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Abstract

Terrorism has bedeviled India and Pakistan for more than three decades now. Both countries accuse each other of stoking sectarian, religious and separatist sentiments, which in turn lead to terrorist acts. India has accused Pakistan of supporting insurgents in Kashmir, Indian Punjab, and northeastern states with training and weapons **[*1*]**. Pakistan also castigates India for aiding and abetting Baloch militants **[*2*]**. Post 9/11, terrorists adopted the technique of spectacular attacks. The 2008 Mumbai attacks and the Peshawar school attack in December 2014 have affirmed credence in the fear that the terrorists will resort to any possible method to kill innocent citizens of both countries.

The geopolitical rivals have had a tortuous relationship since their respective independences, but neither of them will tolerate an incident of nuclear and radiological terrorism in South Asia. This paper will discuss the probability of nuclear and radiological terrorism in South Asia, the opportunities for collaboration between India and Pakistan to deter and detect such terrorism, and the impact of an India–Pakistan collaboration.

I. Probability of Nuclear and Radiological Terrorism

The Federation of American Scientists (FAS) classifies nuclear and radiological terrorism in four threat categories: (1) the possibility of non-state actors acquiring an intact nuclear weapon; (2) the acquisition of enough fissile material to manufacture a bomb; (3) the acquisition of radiological material to make a radiological dispersal devise; and (4) a possible attack or sabotage of a nuclear power plant or a waste storage facility **[*3*]**.

In order to gauge the likelihood of a nuclear and radiological terrorist attack, it is important to understand the ideology and motivations of the major terrorist groups in the region.

A. Ideologies and Motivations of the Major Terrorist Groups in South Asia

According to Ashley Tellis, the following types of terrorist groups operate in Pakistan: sectarian groups, Anti–India groups, Al Qaeda and its affiliates, and the Pakistani Taliban **[*4*]**. Among these groups, India-specific terrorist groups, Al Qaeda, and the Pakistani Taliban are likely to employ nuclear and radiological materials to inflict human and financial loss both in India and Pakistan **[*5*]**. Osama bin Laden declared that using weapons of mass destruction is an integral part of jihad. This statement can provide inspiration to groups who share Al Qaeda's ideology to use nuclear and radiological materials in terrorist acts.

Both Al Qaeda, and the Pakistani Taliban have carried out multiple terrorist attacks across Pakistan. Most notably among those attacks was on the army headquarters in December 2010, with the objective of holding senior military officers as hostages **[*6*]**. Recently, the Pakistani Taliban attacked an army-managed high school and killed more than 140 students at point blank ranges **[*7*]**. This attack displayed that the Pakistani Taliban can resort to any tactic in their war against the Pakistani state. Such motivation has even led the Taliban to formulate plans to attack nuclear facilities **[*8*]**. In September 2012, Pakistani intelligence agencies intercepted a telephone conversation between Taliban members who were planning to strike a nuclear facility in Dera Ghazi Khan, Pakistan; the facility comprises uranium milling and mining operations, and a uranium hexafluoride conversion plant.

After the Afghan war, Pakistan created the anti-Indian jihadi network to initiate an insurgency in the Indian-held Kashmir. Gradually these groups, such as Lashkar-e-Taiba and Jaish-e-Muhammad, started attacking major Indian cities. Lashkar-e-Taiba was involved in the attack on the Indian Parliament in 2001 and also carried out the Fedayeen-style attack in Mumbai in 2008 **[*9*]**. Most of these jihadi groups are motivated by the Deobandi sect, which disregards the Westphalia concept of nation states and believes in Ummah (pan-Islamism). According to Hussain Haqqani, former Pakistan Ambassador to the United States, Jaish-e-Muhammad shares the ideology of Al Qaeda, which means that only Muslims should rule Muslim land.

