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# Nuclear Energy and Liability in South Asia

Institutions, Legal Frameworks and Risk  
Assessment within SAARC

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Assessment Within SAARC



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# Nuclear Energy and Liability in South Asia

# Preface

In the development of international law relating to liability, the nuclear energy sector represents an alternative approach to transboundary liability regime. Building on this foundation and following the Chernobyl accident—international consensus was sought for a stronger transboundary legal regime in the event of a nuclear disaster. However, after 60 years of the existence of international nuclear liability laws and 25 years after Chernobyl, the primary objective of the Conventions—harmonisation and a global regime remains unfulfilled. Further, many countries are expanding or introducing nuclear programmes, without adequate transboundary legal protection. On account of these issues, a regional approach to nuclear risk framework appears more promising than the non-achievable global regime. South Asia, with its rapidly expanding nuclear energy footprint is in a unique position to adopt a regional mechanism.

This study undertaken during the period 2009 to 2014, brings out the difficulties that lie ahead in achieving an overarching global nuclear liability architecture. In the case of South Asia—a densely populated region, the existing legal regime and legal arrangements which are under consideration are unlikely to secure a transboundary liability remedy. The technical risk assessment study points to the likely transboundary impact in case of a nuclear accident. There has not been any attempt in forging a regional consensus on the issue of nuclear energy risk to date. The book argues that a regional approach is certainly possible in South Asia, under the structure of SAARC, and the expert opinions confirm this proposition. The result gives a basic framework for decision-makers in SAARC on implementing measures that address the transboundary nuclear energy risk concern.

**Keywords:** Nuclear liability, Compensation, Transboundary pollution, International legal regime, South Asia, SAARC, Nuclear risk community, Risk mapping, Risk perception

# Acknowledgments

My interest in 'nuclear energy and law' arose purely by chance. As a research assistant in 2000 I was asked by Prof. N.R. Madhava Menon, then Vice-Chancellor, National University of Juridical Sciences, Kolkata to prepare a syllabus on energy law. I am indebted to Prof. Menon for his encouragement over the years, and in particular his support for the nuclear law training programme at the University of Montpellier, Paris organised by OECD-Nuclear Energy Agency. The course opened a world of opportunities, and most importantly—was introduced to Patrick Reyners. Over the years Patrick guided my forays into this field of law.

Even though nuclear energy has never been a 'topic' for 'critical' discussion in many institutions in India, my employer—TERI, provided exceptional backing for many of my initial writings and research proposals on the subject. Dr. R.K. Pachuari, head of TERI has institutionally supported my doctoral studies; Dr. Leena Srivastava, allowed me to experiment, and provided an invisible hand of support to many of my activities, which continues even today. I am grateful to TERI, my employer of 10 years in having a liberal study leave policy.

I was most fortunate in my interaction with two of India's foremost nuclear scientists—Dr. R. Chidambaram and Dr. R.B. Grover. They were always welcoming; I am truly thankful to them.

Undertaking doctoral studies at the Indian Institute of Technology, Kharagpur (IIT-KGP), an institution of immense history and importance to India, was a privilege. The Rajiv Gandhi School of Intellectual Property Law at IIT-KGP was established to study the interaction between technology and laws; and my Ph.D. topic, 'Nuclear Energy and Liability' was a good fit. My supervisor, Dr. K.D. Raju provided all assistance in making me feel at home. Apart from an international law expert, Dr. Raju was a military man too. That meant even though I was given full academic freedom, he ensured deadlines were equally strict. M.V. Shiju a friend of many years, whole heartedly supported my endeavour. I was unsure about joining the programme at the time, he was kind enough to give me his train ticket to Kolkata which was purchased to celebrate his wedding anniversary. I am proud to have a friend of his stature and humbleness.

