

- Monitor the functioning of the SECDIV and provide guidance for the achievement of its objectives.
- Review and approve policy and administrative measures for improvement in the functioning of the SECDIV.[56]

6.6.1 Organisation of the SECDIV:



6.6.2 Functions of the SECDIV:

The SECDIV has been tasked to perform the following functions:-

- Control export, re-export, transhipment and transit of goods, technologies, materials and equipment, which may contribute to the designing, development, production, stockpiling, maintenance or use of nuclear and biological weapons and their delivery systems, in accordance with the provisions of Export Control Act – 2004.
- Development, implementation and interpretation of 'Pakistan's export control policy'. Whereas the export control policy here means only that part of the

[56] Zafar Ali (Director Policy, SECDIV), 'Pakistan's Export Control Measure' - presentation made at Partnership for Global Security (PGS) Conference on Pakistan's Nuclear Security at Washington, DC on 21 February 2008.

policy which specifically deals with the export of nuclear and biological materials and technology. It does not deal with the formulation of overall national export policy which falls under the purview of the Federal Ministry of Commerce. The Ministry of Commerce bears the overall responsibility for laying down the national export policy related to export of all other commodities.

- To ensure that the export of sensitive technologies, materials and equipment as specified in the Control Lists does not in any way contribute to proliferation of weapons of mass destruction and their delivery systems.
- To reach out to industry, media and other relevant entities for technical advice and dissemination and sharing of information.
- To evaluate on a regular basis whether the existing strategic export policy is adequately serving the country's national interests and future needs.

6.7 National Control Lists and Licensing Process:

Export Controls are designed to serve specified purposes and are not meant to stifle the exports. Therefore, the procedures should be unambiguously stated to facilitate the exporters while fulfilling the government's policy objectives. National Control Lists play an important role in this regard by clearly identifying the items of equipment and materials along with their detailed specifications. Strategic Export Control Lists were initially issued in 2005 and were later reviewed and amended in 2011.[57] These lists are subjected to a constant review process and are likely to be modified from time to time in conformity with any changes introduced by NSG, MTCR and Australia Group.

The prospective exporters are required to submit a licence request to the SECDIV. At the SECDIV the goods intended to be exported would be checked against the control lists and given a technical rating in accordance with their sensitivity and likely uses. The review process of the requests for an export licence would invariably be exhaustive in view of the sensitive nature of the exports. The review process is designed to establish the following:-

- Whether the applicant has the right credentials and is eligible to export the items in question.

[57]IAEA INFCIRC/832, op. cit.

- Whether the particular export is in conformity with non-proliferation objectives and whether it is in full compliance with the existing unilateral and multilateral export control regimes. It will also determine whether the item/items under review or the recipient country itself are affected by any UN embargoes or sanctions.
- Whether all parties involved in the transaction are bona-fide.
- Are there adequate assurances against re-export/transfer and enough guarantees on non-diversion, of the items to be exported from their declared end-use?
- Whether the quality and quantity of the proposed export to the recipient is in line with the stated end-use.
- Any other legal impediments to the proposed export.
- Any national security or foreign policy implications of the proposed export.[58]

An exporter will have to register with the SECDIV before filing an application for export. The application once received will be verified and classified, and a registration number will be assigned to the application by the SECDIV. It will then, be forwarded for technical and policy review. The application will go through an interagency review before a final decision would be made whether to approve or deny the request.

6.8 Oversight Institutions:

National institutions responsible for overseeing the implementation and enforcement of the provisions of the Export Control Act – 2004 and other relevant rules and regulations such as the CWC Implementation Ordinance – 2000 and PNRA Ordinance – 2001 etc. are as under:-

- National Command Authority:
  *Strategic Plans Division.
  *Security Division.
- Strategic Export Control Oversight Board.
- Pakistan Nuclear Regulatory Authority.
- National Authority for CWC Implementation.
- Designated National Point of Contact for BWC related actions (at the Ministry of Foreign Affairs).
- Ministry of Defence Production.

[58] Zafar Ali, op. cit.

6.9 Enforcement Agencies:

To ensure the effective implementation and enforcement of export control laws following agencies which have the primary responsibility for controlling the land, air and sea entry and exit points have been designated:-

- Pakistan Customs is the lead agency as far as enforcement of export control measures is concerned.
- Maritime Security Agency is responsible for the security of the maritime frontiers.
- Coast Guards are responsible for looking after the territorial waters.
- Frontier Corps has the responsibility for the Western border with Afghanistan and South Western border with Iran.
- Pakistan Rangers look after the eastern borders between Pakistani provinces of Punjab and Sindh and India.
- Northern Area Scouts take care of the northern reaches of the country.
- Anti-narcotics Force is primarily responsible for preventing smuggling of narcotics into and from the country but has intelligence, surveillance and enforcement resources which can be helpful in other law enforcement missions as well.
- Air Port Security Force.
- Police.

6.10 Analysis:

Pakistan's export control regime can be traced back to the 1950s but the export laws were general in nature and it was only in 1984 when Pakistan Nuclear Safety and Radiation Protection (PNSRP) Ordinance was issued and was followed by the PNSRP Regulations in 1990, that nuclear specific export laws came into being. However, these laws were not comprehensive enough, did not contain any accompanying control lists and penalties for violations were ambiguous. The lack of urgency in development and promulgation of effective and comprehensive nuclear specific laws can be explained by the fact that Pakistan did not consider itself to be an exporter of nuclear materials and technology. Moreover, the covert nature of Pakistan's nuclear programme from early 1970s to 1998 meant that secrecy took precedence over security and accountability. After 1998 when the nuclear capability became overt, a need was felt to take all

necessary measures to bring all facets of the nuclear programme under institutional controls to reassure the international community as well as the domestic public and establish Pakistan's credentials as a responsible nuclear state.

In the realm of export controls, as a first step, a statutory regulatory order was issued, not long after the nuclear tests in May 1998, to specifically prohibit export of fissionable materials. This was followed by a series of WMD specific laws in the form of SROs and ordinances etc. Subsequently, in the year 2000, an inter-ministerial working group was put together to develop a comprehensive nuclear-export control law. However, the progress remained rather slow until the revelation of AQ Khan's illegal export network in early 2004 caused national embarrassment and infused a new sense of urgency in the effort. The UNSC Resolution – 1540 passed in April 2004 gave further impetus to the process. The resulting 'Export Control Act on Goods, Technologies, Material and Equipment related to Nuclear and Biological Weapons and their Delivery Systems-2004' is an all-encompassing piece of legislation.

Having had a detailed overview of the historical progression of Pakistan's export control regime one may ask whether there has been any learning in this field. One could then proceed to determine the levels of analysis at which the learning is discernible and which areas show lack of learning. A legal expert who has advised the concerned government departments on nuclear related legislations opined that Pakistan has demonstrated a rather steep upward learning curve in the last decade or so, which is evident in the shape of enactment of a series of main as well as delegative legislations including the Export Control Law of 2004 which fully meets the international standards[59] and the NCA Act of 2010 which was originally promulgated as an ordinance in 2007. The delegative legislation is in the form of regulations, guidelines and notifications. This substantive body of legislative work indicates a serious consciousness about nuclear non-proliferation. The driving force behind the formulation of these new laws has been the SPD which realised the implications of the existence of these laws or absence thereof. These legislative measures have not only fulfilled the state's legal obligations but also have administrative connotations by way of establishing new institutions through specific statutes.[60]

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[59]The Control Lists accompanying the legislation include all the items listed in the NSG, MTCR and Australia Group guidelines which set the international standards.

[60] Author's personal Interview with a senior Supreme Court lawyer and eminent international law expert at Islamabad in August 2012.

This learning has been partly out of realisation that Pakistan lacked an effective export control system especially in the nuclear realm and partly out of compulsions such as the revelation of illegal activities of some Pakistani citizens and the building up of international pressure in the form of UNSC resolutions. The process was also facilitated by international cooperation both bilateral as well as multilateral which provided opportunities for concerned Pakistani officials to learn from the best practices and experiences of their counterparts. However, this learning can mostly be discerned at the institutional and government levels as well as international learning to some extent.

However, within the country there has been a lack of involvement of either the political parties or the civil society and even the relevant industries did not participate in the process. This lack of interest becomes even more visible in case of academia and the legal fraternity with almost complete absence of any comment or criticism. The possible reasons for this apparent lack of interest are that on the one hand the academics usually consider legal affairs as something exclusive and normally refrain from commenting on such issues and on the other hand, the lawyers' community considers nuclear laws as something too technical for them to delve into. As a result most people simply shy away from these.[61]. Comment, analysis and criticism by the intelligentsia would help remove any weaknesses and to improve the quality of these laws. Pakistan, though, has a distinct advantage over most other countries and has a comparatively easier task to enforce its nuclear export control laws since almost all the entities dealing with nuclear substances and related technology and materials are state controlled and the private sector currently does not play any role in this field.

Learning about nuclear export controls is essential for the institutions dealing with the subject and the relevant government ministries. To that extent significant learning has taken place as is evident by the body of legislations, rules and regulations and establishment of specialised institutions. Pakistan also made an effort to learn from the greater experience and expertise of advanced countries such as the US and Japan in formulation and implementation of export control legislations and Pakistani experts consulted their counterparts in those countries before finalising the legislation. The control lists accompanying Pakistani legislation include all the items listed by international export control groupings such as the NSG, MTCR and the Australia Group and are therefore, in full compliance with the international standards. Learning in the field of nuclear export controls which has resulted from Pakistan's own bitter

[61] Ibid.

experience with its flawed export control system which allowed the AQ Khan network to operate unchecked as well as developments in this area internationally in the form of UNSC Resolution-1540 has been extensive.