B. Emerging Nexus Between Different Terrorist Groups

Although these groups originated to serve differing purposes, a strong nexus is emerging between them. According to Don Rassler, in addition to providing expertise, Al Qaeda is playing the role of mediator and coordinator among these militant groups **[*10*]**. He further quotes Bruce Riedel that the Pakistani Taliban, Al Qaeda, and the anti-Indian militants are collaborating on terrorist attacks **[*10*]**. Sectarian groups like Lashkar-e-Jhangvi, which target Shias, have also forged an alliance with the Taliban **[*11*]**. In 2012, the leadership of the sectarian militant groups and the Pakistani Taliban operated with impunity from North Waziristan, one of the seven lawless, tribal agencies of Pakistan **[*12*]**. Sajjan Gohel, Director for International Security for the Asia-Pacific Foundation, believes that Al Qaeda operatives were based in major cities of Pakistan and not restricted to tribal areas: Khalid Sheikh Mohammed was caught in Rawalpindi, Abu Zubaydah in Faisalabad, and Tawfiq bin Attash and Ramzi Binalshibh in Karachi **[*13*]**. Khalid Sheikh Mohammed was apprehended from the house of an activist of Jamaat-e-Islami, a major political party in Pakistan **[*14*]**. Nigel Inkster, Director of Transnational Threats and Political Risk for the International Institute for Strategic Studies (IISS), believes that Al Qaeda has created alliances through intermarriages and business partnerships.

Al Qaeda and Islamic State in Iraq and al-Sham (ISIS) are competing for supremacy in South Asia. In order to outshine ISIS, Al Qaeda created its South Asian wing **[*15*]**. ISIS, which controls territory in Iraq and Syria, has found support among militant factions in South Asia **[*16*]**. The newly created South Asian

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wing of Al Qaeda launched an audacious attack on a dockyard in September 2014 to hijack a naval frigate which would have been used to attack United States and Indian naval ships in the Arabian Sea **[*15*]**. This reflects that Al Qaeda is trying new methods of attacking western targets and it has now included India on the list of its targets.

The South Asian wing of Al Qaeda, in collaboration with Pakistani Taliban and its other affiliates, could try to procure and employ nuclear and radiological sources in terrorist attacks. After Operation Zarb-e-Azb was launched by the Pakistan Army to clear its tribal areas of the terrorist group, the risk of a spectacular attack larger than the Mumbai attack should not be ruled out. The International Atomic Energy Agency's (IAEA) Incident and Trafficking Database (ITDB) contains 2,477 incidents of nuclear and radiological material out of regulatory control from January 1993 to December 2013 **[*17*]**. According to IAEA:

> Of the 2477 confirmed incidents, 424 involved unauthorized possession and related criminal activities. Incidents included in this category involved illegal possession, movement or attempts to illegally trade in or use nuclear material or radioactive sources. Sixteen incidents in this category involved high-enriched uranium (HEU) or plutonium. There were 664 incidents reported that involved the theft or loss of nuclear or other radioactive material and a total of 1337 cases involving other unauthorized activities, including the unauthorized disposal of radioactive materials or discovery of uncontrolled sources **[*18*]**.

By pilfering nuclear and radiological materials, terrorists can fabricate Improvised Nuclear Devices (INDs) and Radiological Dispersal Devices (RDDs). In the past, for instance, the Japanese cult Aum Shinrikyo has tried to obtain nuclear material to carry out nuclear terrorism **[*19*]**. Experts have repeatedly said that nuclear terrorism is a possibility if terrorists acquire nuclear materials. According to Matthew Bunn, nuclear terrorism is a very genuine threat and "making a nuclear bomb is really about slamming two pieces [of highly enriched uranium] together at high speed" **[*20*]**.

II. Collaboration Between India and Pakistan to Tackle Nuclear and Radiological Terrorism

A. Historical Precedence of Nuclear and Counterterrorism Cooperation

There is a history of nuclear cooperation between the two nuclear-armed nations. In 1988, India and Pakistan signed an agreement, which stated "each party shall refrain from undertaking, encouraging or participating in, directly or indirectly, any action aimed at causing the destruction of, or damage to, any nuclear installation or facility in the other country" **[*21*]**.

In 1999, Prime Minister Atal Bihari Vajpayee travelled to Lahore for discussions on various issues. At the end of the summit, a Memorandum of Understanding was signed, which stated:

> The two sides are fully committed to undertaking national measures to reducing the risks of accidental or unauthorized use of nuclear weapons under their respective control. The two sides further undertake to notify each other immediately in the event of any accidental, unauthorized or unexplained incident that could create the risk of a fallout with adverse consequences for both sides, or an outbreak of a nuclear war between the two countries, as well as to adopt measures aimed at diminishing the possibility of such actions, or such

> incidents being misinterpreted by the other. The two sides shall identify/establish the appropriate communication mechanism for this purpose **[*22*]**.