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One of the most visible outcomes of the time spent on study leave is the establishment of Nuclear Law Association, India (NLA). The extremely competent first Governing Board of NLA consisting of Arun Khanna, Els Reynaers Kini, Mohit Abraham, Dr. Rajesh Babu, Dipankar Bandyopadhyay and T.P. Krishna believed in me in creating a unique association and committed enormous time and resources.

I was able to do my Ph.D. only because Praachi, my wife, encouraged and supported even when there were small children to take care at home. Many months away from home, long hours of work and my erratic behaviour while writing the thesis, must have taken a toll on her. She can fully justify that the thesis is equally hers, considering the time she spent on reviewing, correcting and debating issues. I am glad that I could finish the work before Uday and Utsa, could start demanding my presence. Amma, if she was alive would have been really proud and Achan was the strongest supporter in my life. Finally, I am indebted to Ma and Papa, and brothers—Mahesh, Paramesh and Prateek for unstinted love.

## About the Author

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# Symbols and Abbreviations

AEA	Atomic Energy Act, 1962 (India)
AEC	Atomic Energy Commission
AERB	Atomic Energy Regulatory Board
BAEC	Bangladesh Atomic Energy Commission
CANDU	Canadian Deuterium Reactor
CEIP	Carnegie Endowment for International Peace
DAE	Department of Atomic Energy
EIA	Environmental Impact Assessment
EU	European Union
FBR	Fast Breeder Reactors
FNCA	Forum for Nuclear Co-operation in Asia
GIS	Geographical Information Systems
HBNI	Homi Bhabha National Institute
IAEA	International Atomic Energy Agency
ICJ	International Court of Justice
KANUPP	Karachi Nuclear Power Plant
km	Kilometer
KNPP	Kudankulam Nuclear Power Plant
MoEF	Ministry of Environment and Forest (India)
MW	Megawatt
NAPS	Narora Atomic Power Station
NDMA	National Disaster Management Authority
NNPAP	National Nuclear Power Action Plan (Bangladesh)
NNWS	Non-Nuclear Weapons States
NPCIL	Nuclear Power Corporation of India Limited
NPP	Nuclear Power Plant
NSG	Nuclear Suppliers Group
NWS	Nuclear Weapons States
OECD	Organization for Economic Co-operation and Development
OECD-NEA	OECD Nuclear Energy Agency
OEEC	Organization for European Economic Co-operation

PAEC	Pakistan Atomic Energy Commission
PAZ	Precautionary Action Zone
PHWR	Pressurised Heavy Water Reactor
SAARC	South Asian Association for Regional Cooperation
SDMC	SAARC Disaster Management Centre
SDR	Special Drawing Rights
UK	United Kingdom
UN	United Nations
UNAEC	United Nations Atomic Energy Commission
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
UPZ	Urgent Protective Action Planning Zone
US	United States of America
US AEA	United States Atomic Energy Act
USAEC	United States Atomic Energy Commission
USDOE	United States Department of Energy
USNRC	United States Nuclear Regulatory Commission

# List of Statutes and International Conventions

1. The Bangladesh Atomic Energy Regulatory Act, 2012.
2. The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, 1986.
3. The Convention on Early Notification of a Nuclear Accident, 1986.
4. The Convention on Supplementary Compensation for Nuclear Damage, 1997.
5. The Convention Supplementary to the Paris Convention of 29 July 1960.
6. The Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, 1988.
7. The Nuclear Installations Act, 1965 (United Kingdom).
8. The Nuclear Liability Act, 2012 as amended (Canada).
9. The Nuclear Non-proliferation Act of 1978 (United States).
10. The Nuclear Non-Proliferation Treaty (NPT), 1968.
11. The Paris Convention on Third Party Liability in the Field of Nuclear Energy, 1960.
12. The Price-Anderson Nuclear Industries Indemnity Act, 1957.
13. The Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage, 1997.
14. The Protocol to Amend the Brussels Convention Supplementary to the Paris Convention, 2004.
15. The Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy, 2004.
16. The Atomic Energy Act, 1 August, 1946.
17. The Atomic Energy Act, 1962.
18. The Civil Liability for Nuclear Damage Act, 2012.
19. The Environmental Protection Act, 1986.
20. The Nuclear Non-proliferation Act, 1978.
21. The Public Liability Insurance Act, 1991.
22. The Third Party Liability for Nuclear Damages, 1998 (Austria).
23. The Vienna Convention on Civil Liability for Nuclear Damage, 1963.