Chapter – 7

Pakistan's Nuclear Regulatory Regime

This chapter is aimed at exploring the evolution of the nuclear regulatory regime in Pakistan with a view to determine the nature and quantum of learning in this field especially since 1998. In order to evaluate the learning process the focus will be mainly on the tangible signs of learning in the shape of institution building, legislative developments and administrative measures undertaken to establish an autonomous regulatory regime. Nevertheless, an effort will also be made to identify the intangible forms of learning in the form of promotion and inculcation of a safety and security culture within the nuclear establishment. Since the origins of nuclear regulatory regime are rooted in the history of Pakistan's early nuclear development, though the process was greatly accelerated in the decade following 1998, an historical overview of the advancement of the nuclear regulatory mechanisms would also be in order.

7.1 Preamble:

Operation of nuclear power plants and other nuclear installations needs to be conducted within a clearly laid out and strictly implemented regulatory regime due to the complex and hazardous nature of nuclear technology. All countries with extensive civilian or military nuclear programmes need to develop comprehensive arrangements for regulating and monitoring the operation of various nuclear facilities. These facilities include nuclear power plants, research reactors, nuclear medical centres and even private medical clinics, hospitals laboratories using diagnostic and therapeutic equipment containing radioactive sources such as the x-ray machines. In the past decade, the issue of nuclear safety and security has come to the forefront of the international security discourse, in view of the known desire of international terror groups to acquire nuclear and/or radiological materials to perpetrate a catastrophic event using these dangerous materials. There are, however, many technical and practical challenges in the acquisition and use of an already fabricated nuclear device or even an improvised one. The other alternative could be an attack against a nuclear plant or spent fuel storage site to cause the release of harmful radiation. Though the safety record of nuclear plants around the world has been exceptionally good barring a few major accidents such as the three miles island in 1979, Chernobyl April 1986 and the

Fukushima disaster in Japan in March 2011, probability of an accident involving a nuclear installation cannot be completely ruled out. It is, therefore, imperative that the nuclear regulatory regime ensures that all nuclear facilities are operated in accordance with the laid down safety regulations. It is also important that plans and preparations to mitigate the effects of an accident involving release of nuclear radiation are made beforehand, disseminated to the relevant authorities and regularly rehearsed and updated.

Though the primary responsibility for nuclear safety lies with the state in whose jurisdiction any nuclear installation is located, the harmful effects of leakage of nuclear radiation can go across the state boundaries and can cause dangers to the human beings and environment in neighbouring countries as well. This fact, came into sharp focus after the accident at the Chernobyl nuclear power plant in Ukraine in 1986 released radioactive fumes that travelled not only to countries in the immediate neighbourhood but as far away as Sweden. More recently radiation leakages from the Fukushima nuclear power plant complex disaster in Japan have spread to a large area. It is logical, therefore, to expect the international community to take increasing interest in nuclear safety related issues. This interest could manifest itself in various forms such as enhanced international cooperation through forums provided by treaty arrangements or on voluntary basis and laying down minimum acceptable safety standards for universal observance. The Chernobyl disaster acted as a catalyst for multi-lateral negotiations on nuclear safety that were held between 1992 and 1994, culminating in the formulation of an international 'Convention on Nuclear Safety' in 1994. It may be worthwhile here to provide an overview of the salient aspects of the safety convention especially its main objectives and the key obligations accruing from it for states parties to the convention.

7.2 Convention on Nuclear Safety:

The Convention on Nuclear Safety was approved at a diplomatic meeting held under the auspices of the IAEA at its headquarters in Vienna in June 1994 and was subsequently opened for signatures on 20th of September the same year. The contracting parties reaffirmed the need for promotion of high standards of nuclear safety, pointing out that the primary responsibility for nuclear safety rests with the states on whose territory a particular nuclear installation is located. They also expressed a desire "to promote an effective nuclear safety culture."[62] It also talked of

[62]IAEA, INFCIRC/449 OF 5 July 1994 – Convention on Nuclear Safety.

internationally formulated safety guidelines available as standards to be followed to achieve the desired levels of safety. Chapter 1 of the Convention has laid down the following objectives of the Convention:-

- "To achieve and maintain a high level of nuclear safety worldwide through the enhancement of national measures and international cooperation including, where appropriate, safety-related technical cooperation.
- To establish and maintain effective defences in nuclear installations against potential radiological hazards in order to protect individuals, society and the environment from harmful effects of ionizing radiation from such installations.
- To prevent accidents with radiological consequences and to mitigate such consequences should they occur."[63]

The convention defined a nuclear installation as a "land-based civil nuclear power plant" including its associated facilities such as storage, handling and treatment of radioactive materials co-located with the main plant. It also defined the functions of 'regulatory bodies' for each contracting party as "bodies given the legal authority by that Contracting Party to grant licences and to regulate the siting, design, construction, commissioning, operation or decommissioning of nuclear installations."[64] It also clarified the scope of the convention as safety of nuclear installations which is related to the operation of the facilities as distinct from the physical security.[65] It may also be noted that Article 2 of the convention clearly defined a nuclear installation as a land based civil nuclear power plant which means that it neither has any jurisdiction over military related nuclear installations, nor does it cover sea-based or space based nuclear installations.

Article 6 of the Convention requires all states parties to the convention to undertake an urgent review of the safety of their existing nuclear installations and introduce safety upgrades wherever feasible. In case safety upgrades are not possible efforts should be made to shut down such facilities as soon as practicable.[66] Article 7 elaborates the requirements for the legislative and regulatory framework as under:-

- "The establishment of applicable national safety requirements and regulations.

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[63] Ibid.
[64]Ibid., Article 2.
[65]Ibid., Article 3.
[66]Ibid., Article 6.

- A system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence.
- A system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and terms of licences.
- The enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation." [67]

Article 8 specifically lays down the requirement for all states parties to the convention to establish a regulatory body or to designate an existing body as a regulatory body but more importantly asking for a separation between the working of the regulatory body and that of the operators of nuclear facilities.[68] This created an obligation for the states parties to the convention to establish autonomous regulatory institutions. The safety convention also requires states parties to ensure that the exposure of workers and general population to radiation remains below the prescribed national limits and to prepare and regularly test 'emergency plans' for nuclear installations. It also calls upon the contracting parties to disseminate necessary information to its own population in the proximity of the nuclear installations as well as to the concerned authorities of other states located in the vicinity of the nuclear installation for prior planning to respond to a nuclear incident.[69]

Pakistan signed the Nuclear Safety Convention – 1994, when it was opened for signatures on 20 September 1994 and ratified it on 30 September 1997.[70] In February 1992 Pakistan had signed an agreement with China for the purchase of a 300 MW nuclear power plant. The Chinese had gone ahead with this agreement despite US pressure not to do so unless Pakistan accepts full scope safeguards on its whole nuclear programme. A Chinese request for the reactor cooling vessel for the reactor destined for Pakistan from a German firm was also denied on the same grounds. This was a major breakthrough for Pakistan since its efforts to acquire nuclear power plants had been constantly rebuffed since the mid-1970s by the Western industrialised countries. It was, therefore, important for Pakistan to establish its credentials as a responsible state that was willing to implement international safety standards for its nuclear

[67]Ibid., Article 7.
[68]Ibid., Article 8.
[69]Ibid., Articles 15 & 16.
[70] M. Nasim and S.D. Orfi, 'Evolution and Development of Nuclear Safety Regime in Pakistan', *The Nucleus,* 42 (1-2) 2005, p. 67-72. The Nucleus is a quarterly scientific journal of Pakistan Atomic Energy Commission.

programme.[71] The convention entered into force on 24 October 1996. In comparison India signed the convention on 20 September 1994 but did not ratify it until 31 March 2005, Israel has signed but not ratified it while the United States signed the convention on 20 September 1994 and ratified it on 11 April 1999. As recently as 09 January 2014 there were 77 contracting parties while 10 countries have signed but not yet ratified the convention. The convention also requires the contracting parties to submit their annual national reports on nuclear safety to the IAEA for peer review.[72]

7.3 Origins of Nuclear Safety Regime in Pakistan:

Nuclear safety regime has gradually evolved in Pakistan over many decades. To begin with it was accorded a low priority due to the fact that until the mid-1970s Pakistan had a very modest nuclear programme with a 5MW research reactor at Nilore near Islamabad, the 137 MW Karachi Nuclear Power Plant and nuclear agriculture research centres at Faisalabad and Peshawar. By the 1980s the programme had started gaining some momentum due to expansion of peaceful uses of nuclear energy in medicine and agriculture. Many nuclear fuel cycle facilities, related to both the peaceful as well as military nuclear programme, such as fuel fabrication and heavy water plants as well as Uranium enrichment and pilot scale reprocessing laboratories were becoming operational in late 1970s and early 1980s which underlined the need for greater security consciousness. After the Chernobyl nuclear accident in 1986 the importance of high standards of safety at nuclear plants had gained universal recognition. Pakistan's accession to the nuclear safety convention brought greater urgency to the matter since the convention imposes certain obligations on the contracting parties, such as the obligation to establish an autonomous nuclear regulatory and oversight authority. The subsequent developments that have taken place in the realm of nuclear safety and regulation provide enough evidence to suggest that Pakistan has made discernible progress in this direction.

When Pakistan ventured into the nuclear field in the mid-1950s under the auspices of the Atoms for Peace Programme it created a modest Atomic Energy Council with a governing body and an Atomic Energy Commission in February 1956. However, this was merely, an administrative arrangement with no legislative back up.