The two agreements are not only unparalleled in South Asia, but also provide basis for optimism that consensus can be reached to tackle the issue of nuclear and radiological terrorism. There has been precedence where India and Pakistan have agreed to work on counterterrorism in the region. In 2006, Prime Minister Manmohan Singh and President Pervez Musharraf met in Havana, Cuba, where both countries declared that they would set up a Joint Anti-Terrorism Mechanism to identify and investigate terrorist incidents **[*23*]**.

Both nations, utilizing the previous agreements as a general framework, can lay out more precise arrangements described below.

III. South Asian Nuclear Detection Architecture

A. Need Analysis

India and Pakistan share a border of 3,323 kilometers. The current trade between the two countries is only a paltry three billion dollars, but with the normalization of relations, experts expect an exponential growth of trade to 40 billion dollars **[*24*]**. In 2008, India and Pakistan opened a trade route across the disputed territory of Kashmir **[*25*]**. They are also planning to set up 13 border crossings in the coming years **[*26*]**. The first integrated border post was set up in 2012, which increased the number of trucks able to be viewed entering Pakistan from 150 to at least 800. This boost of trade also gives opportunities to non-state actors to traffic nuclear and radiological material across the border.

In order to prevent nuclear and radiological terrorism, detection of such unaccounted-for materials is of paramount importance. Creating South Asian Nuclear Detection Architecture can surmount this challenge. According to Dr. Gowadia, Director of the United States Department of Homeland Security's (DHS) Domestic Nuclear Detection Office (DNDO), "a detection event can be in the form of information or intelligence alerts, technical detection alerts, and traditional law enforcement work" **[*27*]**.

Cooperation between the intelligence agencies may not be possible because of the deep mistrust between the two countries, but a joint project of interdicting nuclear and radiological projects can be initiated by the Customs Department. With the passage of time, law enforcement and intelligence officials can also become part of the project. The South Asian Nuclear Detection Architecture can comprise the South Asian Nuclear Forensics International Technical Working Group (ITWG), jointly manned radiological detection border posts, a joint working group of legal officials holding expertise in forensic evidence, regular interaction between the regulatory bodies, and pre- and post-detonation nuclear forensics training at either Pakistan's center of excellence for nuclear security, the Nuclear Security Training Center (NSTC), or at India's, the Global Center for Nuclear Energy Partnership (GCNEP).

B. South Asian Nuclear Forensics International Technical Working Group

According to IAEA, "nuclear forensics is the analysis of intercepted illicit nuclear or radioactive material and any associated material to provide evidence for nuclear attribution. The goal of nuclear analysis is to identify forensic indicators in interdicted nuclear and radiological samples or the surrounding environment, e.g. the container or transport vehicle" **[*28*]**.

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A concerted effort is required to have a dedicated group of experts with the requisite capacity to perform pre- and post-detonation nuclear forensics. India and Pakistan are already participating in the activities of the Global Initiative to Counter Nuclear Terrorism (GICNT), the International Criminal Police Organization (INTERPOL), and IAEA to augment the nuclear forensics capabilities of these multilateral bodies **[*29*]**. Both countries have endorsed GICNT's Statement of Principles, which calls to "improve the ability to detect nuclear and other radioactive materials in order to prevent illicit trafficking, including cooperation in the research and development of national detection capabilities that would be interoperable" **[*30*]**. They could utilize the guidance of such multilateral forums to establish a South Asian Nuclear Forensics International Technical Working Group. As nuclear forensics requires a wide range of expertise, the nuclear forensics center should ideally accommodate legal experts, scientists, law enforcement and intelligence experts, and first responders.

The Pakistan Nuclear Regulatory Authority (PNRA) and Bhabha Atomic Research Center's (BARC) nominated officials can provide their technical expertise to the law enforcement experts from both sides in this regional forensics-working group.