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1. *Carolina Environmental Study Group v. Atomic Energy Commission* (438 U.S. 59 (1978))
2. *Case Concerning Military and Paramilitary Activities in and Against Nicaragua* (*Nicaragua v. United States of America*) (1986 I.C.J. 14)
3. *Centre for Public Interest Litigation and others v. Union of India* (WP 407/2012)
4. *Common Cause and others v. Union of India* (WP 464/2011)
5. *Conservation Society of Southern Vermont v. Atomic Energy Commission* (No. 19-72 (D.D.C. April 16, 1975))
6. *G. Sundarrajan v. Union of India* (W.P.Nos. 24770 and 22771 of 2011, 8262 and 13987 of 2012 and W.P.(MD) Nos. 14054 and 14172 of 2011, 1823 and 2485 of 2012)
7. *Indian Council of Enviro-Legal Action v. Union of India* (AIR 1996 SC 1466)
8. *M.C. Mehta v. Union of India* (*Oleum Gas Leak Case*) AIR 1987 SC 1086)
9. *Ryland v. Fletcher* (L.R. 3 H.L. 330; [1861–1873] All E.R)
10. *Case concerning the Aerial Incident of 10 August 1999* (*Pakistan v. India*) (ICJ. Reports 2000)
11. *Trail Smelter Arbitration* (*United States Vs Canada*) 1941, U.N. Rep. International Arbitration Awards 1905 (1949)
12. *Corfu Channel Case* (1949). (I.C.J. Reports 1949)

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
1.2	International Law and Nuclear Liability	3
1.3	South Asia	5
1.4	National Laws on Nuclear Liability	6
1.5	Overview of the Critical Literatures on Transboundary Nuclear Liability Regime	8
1.6	Objectives and Scope	14
1.7	Methodology	15
	References	16
<b>2</b>	<b>The Development of Institutions and Liability</b>	
	<b>Laws Relating to Nuclear Energy</b>	<b>19</b>
2.1	Introduction	19
2.2	Institutional Control of Nuclear Energy: Creation of the UN Atomic Energy Commission	21
2.2.1	Military to Civilian Programs: Creation of International Atomic Energy Agency	24
2.3	Nuclear Energy Cooperation: Questions of Liability	25
2.3.1	Technical Studies on Hypothetical Nuclear Accidents	26
2.3.2	Continuing International Cooperation	27
2.3.3	Bilateral Liability Provisions and Transboundary Liability Concerns	28
2.4	Specific Legislative Response on Nuclear Liability	29
2.4.1	The United States Domestic Law	30
2.4.2	Organisation for European Economic Co-operation (OEEC)—Regional Efforts	32
2.4.3	IAEA Sponsored International Framework	34
2.5	The Chernobyl Nuclear Disaster and State Liability	34
2.6	Chernobyl Effect: Reforms in International Nuclear Liability Law	37
2.6.1	Emergency Conventions	37