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[71] Naeem Salik, *Genesis of South Asian nuclear Deterrence,* Oxford University Press, 2009, p. 133.
[72] Convention on Nuclear Safety;
http://www.iaea.org/Publications/Documents/Conventions/nuclearsafety_status.pdf

When a decision was taken by the government in 1959 to set up a research reactor, a team of two American and three Pakistani scientists[73] was formed to carry out selection and appraisal of possible sites. On the basis of the recommendations of this team a decision was taken to place an order for a US made 5 MW (e), research reactor to be built at Nilore in the outskirts of Islamabad. At the time no national nuclear safety legislation existed and the Ministry of Fuel and Natural Resources under whose jurisdiction the PAEC fell, issued notifications about nuclear safety and radiation protection on as required basis. Therefore, the IAEA was approached by the PAEC to carry out a safety review of the reactor named Pakistan Atomic Research Reactor -1 or PARR-1. The PAEC specially formed an ad hoc nuclear safety committee (NSC) to grant approval for start-up of the reactor.[74]

In 1961, PAEC initiated a study to determine the possibility of building a nuclear power plant. The economic aspects of the project were evaluated by an international company, which submitted a report entitled the 'Gibbs and Hill Report'[75]. The report identified three possible sites for construction of a nuclear power plant, two in West Pakistan and one in East Pakistan. Considerations for selection of a site include communications infrastructure, availability of water and power and climatic conditions. It also has to be located at a safe distance from the population and in a stable seismic zone. Karachi was selected as the site since the IAEA in a separate study on the prospects of nuclear power in Pakistan had also concluded that nuclear power could provide a solution for growing power needs of Karachi.[76] Subsequently, an agreement was signed with the Canadian government for the provision of a 137 MW (e) Canadian Deuterium Uranium Reactor commonly known as the CANDU type reactor or a heavy water reactor.[77] A memorandum of understanding (MOU) stipulating the safety procedures was also signed which called for a safety review to be conducted by an Independent Pakistani Nuclear Safety Committee. The MOU also laid down the procedures to be followed for safety evaluation and identified the project stages each of which would require safety appraisals. These stages and the types of evaluation required included: a) Site evaluation report at the time of site selection, b) Safety

[73]The names of these American are not found in any study on the subject, while the Pakistani scientists have been mentioned by M. Nasim and S.D. Orfi and included DrNazir Ahmad, Dr I.H. Usmani and Dr Abdus-Salam.
[74] M. Nasim and S.D. Orfi, op. cit., p. 68.
[75] Ibid.
[76] Ibid.
[77]This type of reactor runs on natural uranium fuel and heavy water is used both as a coolant and as a moderator.

analysis of Plant Design at the time of commencement of construction, c) Final Safety Analysis Report at the time of beginning of fuel loading in the plant.[78] However, in the absence of an independent regulatory institution, the PAEC, which was also going to be the operator of the plant, earmarked its own scientists and engineers who were not directly involved in the project to carry out the safety review. This was at best a stop gap and ad-hoc arrangement.

It was only in 1965 that Pakistan Atomic Energy Commission Ordinance[79] was promulgated providing a legal basis to the activities of the PAEC. The PAEC Ordinance while authorising the PAEC to initiate projects related to promotion of peaceful uses of atomic energy and to make necessary regulations with the approval of the Government of Pakistan, did not envisage any specified organisation within the PAEC to deal with safety and regulatory issues. The purpose of the ordinance as stated in the preamble of the ordinance is:-

> "Whereas it is expedient to provide for the establishment of an Atomic Energy Commission for the promotion of the peaceful uses of atomic energy in Pakistan, the discharge of international obligations connected therewith, the execution of development projects involving nuclear power stations and matters incidental thereto."[80]

The ordinance was essentially meant to provide legal cover to the PAEC and lays down the composition and functioning of the commission including the appointment, terms of service of members and other administrative matters. It does not specify either the responsibility or authority of the commission with regard to safety and regulatory matters except a reference to international obligations related to peaceful uses of atomic energy. The IAEA as per Article III.A.6 of its statutes is obliged to establish safety standards. These standards are not legally binding on IAEA member states who can adopt these standards voluntarily as part of their national regulations if they so desire.[81] Later on in early 1966, the PAEC established what was known as Pakistan Nuclear Safety Committee (PNSC). This seven member committee had a Nuclear Safety and Licensing Division (NSLD) as its secretariat. Subsequently, the PNSC approved the site evaluation and the Preliminary Safety Report for the Karachi Nuclear Power Plant (KANUPP) and issued a construction permit to the supplier, the

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[78]Nasim and Orfi, op. cit.
[79]The Pakistan Atomic Energy Commission Ordinance 1965; (Ordinance No. XVII of 1965).
[80] Ibid.
[81] Ibid., http://www-ns.iaea.org/downloads/standards/spess.pdf

General Electric Company of Canada.[82] Later, as the construction progressed the PNSC provided the 'Final Safety Analysis Report' to the company in October 1969 and then gave step by step approval of the commissioning process, from the pre-start-up to initial start-up and then to full power operation, through a specially designated three member Commissioning Committee.[83] This, improvised arrangement, however, could not be a substitute for a full-fledged and autonomous regulatory authority which was not established until January 2001 when Pakistan Nuclear Regulatory Authority was established through an Ordinance.[84]

7.4 Pakistan Nuclear Safety and Radiation Protection Ordinance - 1984[85]:

In January 1984, the Pakistan Nuclear Safety and Radiation Protection Ordinance was promulgated with the express purpose of providing for the regulations of nuclear safety and radiation protection with its jurisdiction extending to whole of Pakistan. The ordinance clearly defined important terms such as 'ionizing radiation', 'licence', 'nuclear installation', 'nuclear material', 'radiation incident', 'radiation apparatus' which included beside other equipment x-ray machines used for medical, surgical and dental diagnostics and treatment. The ordinance empowered the PAEC to make and enforce 'regulations', 'orders' or 'codes of practice' for nuclear and radiation safety and protection as it may deem necessary. It also authorised the PAEC to issue licenses for the production, storage, disposal, trade in and use of nuclear substances and radioactive materials while granting it the power to inspect all licensed installations to ensure compliance with the existing regulations. It specified the requirement to obtain a license before any person could;

a) "Acquire, manufacture, construct, install or operate any nuclear installation or radiation apparatus,

b) Explore for, mine, mill, extract, use, sell, lease, buy, transfer, transport, import, export, convert, enrich, process, reprocess, fabricate or dispose of any nuclear substance or nuclear material or other prescribed substances,

c) Discharge radioactive waste,

d) Cause a nuclear powered vehicle to enter Pakistan, or

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[82]Nasim and Orfi, op. cit., p. 69.
[83] Ibid.
[84] The Gazette of Pakistan, Extraordinary, (Registered No. M-302/L-7646), Published in Islamabad on January 22, 2001.
[85]The Pakistan Nuclear Safety and Radiation Protection Ordinance 1984, Ordinance No. IV of 1984.

e) Manufacture, sell, distribute or otherwise dispose of food that has been treated or contaminated by ionizing radiation."[86]

PNSRP Ordinance 1984 also authorised the PAEC to prescribe terms and condition for any licensee to maintain financial protection for nuclear damage to cover public liability claims and to require the establishment of an effective reporting system in case of radiation accidents and preparation of plans to mitigate the effects of *nuclear incidents*.[87] More importantly, the ordinance prescribed offences and penalties in case of contravention of the provisions of the ordinance. Any person found to be in non-compliance with the terms of license would be liable to be punished with imprisonment of up to seven years or a fine of one hundred thousand rupees or both. The courts could take cognizance of an offence under the provisions of the ordinance only on a written complaint by a person on behalf of the PAEC.[88]

7.5 Directorate of Nuclear Safety and Radiation Protection (DNSRP) – 1985:

To fulfil the obligations and exercise the powers conferred upon it by the PNSRP Ordinance 1984, the PAEC established a Directorate of Nuclear Safety and Radiation Protection (DNSRP) in 1985. Nuclear Safety and Licensing Division that had been part of the Pakistan Nuclear Safety Committee was merged into the newly established directorate. Later on, PAEC formulated the Pakistan Nuclear Safety and Radiation Protection (PNSRP) Regulations in 1990, which were duly notified through a gazette notification of the Government of Pakistan dated September 12, 1990. These regulations provided substance to the nuclear regulatory effort. However, due to lack of public education and information on the subject the implementation of the regulations initially met some resistance from the medical community which saw it as an encroachment on their domain. The general public was also unaware of the hazardous effects of overexposure to radiation such as the x-rays commonly used for diagnostic purposes. This necessitated the initiation of a public education and awareness programme about the hazards that can be caused by nuclear radiation and the importance of protective measures against these.[89]

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[86] Ibid.
[87] PNSRP Ordinance -1984, op. cit. Nuclear Incident means any incident that may happen at a nuclear installation or during the operation of equipment using nuclear or radioactive materials that may cause the leakage of harmful ionizing radiation which could threaten humans as well as the environment.
[88] Ibid.
[89] Nasim and Orfi, op. cit. p. 69.

Amongst the major regulatory functions performed by the DNSRP were registration and licensing of Pakistan Atomic Research Reactor – 2 (PARR-2). PARR-2 is a 27 KW research reactor which was built with Chinese assistance and is mainly used for the production of radio-isotopes and neutron sources. This reactor is located at Pakistan Institute of Nuclear Science and Technology (PINSTECH) at Nilore, where PARR-1was already located. PARR-1 which was originally a 5MW research reactor was upgraded to 10 MW and also converted from highly enriched uranium (HEU) fuel to low enriched uranium (LEU) fuel. The upgraded PARR-1 was licensed for full operation by the DNSRP in October 2000.[90] In 1992 when an agreement was signed between the Pakistani and Chinese governments for the construction of a Chinese manufactured 320 MW nuclear power plant at Chashma on the eastern bank of river Indus in Northern Punjab province, the DNSRP signed a protocol with its Chinese counterpart for cooperation in the realm of nuclear safety. It also entered into an agreement with Beijing Nuclear Safety Centre to seek assistance in the safety review of technical reports that it will receive at various stages of construction and commencement of operation of the plant.[91] These arrangements with the Chinese institutions are indicative of lack of indigenous expertise in the field of nuclear safety at the time as well as reluctance of other advanced countries to cooperate with Pakistan even in peaceful nuclear activities due to its nuclear weapons programme. Since this was the first ever Chinese built nuclear power reactor exported to any other country the Chinese must also have been keen to ensure that the reactor operates safely to establish their credentials as a nuclear supplier.