C. Collaboration Between Indian and Pakistani National Nuclear Forensics Libraries

> According to IAEA:
> The State should consider establishing nuclear forensics libraries for its inventory of nuclear and other radioactive material. These libraries should include databases of all material produced, used, and stored in a State and, if applicable, supported by sample and literature archives. The State should be capable of responding to queries of other States regarding recovered nuclear or other radioactive materials that may have been produced, used, or stored on the State's territory [31].

According to David Smith, a nuclear forensics library should entail features on key nuclear fuel cycles and isotope production stages like uranium ores and ore bodies, uranium mining and milling, uranium conversion, uranium enrichment, uranium fuel fabrication, mixed oxide fuel fabrication, reactor fresh fuel assemblies, irradiated (spent) fuel, nuclear reprocessing, nuclear waste, and isotope production of both sealed and unsealed radioactive sources [32].

A joint library between the two nuclear-armed nations would be impossible because of the sensitivities attached to the subject; however, both nations can request each other, through the point of contact, to share information if an unaccounted for nuclear or radiological material is detected. If the material does not match the samples in the national libraries, both nations can contact and share their findings with IAEA via their point of contact.

1. Verification of Data

The major problem in creating an international database is that both states have apprehensions about sharing their sensitive data. According to a report prepared for the United States government, the major obstacles for creating a database are: commercial desires to protect sensitive data, problems related to classification and established government policies, states' refusal to cooperate, and attempts to spoof the database **[*33*]**. There can never be confidence in the South Asian nuclear security architecture if the national nuclear forensics libraries of India and Pakistan are not verified. Neither country would allow each other to verify their libraries. However, friendly countries can carry out verification. In the case of Pakistan, it can be conducted by China, while the United States can verify India's libraries.

Pakistan has always been insecure when it comes to sharing details about its nuclear program. After the United States' raid in 2011, which killed Osama Bin Laden, the then Pakistani military chief General Kiyani, feared the United States capability to launch a simultaneous attack to neutralize its nuclear weapons **[*34*]**. Due to its close historic ties with China, Pakistan considers China a reliable ally. The level of trust can be gauged by a statement of Chairman Ansar Parvez of the Pakistan Atomic Energy Commission (PAEC), who argued for a nuclear deal with China instead of the United States **[*35*]**.

China and Pakistan have been opaque regarding their nuclear cooperation agreement signed in 1986. Their cooperation started a decade before 1986 when Prime Minister Zulifqar Ali Bhutto accepted in 1976 that both countries were collaborating in this field **[*36*]**. According to T.V. Paul, the Pakistani bomb would not have existed without the help of the Chinese. They have even provided direct assistance in the building of the plutonium reactors at Khushab **[*37*]**. This shows that Pakistan trusts China and would not have issues sharing the data in their nuclear forensics library. China, in turn, could issue a quality assessment report, without sharing sensitive details, to tell the world that Pakistan has a credible nuclear forensics library.

Despite not being a member of the Nonproliferation Treaty, the United States signed a nuclear agreement with India in 2005. Under this deal, India agreed to implement the Additional Protocol, which gives inspectors intrusive access to its civilian nuclear facilities, works towards negotiating a Fissile Material Cut-off Treaty (FMCT), and continues India's moratorium on nuclear testing **[*38*]**. Besides bringing India to the nuclear nonproliferation regime, the United States and India have formed a joint working group on counter-terrorism and signed a counter-terrorism initiative in 2010 **[*39*]**. For now, this working group has mostly focused on terrorism, financial and economic fraud, narcotics, trafficking, cybercrime, and transnational organized crime **[*40*]**. The group could enlarge the scope of their cooperation to deterring nuclear terrorism and detecting nuclear trafficking. Even when India and the United States did not sign the nuclear deal, efforts were made to establish cooperation between Indian research centers and Brookhaven National Labs **[*41*]**. Lawrence Livermore National Laboratory (LLNL) is one of the prime institutions in the United States that is trying to engage other states in nuclear forensics. In addition to helping India build its national nuclear forensics library, this lab can also verify the quality of the library's data.

D. India–Pakistan Nuclear Detection Check Posts

As mentioned earlier, India and Pakistan are planning to establish 13 integrated check posts for facilitating trade. It is likely that militants in the region can jeopardize any initiative to bring peace. Therefore, these check posts must include nuclear detection equipment and trained manpower to detect illicit trafficking of nuclear and radiological materials.