2.6.2	Joint Protocol Linking the Paris and the Vienna Liability Conventions . . . . .	37
2.6.3	Amendments to the Vienna and the Paris Conventions, and the CSC . . . . .	38
2.7	Continuing Efforts in Liability Regime Reforms . . . . .	43
2.7.1	Fukushima Nuclear Disaster . . . . .	44
2.7.2	Nuclear Exporter's Principle: Achieving the Impossible? . . . . .	46
2.8	Conclusion . . . . .	47
	References . . . . .	48
<b>3</b>	<b>The Indian Civil Liability for Nuclear Damage</b>	
	<b>Act, 2010: An Analysis . . . . .</b>	<b>53</b>
3.1	Introduction . . . . .	53
3.1.1	Making of the Civil Liability for Nuclear Damage Law . . . . .	55
3.2	Analysis of the Civil Liability Act . . . . .	58
3.2.1	Liability: Limited or Open-Ended? . . . . .	58
3.2.2	Operator's Right of Recourse: Indian Innovation or Nightmare in Interpretation? . . . . .	61
3.3	The Indian Law, the Compensation Convention and Transboundary Applicability . . . . .	64
3.4	Conclusion . . . . .	67
	References . . . . .	68
<b>4</b>	<b>A Nuclear Liability Framework for South Asia . . . . .</b>	<b>71</b>
4.1	Introduction . . . . .	71
4.2	Nuclear Energy Programmes and Plans Within South Asia . . . . .	73
4.2.1	India . . . . .	73
4.2.2	Pakistan . . . . .	74
4.2.3	Bangladesh . . . . .	76
4.2.4	Sri Lanka . . . . .	77
4.2.5	Nepal . . . . .	77
4.3	International Legal Obligations on Civil Nuclear Energy and South Asia . . . . .	78
4.3.1	The IAEA Emergency Conventions and South Asia . . . . .	79
4.3.2	Emergency Conventions Dispute Settlement and International Court of Justice . . . . .	81
4.4	South Asia and Nuclear Liability Laws . . . . .	82
4.4.1	Transboundary Nuclear Liability Concerns Within the SAARC . . . . .	84
4.5	The SAARC's Establishment and Functions . . . . .	86
4.5.1	SAARC Charter and Objectives . . . . .	87
4.5.2	SAARC's Mandate and Formation of Nuclear Energy Risk Community . . . . .	88

4.5.3	The SAARC and Energy Initiatives .....	90
4.5.4	The SAARC and Disaster Management Initiatives .....	90
4.6	Conclusion .....	92
	References .....	93
<b>5</b>	<b>South Asian Nuclear Risk Zone: A Mapping Exercise .....</b>	<b>97</b>
5.1	Introduction .....	97
5.2	Technical Study: Structuring a Nuclear Risk Zone Within the SAARC .....	98
5.2.1	Classification of Risk and Risk Zones .....	99
5.2.2	Risk Zones and the United States .....	102
5.2.3	Risk Zones and India .....	102
5.2.4	Risk Zones and France .....	103
5.2.5	Risk Zones and The United Kingdom .....	103
5.2.6	Chernobyl and Fukushima: Extent of Impact .....	104
5.3	Plotting the Probable Impact Scenarios in South Asia .....	106
5.3.1	Operational NPPs in South Asia .....	106
5.3.2	NPPs Under Construction .....	108
5.3.3	The Proposed NPPs in South Asia .....	111
5.3.4	Combined Risk Zones (Existing, Under-Construction and Proposed NPPs) .....	115
5.4	Conclusion .....	117
	References .....	118
<b>6</b>	<b>Establishing a South Asian Nuclear Risk Community: An Empirical Analysis .....</b>	<b>121</b>
6.1	Introduction .....	121
6.2	South Asia's Quest for Nuclear Energy .....	123
6.3	Shared Regional Concerns Within the SAARC .....	125
6.4	Disaster Management Initiatives within the SAARC .....	127
6.5	SAARC: An Appropriate Forum? .....	129
6.6	Nuclear Risk Community or Regional Framework Liability Convention .....	131
6.7	Conclusion .....	132
	References .....	133
<b>7</b>	<b>Conclusion and Suggestions .....</b>	<b>135</b>
7.1	Specific Suggestions .....	138
7.2	Future Scope of Work .....	139
	<b>Index .....</b>	<b>141</b>

# Chapter 1

## Introduction

**Abstract** This study brings out the difficulties that lie ahead in achieving global nuclear liability architecture. In the case of South Asia—a densely populated region, the existing legal regime and legal arrangements which are under consideration is unlikely to secure a transboundary liability remedy. The technical risk assessment study points to the likely transboundary impact in case of a nuclear accident. There has not been any attempt in forging a regional consensus on the issue of nuclear energy risk to date. The book argues that a regional approach is certainly possible in South Asia, under the structure of SAARC, and the expert opinion confirms this proposition. The result gives a basic framework for decision-makers in SAARC on implementing measures that addressing the nuclear energy risk concern.