In its effort to project DNSRP as an independent organization and to enhance its status PAEC upgraded its director to the rank of Director General, detached it from Member Technical PAEC and made him directly answerable to Chairman PAEC. But these changes remained cosmetic in view of the fact that there were no commensurate changes in the structure and capacity of DNSRP. Since the DNSRP remained within the PAEC and under the control of Chairman PAEC it was difficult to establish its credentials as an independent body amongst its international counterparts such as the US Nuclear Regulatory Commission (NRC) which is an autonomous regulatory body outside the purview of the Department of Energy (DOE).[92]

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[90]Nasim and Orfi, op. cit., p. 70.
[91]Nasim and Orfi, op. cit., p. 70.
[92] Ibid.

7.6 Establishment of Pakistan Nuclear Regulatory Board (PNRB):

In early 1994, the PAEC had decided in principle to grant full autonomy to the DNSRP to enable it to perform its assigned functions more effectively. As an interim measure it was decided to set up Pakistan Nuclear Regulatory Board (PNRB) and it was envisaged that a fully autonomous regulatory body will be established within the next five years.[93] Apparently, the PAEC was moving towards the creation of an autonomous regulatory body on its own volition to prepare the groundwork for the forthcoming Nuclear Safety Convention. It is important to note here that diplomatic negotiations to formulate an international nuclear safety convention had already been underway since 1992 and the convention was approved in June 1994. As already pointed out, Pakistan had signed the convention in September 1994 when it was opened for signatures and ratified it in September 1997. Amongst other provisions the convention required the contracting parties to establish autonomous regulatory authorities. On the other hand, Pakistan was also expanding its nuclear power infrastructure. A Chinese supplied nuclear power reactor was already under construction and building of more reactors was being envisaged at the nuclear complex at the Chashma site. PNRB at best was a halfway house and could not meet the criteria for a fully independent regulator since it was still within the organisational structure of the PAEC which was the only operator of nuclear plants in Pakistan. Moreover, the PAEC Chairman remained the ex-officio chairman of the PNRB and its funding was also controlled by the PAEC.[94] A stage was however, set for the next phase in the development of an independent nuclear regulatory framework.

7.7 Pakistan Nuclear Regulatory Authority (PNRA) Ordinance – 2001:

In order to completely separate the regulatory and operational roles in the management of nuclear energy PNRB explored various options. In July 1997, the Chairman PNRB tasked a three member committee of experts to prepare a draft law to set up a new nuclear regulatory authority. The draft legislation prepared by the experts committee was formally approved by the PNRB in February 1998. The draft was then sent to the Prime Minister's Secretariat for further processing. It was reviewed several

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[93] Ibid. Prime Minister's Secretariat Notification issued at Islamabad on the 30th of October, 1994 on the subject of 'Creation of Pakistan Nuclear Regulatory Board was published vide 'The Gazette of Pakistan, Extraordinary, Registered No. M-302, Karachi, November 24, 1994.

[94] Nasim and Orfi, op. cit., p. 70.

times in consultation with the technical as well as legal experts in the Law Ministry before its finalisation.[95] Finally, on 22nd of January, 2001, the Ministry of Law, Justice, Human Rights and Parliamentary Affairs issued a Presidential Ordinance, "to provide for the establishment of the Pakistan Nuclear Regulatory Authority for regulation of nuclear safety and radiation protection in Pakistan and the extent of civil liability for nuclear damage resulting from any nuclear incident." [96] The Ordinance stipulated the establishment of Pakistan Nuclear Regulatory Authority (PNRA) as the designated national authority to regulate the setting up and operation of civilian nuclear installations, cater for protection against risks arising from any incident causing leakage of radiation, determine the amount of civil liability in case of any damage caused to life and property as a consequence of a nuclear incident and all other related matters.[97] It defined nuclear installations to include nuclear power reactors, nuclear fuel production facilities, nuclear processing and reprocessing facilities, and nuclear storage sites. These are all mainly civilian nuclear facilities and do not include military nuclear installations including the plutonium production, uranium enrichment and weapons fabrication and testing facilities. The ordinance, which came into force immediately, extended to whole of Pakistan.

The PNRA Ordinance also laid down the composition of the authority and essential qualifications and experience required for its chairman and members including terms of service and tenure of their appointment. The headquarters of the authority would be in Islamabad while it could establish regional offices as well. The authority was granted the powers to establish one or more directorates to fulfil its mandated obligations.

7.8 Pakistan Nuclear Regulatory Authority (PNRA):

Pakistan Nuclear Regulatory Authority is a fully autonomous body created under the provisions of the PNRA Ordinance of 22nd January 2001. It has been closely collaborating with the Nuclear Regulatory Commission (NRC) of the US, the IAEA and its Chinese counterparts. The PNRA envisions itself:-

> "to become a world class regulatory body with highly trained, competent and dedicated personnel working in unison with a zeal to foster a positive safety

[95]Ibid, p. 71.
[96] The Gazette of Pakistan, Extraordinary, (Registered No. M-302/L-7646), Published in Islamabad on January 22, 2001.
[97] Ibid.

> culture in their licensees and regulate nuclear facilities to protect the public, workers and environment from the harmful effects of radiation in a manner that wins the confidence of all the stake holders viz. the public, the government and the licensees."[98]

The stated mission of PNRA is "to ensure safe operation of nuclear facilities and to protect radiation workers, general public and the environment from the harmful effects of radiation by formulating and implementing effective regulations and building a relationship of trust with the licensees and maintain transparency in its actions and decisions."[99]

7.8.1 Organisational Structure and Roles of PNRA:

The PNRA has a Chairman, two full time members and seven part time members all of whom are appointed by the Federal Government. The Chairman is required to have a postgraduate degree, preferably a PhD, in physical or nuclear sciences or engineering and technology from an internationally recognised university, a work experience of at least 25 years in the relevant fields and should be a citizen of Pakistan. The two full time members are also required to hold similar qualifications but with a work experience of at least 20 years in the fields of radiation protection, nuclear or reactor safety.[100] Of the part time members two are required to hold qualifications similar to the Chairman and full time members except that they should have a work experience of 15 years. One member is supposed to be a medical doctor with postgraduate degree in nuclear medicine, radiotherapy or radiation sciences with 15 years' work experience. One member each is from the Ministry of Health and Pakistan Environmental Protection Agency. One member is from PAEC with a standing similar to the full time member of the commission. The Director General Strategic Plans Division (DG SPD) is the ex-officio member. The authority has a Secretary who is a non-voting member. The term of office of the Chairman is four years which can be extended by another term of four years. Similarly, the full time as well as part time members are also appointed for a term of four years at the expiry of which they can be reappointed for another four years.

The PNRA Chairman is the chief executive of the authority and reports directly to the Prime Minister of Pakistan. The authority has an Executive Wing and a

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[98] Pakistan Nuclear Regulatory Authority National Report 2007.
[99] Ibid.
[100] PNRA Ordinance 2001, op. cit.

Corporate Wing, each headed by a full time member who in turn report to the Chairman. The executive wing has three technical directorates headed by Director General (Technical) and three regional directorates headed by Director General (Inspection and Enforcement). Three other projects i.e. Nuclear Security Action Plan, Project for Dosimetry and Project for Environmental Monitoring also fall under the purview of the executive wing. Both directors general report to Member Executive who in turn reports to the Chairman PNRA. The corporate wing has seven directorates each headed by its own director. All seven directorates come under a Director General (Corporate), who in turn reports to Member Corporate.[101]

The purview of the responsibilities of PNRA extends from exploration/mining of radioactive substances to their import, export, transportation, transfer, use and storage as well as the disposal of radioactive sources that have completed their useful life. This wide ranging mandate is often described by the PNRA officials as the responsibility to oversee radioactive sources from 'cradle to grave.' The PNRA is the designated licensing authority for any import or export of radioactive substances and their subsequent use for medical, agriculture, industrial, educational or research purposes. It ensures that the licensees have made adequate physical protection arrangements and catered for sufficient insurance coverage to meet the liability in case of a nuclear incident. It also has the authority to inspect all nuclear installations, radiation generation equipment such as X-ray machines and radiation sources and nuclear substances in storage to ensure that the provisions of the concerned regulations are being fully complied with.[102]

The ordinance allows the PNRA to enter into cooperative arrangements and agreements with other nuclear regulatory authorities and concerned international organisations subject to government approval. Strict penalties have been prescribed under the ordinance to deal with any person found to be in contravention to the provisions of the sections 19 - 23 of the ordinance. Offences under the ordinance are liable to be punished with imprisonment for a term of up to seven years, or a fine of up to one million rupees or with both. Any person found to have filed a false return or provided false information or prevented any official of PNRA from undertaking his assigned duties shall be punishable with an imprisonment of up to one year, or with a fine of 0.25 million rupees or both. Similarly, any operator found to be in violation of

[101]PNRA Ordinance 2001, op. cit.
[102] Ibid.

the provisions of the rules and regulations framed under this ordinance would be liable to a punishment of imprisonment of up to three years or a fine of 0.5 million rupees or both. If a person fails to comply with or violates any provision of the ordinance or rules and regulations made subsequent to the ordinance where no penalty is clearly defined for that offence, he shall be punishable with imprisonment of up to six months or a fine of 0.1 million rupees or both. The courts can only take cognizance of any offence under the ordinance on the written complaint of an officer authorised for this purpose by the PNRA.[103]

The applications by the intending importers and licensees are initially received and reviewed by the regional nuclear safety directorates of PNRA. The review process determines the credentials of the applicants. The licences and no objection certificates are issued only after evaluation of the professional credentials of the applicant. The responsibility for controlling the entry and exit of nuclear and radioactive substances into and out of the country in the light of import and export procedures laid down by the Ministry of Commerce and the regulations formulated by the PNRA lies with Pakistan Customs.[104]

In the aftermath of 9/11, when the probability of an act of nuclear terrorism appeared to be high, the PNRA moved quickly to devise and pronounce a series of new measures in order to improve nuclear disaster management system to provide protection for "the plant and society from hazards that could be man-made or natural." These included enhanced quality control and monitoring for both infrastructure and equipment, creation of multiple physical barriers to prevent the release of radioactive materials, radiation protection procedures, and procurement of equipment for disaster mitigation. The PNRA also critically appraised the adequacy of resources in nuclear facilities, including the availability of technically qualified manpower to deal with emergency situations.[105]

7.8.1.1 Role and Functions of Nuclear Safety Directorate (NSD):

The Nuclear Safety Directorate (NSD) is located at the PNRA Headquarters at Islamabad and is one of the more important directorates of the executive wing. The NSD has been assigned to:-

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[103]PNRA Ordinance 2001, op. cit.
[104] Kenneth Luongo and Naeem Salik, 'Building Confidence in Pakistan's Nuclear Security', Arms Control Today, Arms Control Association, December 2007.
[105] Ibid.