Let's consider a hypothetical scenario, where a truck carrying a radiological material is interdicted at the Wagah–Attari border between India and Pakistan: the jointly manned detection post will inform its supervisors about the confiscated material. The detection post will contact both the regulatory authorities in India and Pakistan, which in turn would convene the nuclear forensics-working group. The technical experts will analyze the interdicted material and conduct a non-destructive analysis. The nuclear forensics analysis can be carried out at the post, utilizing the mobile radiological lab developed by India **[*42*]**. For a destructive analysis, the presence of scientists from both sides becomes all the more important because cooperation will result in confidence in the nuclear forensics process. The nuclear forensic analysis should be carried out as soon as possible, as it would prevent further pilferage from the source of the interdicted material.

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E. Development of Radiation Detection Equipment

India has indigenously developed radiation detection equipment, which includes personal radiation detectors, aerial radiation detectors, and environmental sampling equipment **[*43*]**. It plans to deploy radiation portal monitors at all of its airports, seaports and manned border crossings by the end of 2015 **[*44*]**. Pakistan, too, has a national detection architecture that covers several entry and exit points to detect and deter illicit trafficking.

Pakistan and India have closely cooperated in multilateral forums like IAEA, in the field of nuclear safety **[*45*]**. They must also cooperate bilaterally by sharing their expertise and learning from each other's experiences. BARC and the Electronic Corporation of India Limited (ECIL) of India, a subsidiary of the Department of Energy, have been at the forefront of research and development in radiation detection and environmental sampling.

PNRA has also built the School of Nuclear and Radiation Safety, which is equipped with a non-destructive lab and a radiation-testing lab **[*46*]**. Scientists from the Pakistan Institute of Nuclear Science and Technology (PINSTECH), the major research institute of PAEC, could learn from the research conducted by BARC and ECIL. Joint radiological safety training can be arranged, which will help both nations improve their ability to develop nuclear and radiological detection equipment and expertise.

F. Legal Issues pertaining to Nuclear Forensics

The member states of the United Nations are bound by United Nations Security Council Resolution (UNSCR) 1540 to give nuclear security paramount importance. The resolution recognizes the grave concerns about the risk of non-state actors trying to acquire, develop, and traffic nuclear, chemical, biological, and radiological material to employ them in terrorist activities **[*47*]**. Furthermore, it shows concern that the illicit trafficking of such weapons and materials poses a threat to international peace and security **[*47*]**. It also binds states to adopt legislation to prevent trafficking of nuclear and radiological material **[*47*]**. Nuclear forensics is part of nuclear security and cannot be compartmentalized. Therefore, an effective nuclear security framework requires stringent border controls, physical protection systems, export controls, and, most importantly, prosecution in the court of law for those who violate all such arrangements.

India and Pakistan can assemble a sub-committee of reputed jurists and legal experts within the nuclear forensics-working group to discuss the legal process for nuclear forensics findings. The legal experts can come up with suggestions for both of the legislative bodies of these countries to formulate laws that create organizations to prevent illicit trafficking. The countries can draw inspiration from the United States Nuclear Forensics and Attribution Act that was passed in 2010, which established the National Technical Nuclear Forensics Center (NTNFC) within the Department of Homeland Security's Domestic Nuclear Detection Office (DNDO) **[*48*]**. This act also exhorted the President of the United States to pursue bilateral and multilateral forums that aid in interdicting nuclear and radiological weapons and material, and investigating post-detonation scenarios involving such weapons and material **[*49*]**. Pakistan and India should also pass legislative acts that help in tackling the threat of nuclear terrorism.

IV. Impact of a South Asian Nuclear Detection Architecture

A. Responsible Nuclear Weapons States

Since their nuclear tests in 1998, both India and Pakistan have been in a quest to be considered as de jure Nuclear Weapons States. India, with the help of a nuclear deal with the United States, is already considered a de facto Nuclear Weapons State, but it aims to be accepted into the Non-Proliferation Treaty (NPT) as the sixth nuclear weapon state **[*50*]**. On the other hand, Pakistan, aspiring to be treated equal to India, craves to be recognized as a responsible Nuclear Weapons State **[*2*]**. The South Asian Nuclear Detection Architecture will make India's and Pakistan's case stronger. Furthermore, Pakistan could advocate for a nuclear deal with the United States based on its nuclear security architecture.