**Keywords** Nuclear liability literature • Review of nuclear liability law development • Nuclear energy and South Asia • Critical analysis of transboundary nuclear liability regime

### 1.1 Background

The adoption of nuclear energy for power generation by countries worldwide has been a contentious issue. Contentious for the fact that, development of nuclear energy was initiated for military purposes and the dreadful consequences of the bombing of Hiroshima and Nagasaki, Japan, on 6 and 9 August 1945 has contributed to the continued perception of fear. However, countries have moved forward in their adoption of this technology, mainly due to large possibilities in generating abundant power. But the question remains whether this forward march is without understanding the larger implications of nuclear energy technology adoption.



These concerns were not unfounded either. Three-Mile Island nuclear accident in the United States (US) (1979),<sup>1</sup> Chernobyl in the former Soviet Union (USSR) (1986)<sup>2</sup> and the nuclear fallout subsequent to earthquake and tsunami in Fukushima, Japan (2011)<sup>3</sup> exposed the nature of nuclear accidents and our helplessness to grapple with the accidents of such magnitude.

For the above disasters, in terms of transboundary impacts—the subject of the book, the Chernobyl accident as reported resulted in considerable human, environmental and economic loss, both in the country of origin and much of Europe. More importantly, in the Chernobyl case, the offending State failed to immediately protect, assist or otherwise notify any of its neighbouring States.

The Chernobyl accident clearly illustrated that the geographical scope of nuclear damage is not necessarily confined to national boundaries. Official acknowledgement of the accident from Soviet Union came only much later. It was the Swedish authorities who raised the alarm and notified the international community on the occurrence of the disaster. Soviet Union, at that time was not a party to any of the international conventions relating to nuclear liability; because of this there were no legal requirements for payment of international compensation.

This experience led the international community to believe that an international consensus on ‘state liability’ in the event of a nuclear accident is not only desirable but necessary. In response to Chernobyl, the world community over the past few decades, has endeavoured through international legal instruments to impose stricter obligations upon States pursuing civil nuclear energy programmes.

However, 25 years after the Chernobyl accident, even today, it appears that the international consensus has not been achieved on many issues, and a unified international legal regime—the foundation of successful nuclear energy programmes, remains elusive. Most of the existing international conventions are not adequately adhered to, and national laws are at variance with each other and also with the international conventions. The hard fact is that the countries with a majority of the operating nuclear power plants (including Canada, China, Japan, Korea, South Africa, Switzerland and the US) have only recently considering or are yet to be part of an international regime. Instead, many rely on their own domestic liability laws.

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<sup>1</sup> On March 28, 1979 a partial nuclear meltdown occurred at the Three Mile Island power plant in Dauphin County, Pennsylvania, United States. It was the worst accident in US commercial nuclear power plant history, and resulted in the release of small amounts of radioactive gases and radioactive iodine into the environment. There was no transboundary consequence from the accident.

<sup>2</sup> On April 26 1986, a testing went horribly wrong, causing an explosion at the Chernobyl nuclear power station in northern Ukraine. The Chernobyl disaster is the worst nuclear power plant accident in the history, and the first one to be classified as a level 7 event (extreme) on the IAEA International Nuclear Event Scale. The impact was considerable not only to the people and environment in and around Ukraine, but to whole of Europe.

<sup>3</sup> The 2011 nuclear accident in Fukushima Japan is the result of series of natural events—earthquake and then tsunami leading to nuclear accident. IAEA International Nuclear Event Scale categorises it as level 7.