- Formulate regulations, operating procedures and guidelines to be followed by the operators of the Nuclear Power Plants.
- Issue licenses to nuclear power plants for operations or for carrying out any modifications. Carry out regular safety reviews and re-license power plants for life extension.
- Issue licenses and carry out inspections of industrial units involved in manufacturing of equipment for nuclear facilities.
- Conduct periodic reviews and assess safety standards.
- Create a regulatory system for nuclear safety and ensure its uninterrupted implementation.
- Carry out coordination with PNRA's Regional Directorates in matters related to nuclear safety.
- Maintain the latest and updated information with regard to nuclear safety and ensure its sharing and dissemination with other departments within PNRA.[106]

The NSD has been energetically performing its assigned tasks and has already accomplished some important tasks including the planning and coordination of the safety review of 'Preliminary Safety Analysis Report' prepared for the construction of the second power plant (C-2) at the Chashma nuclear complex. NSD also relicensed the Karachi Nuclear Power Plant (KANUPP) to run on full power in 2007. The plant was initially allowed to run on a reduced power level for two years after its life extension and refurbishment. It also coordinated on behalf of the PNRA, the visits of IAEA's experts to review the Preliminary Safety Analysis Report related to C-2. Moreover, it has laid down standards for issuance of licenses for industrial units involved in the manufacturing of mechanical components used in nuclear plants. A case in point is Heavy Mechanical Complex-3 (HMC-3) at Taxila, which manufactures reactor containment vessels and other safety related equipment for nuclear power plants. It has also been coordinating inspection activities by the PNRA, whenever Chashma nuclear power plant unit-1 (C1) is shut down for refuelling purposes, besides making plans and preparations for integrated safety review of all safeguarded civilian nuclear facilities in

[106] www.pnra.org

Pakistan. It has also awarded licenses to Reactor Operators and Shift Engineers of C-1 and K-1(Karachi-1) plants.[107]

7.8.3.2 Functions of Radiation Safety Directorate (RSD):

The Radiation Safety Directorate is primarily responsible for regulating and overseeing the radiation safety and protection related issues. The directorate is tasked with ensuring that radiation produced as a result of normal operations of nuclear facilities and equipment remains below the minimum acceptable national standards. The underlying purpose is to ensure that level of radiation emissions that can cause harm to human health and the environment remains "As Low as Reasonably Achievable (ALARA)." The RSD is headed by a Director and has a highly professional staff with a majority of them holding post-graduate degrees in relevant fields of physical sciences and medicine. In terms of its functioning the RSD works independently just like the other technical directorates within the PNRA. It formulates its technical recommendations only after a thorough assessment and evaluation of the prevailing radiation safety environment in various licensed facilities. These recommendations are then submitted for perusal and approval of the PNRA for subsequent implementation as regulations.[108]

In terms of its radiation protection related work the RSD covers many diverse areas including preparation of regulations and guidelines to facilitate the implementation of these regulations by radiation users. It also evaluates plans prepared by nuclear power plant operators for protection against radiation, medical applications of radiation, use of radiation for purposes of research at the universities and use of radiation sources by the industry, and to ensure adequate protection is provided against work related exposure to radiation. The RSD also manages the National Radiation Emergency Coordination Centre (NRECC) and can acquire the services of the experts from other technical directorates of PNRA to constitute the 'technical support group' to deal with any emergency situation. These experts will provide technical advice and guidance on how to deal with the incident and contain the spread of radiation. The technical support group and NRECC staff regularly participate in training exercises to practise and further enhance their skills.[109]

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[107]Briefing of the author by senior PNRA officials at PNRA Headquarters in August 2012.
[108]www.pnra.org
[109] Ibid.

The RSD also participates in joint international projects under the auspices of IAEA, United Nations Scientific Committee on Effects of Atomic Radiation (UNSCEAR), and International System of Occupational Exposure (ISOE). These activities are aimed at gaining experience and learning from interactions with international experts to improve the radiation protection arrangements at the national level. It also benefits from IAEA programmes for the improvement in radiation safety standards and radiation protection practices.

7.8.3.3 National Radiation Emergency Coordination Centre (NRECC):

One of the responsibilities of PNRA is to make sure that all the licensees have made appropriate arrangements to deal with any serious nuclear or radiation emergency. In this regard PNRA has developed necessary regulations for the management of nuclear accidents and radiological emergencies entitled 'PAK-914'. These regulations are designed to mitigate the consequences of a nuclear or radiation accident. The National Radiation Emergency Coordination Centre (NRECC) has been provided with necessary communication resources to enable it to communicate with relevant national and international authorities in the event of an emergency. NRECC remains operational round the clock to receive information about any emergency without any delay. NRECC is managed by the Radiation Safety Directorate (RSD) and acts as a secretariat to Chairman (PNRA) who has been designated as the National Competent Authority for radiation related emergencies whether domestic or international.[110]

NRECC constitutes the national focal point to meet national as well as international obligations accruing from Pakistan's accession to 'International Convention on Early Notification of a Nuclear Accident' (CENNA) and 'Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency' (CACNARE). PNRA itself maintains its readiness to assist the licensees as well as the authorities and regularly tests its emergency preparedness through periodic drills and table top exercises. NRECC's primary purpose is to facilitate communication with the licensees, the administration and the concerned international organisations, to reduce the damage to property and harm to the public and the environment to the minimum, in the event of a radiological disaster. It is also required to provide immediate help and advice in such eventualities. The primary responsibility for managing a nuclear or

[110] www.pnra.org

radiation accident lies with the licensees, for which purpose they are required to prepare and rehearse emergency plans. PNRA provides assistance and advice and ensures adequate emergency preparedness through regular drills and exercises involving all stake holders.[111]

The actions required to be undertaken by the NRECC during an emergency are as under:-

- It would receive information about the nature and scale of the emergency including the likelihood of any national and/or trans-national consequences.
- It would verify and authenticate the accuracy of the information received and determine the seriousness of the emergency.
- Immediately after receiving the information about an incident it would inform all those in the NRECC chain of command about the information received.
- It would share without delay the information received with the licensee, government authorities and concerned international agencies without compromising the confidentiality of sensitive information.
- It would facilitate and co-ordinate the provision of assistance at the national as well as international level in case it is required to do so.
- It would render technical advice to the National Competent Authority (Chairman PNRA) on the advice and recommendations he will proffer to the government about appropriate protective measures such as sheltering and evacuation etc.
- It would also facilitate cooperation between the licensee, the local authorities and international agencies.
- It would, in cooperation with concerned authorities, provide timely and reliable information and briefings to the media.[112]

Since an appropriate response to an emergency mainly depends on the correct categorisation of the emergency, the NRECC categorises the emergencies into two broad types as under:-

- Emergency specific to nuclear installations e.g. site area emergency or general emergency.

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[111] Ibid.
[112] Ibid.

- Emergency not specific to nuclear installations e.g. a missing dangerous radiation source or an accident during transportation of a radiation source, etc.[113]

NRECC maintains a 'Mobile Radiological Monitoring Laboratory' (MRML) and other radiological monitoring equipment. Supplies of essential emergency items are also available at NRECC. The MRML is located at PNRA Headquarters in Islamabad and can be activated on a few hours' notice to support PNRA's Regional Directorates, or the licensees and/or the local administration.[114]

7.8.3.4 Transport and Waste Safety Directorate (WSD):

Transport and Waste Safety Directorate (WSD) of PNRA, as the name suggests, deals with issues related to management of radioactive waste, safe transportation of radioactive materials, physical protection of nuclear materials and nuclear installations, safety and security of radioactive sources in use at various facilities and decommissioning of nuclear facilities. To fulfil these responsibilities it has created a regulatory system which includes regulations, safety guidelines, and checklists for safety inspections. It also ensures compliance with the regulations with the help of regional directorates of PNRA.IAEA's 'Radiation Safety Infrastructure Appraisal' (RaSIA) Mission of 2005, acknowledged the existence of a well- developed legal regime with an autonomous regulatory authority which issues licenses for import and use, carries out inspections and enforces the regulatory system for radioactive sources. The system in vogue is in conformity with the internationally accepted standards. Additionally, PNRA also guides the licensees to ensure that their operations are carried out in such a way that they produce the minimum possible volume of radioactive waste.[115]

Physical protection measures implemented by the operators at various nuclear installations are regularly checked through on-site inspections. The licensees are required to abide by the physical protection standards prescribed by IAEA document INFCIRC/225/REV-4. WSD also maintains the nationwide database of Sealed Radioactive Sources (SRSs). These sources are classified into five different categories depending on their characteristics. It further classifies the sources into four categories

[113] www.pnra.org and interviews of senior PNRA officials at Islamabad in August 2012.
[114] Ibid.
[115] Ibid.

on the basis of security requirements and keeps a track of the sources from their initial import to their final disposal.[116] The WSD collaborates with other concerned state institutions not only to maintain control over radioactive sources and materials but also to prevent any malicious act against facilities using these sources. With regard to the import and export of radioactive sources WSD works in close harmony with the Customs Department as well as the Ministry of Commerce. WSD works proactively to disseminate information to the operators of radiation facilities to develop awareness and to promote a safety culture. It also benefits from IAEA's activities in this regard.[117]

7.8.3.5 Other Organs of PNRA:

Other directorates of PNRA which in their own right perform equally significant work and facilitate the working of the above mentioned directorates include Information Services Directorate (ISD), Policies and Procedures Directorate (PPD), Human Resources Development Directorate (HRD), International Cooperation Directorate (ICD) and Regulatory Affairs Directorate (RAD). PNRA has its own Technical Support Organisation which is called Centre for Nuclear Safety (CNS). CNS has a Directorate of Safety Analysis and a Directorate of Safety Review. PNRA has also established a School for Nuclear and Radiation Safety (SNRS) which runs Postgraduate Diploma courses, specified short courses, refresher courses and specialised training courses for its own employees as well as those of other stake holders. It is in the process of setting up a School for Nuclear Security as well. It has laid down 'Safety Performance Indicators' which are used as reference points for evaluating the performance of the licensees. It also carries out 'Self-Assessment of Regulatory Effectiveness'. The results of this self-assessment are reflected in the Annual Performance Review Reports. The PNRA also invites IAEA experts for peer reviews and subjected itself to IAEA's International Regulatory Review Team in December 2003 for evaluation of its performance in the light of international standards.[118]

7.8.4 Major Achievements of PNRA:

Over the last decade or so since the establishment of an autonomous regulatory authority (PNRA) in January, 2001, it has made considerable progress in multiple areas

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[116] Ibid.
[117] www.pnra.org and interviews of senior PNRA officials at Islamabad in August 2012.
[118] Ibid.

and has established its credentials as an effective regulatory body. One of the earliest tasks performed by the PNRA was the relicensing of the Karachi Nuclear Power Plant (KANUPP) which had completed its designed life of 30 years in 2002. The PAEC was of the view that since the plant is running safely it should be allowed to run while the PAEC upgrades its safety systems and prepares it for relicensing. However, the PNRA did not yield to this request and in the interest of safety ordered the plant to be shut down until its safety upgrades were completed to its satisfaction and in line with internationally recognised standards. As a result the plant remained shut for over two and half years before it was issued a new operating licence and life extension. Similarly, The PNRA has ordered the shutting down of Chashma Nuclear Power Plant for weeks at a time until the safety issues raised by it were addressed by the operator.[119] While the exact nature of the safety issue which necessitated the plant to be closed down remains confidential the episode illustrates the effectiveness of the regulatory regime which does not compromise on safety standards. Though the purview of the PNRA's activities is confined to civilian nuclear facilities only, it has prepared security and safety checklists for the military nuclear facilities as well. These check lists are used as a guide by the SPD and the respective heads of those institutions to periodically assess the state of safety and security within these facilities. The PNRA subscribes to IAEA's Code of Conduct for Safety and Security of Radioactive Sources and applies it for regulating the radioactive sources within the country.

A very significant achievement of the PNRA has been the development of a National Nuclear Security Action Plan (NSAP). It is fully cognisant of the importance of physical protection of nuclear installations and materials and the synergy between nuclear safety and nuclear security. It may be pertinent here to recount some of the salient aspects of the NSAP which has received the acclamation of the IAEA as a model programme to be emulated by other states.

7.8.4.1 Nuclear Security Action Plan (NSAP):[120]

The programme was initiated in July 2006 at the behest of the Government of Pakistan and was targeted to achieve its major objectives over the next five years. This phasing of the plan allowed the distribution of expenditure over a period of five years thereby reducing the budgetary pressures. The NSAP has not only enhanced the confidence of the nuclear energy sector and industry in Pakistan but the international

[119] Author's personal recollection having dealt with the issue in his official capacity.
[120] www.pnra.org and Luongo and Salik, Arms Control Today, December 2007, op. cit.

community as reflected in the NTI Index for 2014 which recognised Pakistan's nuclear safety and security as the most improved amongst the nuclear states.[121] The IAEA DG Yukiyo Amano during a visit to Pakistan from March 10-12, 2014 also visited Pakistan's Centre of Excellence (CoE) for Nuclear Security and commended the high level of professional excellence.[122] The IAEA has also planned to run its regional Radiation Safety Course for 2014 at Pakistan's CoE.[123] A team of IAEA experts stated at the conclusion of a 12 day Integrated Regulatory Review Service that, "PNRA is an independent and competent regulatory body, empowered with the full scope of regulatory powers required by the IAEA standards and is provided sufficient resources and the legislation and associated regulations provide a binding legal framework for nuclear and radiation safety in Pakistan."[124] These statements by DG IAEA and senior international experts are an acknowledgement of Pakistan's seriousness in meeting its international treaty obligations through the creation of an effective regulatory regime. The NSAP has integrated all stake holders and concerned governmental institutions and departments and has enhanced the preparedness and capabilities to deal with any radiological emergency. The main priority areas of NSAP are:-

- Bringing all radiological sources under regulatory control. Carryout an assessment of vulnerable facilities and assist in the efforts to address these. Conduct inspections of all sources whether they are being used, are in storage or being transported. Carryout biannual security assessments and follow these up to ensure that its recommendations are being implemented. Re-evaluate the existing protection arrangements around various facilities and render advice, guidance and training for further augmenting these.
- Setting up a Nuclear Safety and Security Training Centre to run training courses on nuclear security, physical protection of radioactive materials, emergency preparedness, operating of detection equipment, recovery operations, and border monitoring. The training is being imparted to PNRA personnel as well as the first responders in case of an emergency, including officials from customs,

[121]NTI Nuclear Materials Security Index- Building Assurance, Accountability and Action, www.ntiindex.org
[122]Visit of DG IAEA TO Pakistan's Centre of Excellence for Nuclear Security, ISPR Press Release No. PR53/2014-ISPR of 12 March 2014. Also see 'DG IAEA visits nuclear Centre of Excellence,' *The News,* Islamabad, March 13, 2014.
[123]Information shared with the author by senior SPD officials in March 2014.
[124]'IAEA Mission Concludes Peer Review of Pakistan's Nuclear Regulatory Framework,' IAEA Press Release 2014/09. Available at file:///G:/IAEA%20Mission%20Concludes%20Peer%20Review%20of%20Pakistan's%20Nuclear%20Regulatory%20Framework.htm

border control agencies, local administration, and law enforcement agencies. Several hundred personnel have already undergone this training.

- As part of the NSAP a National Nuclear Security Emergency Coordination Centre (NuSECC) has been established at Islamabad to coordinate with relevant government agencies, and PNRA's regional directorates. Three additional regional directorates have been created in addition to those already existing at Karachi, Chashma, and Islamabad. A mobile lab has already been acquired and efforts are at hand to procure five more to be provided to regional directorates and inspectorates.
- NSAP also aims at locating and securing any orphan radioactive sources that may be present in the country. Orphan sources are defined as "sources not under regulatory control, either because they have never been under regulatory control or because they have been abandoned, lost, misplaced, stolen or transferred without proper authorization." The PNRA's campaign to locate all sources through physical and nonphysical searches and public outreach is already underway.
- Another objective laid down for the NSAP was deployment of radiation detection portals at major entry and exit points in the country to prevent any illicit movement of radioactive sources into or out of the country and to help the border control agencies to respond to a radiological emergency in a timely manner for which they are being provided with requisite training.

7.8.5 Analysis:

The preceding overview of the evolution of a nuclear regulatory regime in Pakistan over the course of five decades indicates a slow and gradual learning process which led to the realisation that a fully autonomous regulatory authority separate from the operators of nuclear plants was an essential requirement for safe and secure running of these plants. The importance of public as well as environmental safety was also recognised. This learning process gained some momentum as the nuclear power programme started to expand in the 1990s. It was also helped along by the international treaty agreements such as the Convention on Physical Protection of Nuclear Materials (CPPNM) and the Nuclear Safety Convention which specifically required the establishment of an autonomous regulatory authority by states parties to the convention. A further urgency was instilled by the major changes in global security

perceptions following the 9/11 incidents. That may explain the discernible acceleration of the process since the promulgation of the PNRA Ordinance in January 2001 and the establishment of The PNRA. In fact, the body of regulatory work carried out by PNRA since 2001 is far greater than what had been achieved by its predecessors in almost four decades. It may also be pointed out that the PNRA's establishment and growth coincided with the establishment of the National Command Authority (NCA) with SPD as its permanent secretariat which led to the reorganisation and reform of existing nuclear management structures and the building of new institutional mechanisms. This holistic institutional development and learning has certainly helped the rapid growth of the PNRA and the nuclear regulatory regime in Pakistan.

The establishment and maturing of the PNRA is clearly indicative of learning about the importance of nuclear safety and the need for establishment of an effective regulatory regime in the backdrop of construction of several major nuclear energy projects. The PNRA's efforts has raised awareness and has helped the development of a safety and security culture amongst the strategic organisations and institutions involved in the management of the nuclear programme an aspect which though not completely absent had not been accorded due importance. The learning has mainly happened at the institutional level both in the relevant civilian as well as military institutions. This learning has been partly out of necessity in view of the ongoing and projected expansion of nuclear energy in Pakistan and partly by the international obligations accruing from treaties such as the Nuclear Safety Convention as well as the deteriorating internal and external security environment.

In view of the fact that PNRA has proven its credentials as an effective and independent regulatory authority by instituting internationally recognised safety standards and implementing these strictly, developing very close cooperative relationship with the IAEA and developing a substantial body of regulations besides preparing national plans for dealing with radiation emergencies the learning in the nuclear regulatory domain can easily be categorised as 'extensive.'

Chapter-8

Conclusion

This thesis contends that states that acquire nuclear weapons capabilities learn over time to manage these capabilities irrespective of the fact that this learning falls in the category of normative or non-normative learning. Given the cognitive nature of learning it is hard to measure the magnitude of this learning but one can have a fairly accurate assessment of the nature and quality of learning from the discernible manifestations of learning. Such manifestations of learning are found in the form of establishment of purpose built institutions for command and control, safety and security, export controls and regulation of nuclear operations. Further evidence of this learning can be found in the evolution of doctrinal precepts, public articulation of nuclear policy by the leadership, crisis behaviour of states and nuclear related legislation. Nuclear learning however, does not follow a linear progression according to a long term plan deliberately laid out at the very beginning. Since nuclear policies are sensitive to changes in the security landscape they remain dynamic in nature and adjust and adapt to changes in the threat environment. The learning process therefore, is a mix of learning by doing or experiential learning, trial and error learning, and adaptation to meet various exigencies as is evident from the experience of the established nuclear weapons powers through the Cold War years and beyond.

In this regard Pakistan provides an interesting case study due to the unconventional nature of its nuclear development and the general disquiet of the international community with acquisition of nuclear capability by a state which is perceived to be politically and socially volatile. Pakistan started its nuclear programme in the early 1970s coinciding with the newly established rules of the nuclear game through the entry into force of the Non-proliferation Treaty (NPT) in 1970 and the beginning of an ever expanding technology control regime. Pakistan was, therefore, seen to be going against the prevailing international norms. Consequently Pakistan faced an array of sanctions, political and diplomatic pressures and negative media images. Many Pakistanis have deeply ingrained feelings that their country has been subjected to an unfair treatment unlike other countries with comparable nuclear programmes outside the purview of the existing non-proliferation regime. This difficult historical experience has predisposed Pakistan to adopt certain

policies and thus impacted its nuclear learning process. However, through the difficult development phase Pakistan learnt two important lessons. First, it learnt that national security or economic interests of the global powers can always trump their non-proliferation concerns as was evident from the reprieve Pakistan won during the Afghan war against the Soviets through the 1980s. Second, a lesson driven home was that if a nation is determined to achieve an objective and willing to pay the price, it will ultimately surmount all difficulties and hardships and succeed in reaching its goals. Pakistan's learning process was hastened by developments such as 9/11 and the revelation of the proliferation network run by AQ Khan and the marked deterioration in its external as well as internal security environment. Pakistan also learnt its lessons from the Kargil Crisis of 1999 which occurred at a time when the lessons had not been adequately grasped from the nuclearisation of the security environment. This crisis learning was reflected in discernible maturity in Pakistan's conduct as a state in dealing with the 2001-02 Military Crisis as well as the 2008 Mumbai Crisis.

During the development stage of its programme, to deflect international pressure Pakistan also learnt the art of denying the existence of a nuclear weapons programme, while periodically sending out ambiguous signals of its growing technological capabilities to deter any military adventurism by India. However, this policy while alleviating the external pressures stifled any public discourse on issues related to a prospective nuclear doctrine that would be required as and when the nuclear capability is operationalised. As a result after the nuclear tests in May 1998, Pakistan had to quickly devise a nuclear doctrine that would also provide guidelines for the configuration of nuclear forces and help establish developmental targets. Though Pakistan has chosen not to pronounce its nuclear doctrine its broad contours have been alluded to by responsible state functionaries from time to time. Such statements which now appear in the form of press releases at the conclusion of the meetings of the National Command Authority or after the missile flight tests show increasingly mature and nuanced articulation of doctrinal goals. In essence Pakistani nuclear doctrine is aimed at maintaining a credible minimum deterrence and to deter aggression at all levels of conflict including conventional war. Of late, Pakistan has also tested short range battlefield nuclear weapons in response to India's 'Cold Start' or 'Proactive' war doctrine. This shows some dynamism in the nuclear doctrinal thinking thereby allowing it to adapt to changing security environment. This particular development

is seen by many observers, including some within the country, as a destabilising development and could therefore be termed as non-normative learning or 'unlearning,' because Pakistan had initially eschewed the development of battlefield nuclear weapons having learnt of their futility from the US and Russian experience. From a non-existent doctrine in 1998 to integration of nuclear weapons into military doctrine by synergising the conventional and nuclear war doctrines, incorporating the nuclear factor in curricula of military's higher learning institutions, and testing these concepts through war games shows that considerable amount of learning has taken place.

In the pre-1998 period there were no formal command and control mechanisms and only an informal arrangement involving the President, the Prime Minister, the Army Chief and senior scientists was available for decision making. After the overt demonstration of its nuclear capability however, Pakistan felt the urgency to establish an effective and viable nuclear command and control system in order to establish its credentials as a responsible nuclear state. This led to the establishment of a three tiered nuclear command and control structure. At the apex of this structure is the National Command Authority (NCA) which is chaired by the Prime Minister and has four key cabinet ministers besides the Chairman Joint Chiefs of Staff and the three services chiefs. NCA's decision making and implementation is carried out with the help of a permanent secretariat known as the Strategic Plans Division (SPD) which is headed by a three star general and includes officers from all three services. The third tier of nuclear command and control consists of three services strategic force commands which are custodians of the delivery systems while the warheads and operational control remain with the NCA. This elaborate institutional structure which has grown from a modest beginning in February 2000 is the visible manifestation of learning in this regard while intangible learning in the form of development of standard operating procedures and routines is difficult to measure. The system of extended tenures of duty and overlap between successive directors seems to have worked well to develop an institutional memory and a pool of expertise. However, a downside of this arrangement is the danger of succumbing to 'group think,' that can curb fresh ideas and diversity of opinion, which needs to be guarded against.

During the course of interviews conducted in Pakistan with a representative group of civilian and military respondents in July/August 2012, the issue of civil-military

equation in the nuclear stewardship remained a divisive one. There was no agreement amongst respondents as to the respective roles of the military and civilian leadership in the nuclear policy/decision making. The military respondents felt that the civilians have a fair representation in the NCA and they play an effective role in policy making while the civilians, barring a few exceptions, feel that the decision making is dominated by the military and the civilians do not play a meaningful role. However, a variety of reasons were proffered for the ineffectiveness of the civilian role in nuclear decision making. One group of respondents believed that it is a reflection of the existing civil-military imbalance in Pakistan wherein as a result of successive periods of military rule, the military has become dominant in all aspects of national security policy and the same applies to the nuclear policy as well. Others felt that the inability of the civilian leadership to play their due role in nuclear decision making process is mainly due to their own ineptitude, lack of effort on their part to improve their knowledge and understanding of the issues, tendency to use nuclear capability for achieving political ends, low priority given to nuclear policy making in their political agenda and therefore, a readiness to abdicate their responsibility to the military. A few however, felt that civilian understanding of the issues though not up to the mark at the moment is improving and their role and representation is no different from the situation in other advanced nuclear powers. According to this view point civilians are only required to provide broad policy guidelines while the military is responsible to take care of technical and operational issues as is the system in vogue in most countries around the world.

The civilian leadership is however, entangled in a complex web of socio-political and economic problems. It has neither time nor inclination to focus on nuclear policy making and is resigned to concede the leading role to the military. The manifestation of this lack of interest is the fact that the last political government did not appear to be mindful of the fact in assigning cabinet portfolios that certain ministers were going to sit on the nuclear high table. The current government seems to be oblivious of the importance of proper civilian representation in the NCA by not appointing the foreign and defence ministers to begin with and still not having a full time foreign minister a year and a half into their tenure. Nor have the politicians pondered over the implications for nuclear stewardship during the term of the interim government which runs the country for three months or so prior to national elections.

Pakistan's perpetual political instability and weak governance has always given rise to speculation about its ability for safe keeping of its nuclear assets. In the past decade or so the spill over of war in neighbouring Afghanistan and the growing incidence of terrorism and extremism within the country have given rise to renewed concerns about nuclear safety and security in Pakistan. This combined with serious gaps in the security system which had allowed AQ Khan to run his nuclear proliferation business unimpeded had further accentuated the worries about the inadequacy of the nuclear security. The initial structure of NCA had included a brigadier designated as 'Advisor Security NCA' with a few dozen serving and retired personnel at his disposal. However, the transformation of the security environment after 9/11, the discovery of AQ Khan network and the growing threat of domestic terrorism combined together to infuse a sense of urgency in this matter. As a result a new security division was created with a two star general at the helm and the recruitment of its manpower, training and equipment was completely overhauled. Bilateral cooperation with the US in the form of sharing of information, provision of training and financial assistance helped the process to proceed rapidly. The specially recruited manpower now being trained at a purpose built training academy has grown to over 25,000 personnel and is likely to reach a figure of 28,000 in the next two to three years. An elite rapid response force capable of reaching any trouble spot anywhere in the country within half an hour has also been created. Moreover, to guard against indiscretions by scientists, engineers and security personnel assigned to sensitive areas of the programme, such personnel are now covered by a Personnel Reliability Programme (PRP). The PRP is meant to prevent the recurrence of AQ Khan's incident as well as counter any potential insider threat. The learning curve in nuclear safety and security appears to be distinctly steep and has recently been recognised by the NTI nuclear Security Index 2014, which termed Pakistan's nuclear security as most improved among nuclear states. The Director General of IAEA during a visit to Pakistan in March 2014 visited its Centre of Excellence for Nuclear Security and appreciated the high standards of professionalism at the related training facilities.

International obligations accruing out of Pakistan's accession to the International Convention on Nuclear Safety in 1997 and the Convention on Physical Protection of Nuclear Materials (CPPNM) in 2000 as well as the enhanced threat of radiological and nuclear terrorism in the wake of 9/11 also led Pakistan to tighten the safety and security of

its civilian nuclear infrastructure. The learning in this domain started with the establishment of an independent regulatory authority in the form of the Pakistan Nuclear Regulatory Authority (PNRA) in January 2001. The learning curve in this regard has been fairly steep with the development of a body of legislation and regulations along with the establishment of training and oversight institutions some of which have now evolved into a Centre of Excellence (CoE) for nuclear security training. These developments have received international recognition as mentioned above.

Prior to 1998 Pakistan had not paid much attention to the development of an effective nuclear export controls system because it did not consider itself a nuclear exporter. The need for a comprehensive export control mechanism was felt after 1998 when the need to bring the nuclear programme under effective oversight and control was felt. Consequently, an inter-ministerial committee was formed to develop comprehensive legislation. However, this process remained stuck in the bureaucratic red tape until the AQ Khan episode brought to light the weaknesses of the existing system. It became obvious that the system existing at the time had utterly failed to check the illegal technology transfers and it also lacked the capacity to punish the people involved in illicit activities should a decision be taken to proceed against them. Around the same time the UNSC passed resolution 1540 which made it mandatory for all UN member states to bring their export control legislations and implementation mechanisms at par with the international standards irrespective of the fact whether any country had the capacity to export nuclear technology or not. These developments hastened the process and a comprehensive export control law was passed in September 2004. Pakistan has submitted detailed reports to the 1540 committee beginning October 2004 and has also offered to provide assistance in developing export control laws to countries which do not have any experience or expertise in the field. Pakistan, itself, during the course of development of its own legal instruments had sought advice from countries like the US and Japan in order to learn from their greater experience in the field. The existing export control laws with associated control lists, implementation rules and regulations and oversight and enforcement mechanisms in the form of a high powered oversight board and a Strategic Export Controls Division housed in the Ministry of Foreign Affairs meet the accepted international standards. Learning in this particular field is also reckonable with requisite institutional and legal basis firmly in place.

A clear upward learning curve is discernible in the legislative field. There is an impressive list of new nuclear specific legislations. Prominent among these laws are the NCA law, which provides legal cover to the activities of the NCA and governs the conduct of thousands of employees in various strategic organisations and SPD itself, the PNRA Ordinance, which established PNRA as an autonomous body to oversee nuclear and radiation safety, and the Export Control Law, which regulates the export of sensitive materials and technologies. However, this legislative process has been mainly driven by the SPD and the laws were drafted through an inter-ministerial process. The end product was then either enacted as an Ordinance or passed as an Act of Parliament. In case of the NCA Law it was first promulgated as an Ordinance in December 2007 and later passed by the parliament as an act in 2010. Neither the legal fraternity nor the civil society has evinced much interest in this process. They have not looked at these pieces of legislation critically with a view to point out weaknesses or to suggest improvements. The academia has also not demonstrated any desire to understand or to evaluate these laws.

There has been a visible effort to create a critical mass of academic analysts with requisite understanding of nuclear policy related issues and most university departments are running basic courses related to the subject in international relations and defence studies departments. The National Defence University has even started a dedicated department which runs post-graduate courses in the discipline of nuclear studies. In recent years a number of books written by Pakistani scholars on nuclear issues have also been published and some serious articles have appeared in research publications. The media's performance has been inconsistent. On the one hand it has shown greater understanding and displayed a greater degree of maturity while dealing with nuclear matters, while on the other hand it has failed in its responsibility to educate the general public about the serious ramifications of nuclearisation of the South Asian region. A common man simply loves the bomb, considering these as bigger and more powerful bombs no different from the conventional bombs and is unaware of the devastating and long term consequences of any use of nuclear weapons. This public affinity with the nuclear weapons is then exploited by the politicians to gain political mileage. Ironically, this also constrains their ability to control the trajectory of the nuclear programme because if they curtail any aspect of nuclear development or disapprove of testing or fielding of a new weapon system they will be perceived to be compromising on national security or yielding to external pressure.

Lack of public understanding of the consequences of a nuclear war could also generate unwarranted pressures for the decision makers during a crisis which would be a very dangerous situation.

Pakistan has not evolved as a 'normal nuclear state,' as one expert[1] remarked, as compared to India or any other nuclear power. This has happened because of the combined impact of external and internal challenges. The origin of both of these factors can be found in the so called 'Global War on Terror' in which Pakistan has been an important player. As a result Pakistan has been and continues to be under international scrutiny over the safety and security of its nuclear assets. The deteriorating internal security situation has not only created pressures internally, but has also fed into adverse perceptions abroad about Pakistan's ability to safeguard its nuclear weapons and installations. These stresses and strains have had both positive and negative consequences. On the positive side these have helped accelerate the learning process which in turn has hastened the building of command and control, safety and security and export controls mechanisms. While on the negative side the perpetual international scrutiny and criticism has resulted in the tendency on part of the nuclear establishment to shut itself to any alternative views due to the paranoia resulting from continuous vilification and the anxiety about the possibility of a hostile action against Pakistan's nuclear weapons. This has also caused a hardening of Pakistani positions in nuclear diplomacy at the multilateral negotiating forums.

Seen from the level of analysis perspective, there appears to be sufficient evidence of learning at the individual level especially amongst the academia. However, the greatest amount of learning seems to have taken place at the organisational level, though that is unevenly distributed between military and civilian institutions. The reason for greater learning in the military organisation can be attributed to its more efficient institutional structure and professional ethos as well as the fact that for the bulk of the time since 1998 Pakistan remained under military rule. There are also indications of some governmental and state learning which is evident from the body of legislations that have been enacted and a decrease in nuclear rhetoric. Amongst the general public the level of even the 'factual learning' is not up to the desired level due to low literacy rates as well as lack of any concerted effort on part of the government or the media to educate the people.

[1] Mark Fitzpatrick, 'Overcoming Pakistan's Nuclear Dangers,' Oxford, Routledge, 2014.

Amongst the politicians the standard of both factual as well as 'inferential learning' leaves much to be desired, due to a general lack of interest, lack of effort to enhance their competence and low priority of the issue on the political agenda.

An important conclusion one can draw from the preceding discussion is that the process of 'nuclear learning' as hypothesised by the academic experts does not follow the same pattern in real life situations. It is apparent in case of Pakistan, and there is no evidence to suggest that it is any different in other nuclear states, that there is no overarching framework or blue print to be followed systematically over a period of time. In reality, the process does not follow a linear pattern but unfolds in the form of a series of haphazard steps taken by different stake holders in response to the ever changing security environment and the unanticipated challenges posed by internal as well as external developments. It is hard to characterise the responses as a proof of learning or adaptation to a dynamic environment. The whole phenomenon would in fact be a combination of learning and adaptation without any clear cut distinction or a precise framework.

The interviews revealed a clear divide between the military respondents, civilian officials and younger scholars and analysts on the one hand and the senior academics and analysts on the other. While the former appeared to be more upbeat and confident of the positive trajectory of learning, the latter while acknowledging the progress made so far were less enthusiastic with a hint of scepticism in their views. The politicians interviewed clearly recognised the higher degree of learning within the military and were critical of the politicians' inability and lack of effort to learn. Most of the academic experts also seemed to concur with this view. While the civilian bureaucrats saw their role in policy making as significant, some respondents saw the civilian input into decision making as inconsequential. While some interviewees lamented the lack of purposeful institution building in the civilian domain, others thought that such institutions existed in the form of government funded think tanks, but conceded that these were not being utilised optimally. In terms of learning in the legislative domain, a knowledgeable legal expert saw appreciable achievements in the field and a significant amount of learning.[2] There was also a general consensus that learning by the general public including the media leaves much to be desired. The media only takes up these issues whenever international media runs some

[2] Interview with respondent 'N' at Islamabad in August 2012.

story about Pakistan's nuclear programme but the discussions usually lack professionalism and technical understanding, are not well informed and are rhetorical in nature. Such media discourse only helps sensationalise the issues rather than promoting a sober and informed understanding.

The preceding paragraphs have highlighted the fact, that considerable amount of learning of various types such as factual, inferential, experiential, perceptual, crisis and imitative has taken place in Pakistan at different levels of analysis. However, viewed from the stand point of 'simple' and 'complex' learning it appears that much of the learning that has taken place in Pakistan since 1998 can be categorised under the 'simple learning' rather than 'complex learning.' While Pakistan seems to have readjusted the means to achieve its national objectives especially after Kargil, there is no clear evidence to suggest that a comprehensive policy overhaul has taken place to re-evaluate the means – ends relationship nor is there any indication that any reappraisal of national aims and objectives has taken place to modify the national objectives. Pakistan, however, is not alone in this regard as the experience of other nuclear powers also suggests that whereas it is quite common to see readjustment in the means, it is rare to see any effort to substantively modify the national goals and objectives. In South Asia, India's approach in dealing with its territorial disputes either with China or with Pakistan has not undergone any reckonable transformation after the nuclearisation of its security environment. Similarly, in the United States President Obama's nuclear policy may appear to be more nuanced in articulation but in substance it is no different from the Bush era nuclear policy. Given Pakistan's volatile internal and external security environment and persistent political instability it would be unrealistic to expect any significant advance along the complex learning curve in the near future.

The following table summarises the degree of learning across various nuclear policy domains. However, this is at best a subjective representation of learning given the difficulty in precisely measuring or quantifying learning which is cognitive by nature.

Table Summarising Degree of Nuclear Learning in Pakistan

Domains	**Degree of Learning**		
	Low (Minimal Adaptation)	**Medium** (Moderate Learning)	**High** (Extensive Learning)
Nuclear Doctrine		Medium.	
Command & Control		Medium.	
Safety & Security			High
Export Control Regime			High
Nuclear Regulatory Regime			High

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