B. Reduction in Risk of War

There is risk of a war between the two archrivals if non-state actors from Pakistan carry out terrorist attacks in India. Former United States ambassador to India, Robert Blackwill, believes that Prime Minister Narendra Modi would not show restraint if a terrorist strike in India is linked to Pakistan **[*51*]**. In such a scenario, initiatives like the Nuclear Detection Architecture can lessen the chances of war, particularly in the case of nuclear and radiological terrorism. The international community would also be supportive of such mechanisms since they reduce the chances of conflict between the nuclear-armed neighbors.

C. Confidence Building Measure Between the Archrivals

Active cooperation between Pakistan and India in the nuclear arena will give an impetus to the composite peace dialogue. It will be a signal to the hawks in both countries that, given the will, Pakistan and India can solve contentious issues like Kashmir, terrorism, and other territorial conflicts.

V. Conclusion

Pakistan and India have fought three wars but, as both countries are nuclear-armed, the risk of a future war needs to be minimized. In the past, non-state actors have brought both nations to the brink of war, be it the attack on parliament in December 2001 or the Mumbai 2008 attack. There is a fear that any limited conflict can lead to a "Nuclear Armageddon" in South Asia. Efforts should be made to increase the escalation ladder in the region, which has been shortened due to Pakistan's induction of tactical nuclear weapons. Pakistan has developed tactical nukes in response to India's threat of a conventional attack in case there is a terrorist attack linked to non-state actors based in Pakistan. The South Asian Nuclear Detection Architecture will aid in increasing the escalation ladder, as it will provide a platform for both nations to trace the perpetrators of any nuclear and radiological attacks in either country.

VI. Works Cited

1. B. Subrat, Terrorism in India: Domestic and External Influence. *India Int. J. Interdiscip. Multidiscip. Stud.* (2014), (available at http://www.ijims.com/uploads/696780174f19c7634e08zppd_2014411.pdf).

2. Dawn.com, Pakistan says evidence of Balochistan interference shared with India (2013), (available at http://www.dawn.com/news/1047628).

DOI: 10.7290/V77D2S2Q

3. Nuclear & Radiological Terrorism. *Fed. Am. Sci.* (2016), (available at https://fas.org/issues/nuclear-and-radiological-terrorism/).

4. Z. Laub, Pakistan's New Generation of Terrorists. *Counc. Foreign Relat.* (2013), (available at http://www.cfr.org/pakistan/pakistans-new-generation-terrorists/p15422).

5. A. Pashupati, Al Qaeda Launches Wing in Indian Subcontinent. *NDTV.com* (2014), (available at http://www.ndtv.com/india-news/al-qaeda-launches-wing-in-indian-subcontinent-658803).

6. F. the Newspaper, Attack on GHQ: confessions of a terrorist mastermind. *Dawn.com* (2011), (available at http://www.dawn.com/2011/09/21/attack-on-ghq-confessions-of-a-terrorist-mastermind/).

7. Y. Lukov, A. Lawson, As it happened: Pakistan school attack. *BBC News* (2014), (available at http://www.bbc.com/news/live/world-asia-30491113).

8. H. Manan, Taliban threat: Nuclear site in DG Khan cordoned off. *Express Trib.* (2012), (available at http://tribune.com.pk/story/432295/taliban-threat-nuclear-site-in-dg-khan-cordoned-off/).

9. H. Haqqani, The Ideologies of South Asian Jihadi Groups. *Carnegieendowment.org* (2016), (available at http://carnegieendowment.org/files/Ideologies.pdf).

10. D. Rassler, Al-Qa`ida's Pakistan Strategy. *Combat. Terror. Cent.* (2009), (available at https://www.ctc.usma.edu/posts/al-qaida%e2%80%99s-pakistan-strategy).

11. Karachi, Escalation: Links between violent sectarian groups and the Pakistani Taliban are growing. *The Economist* (2012), (available at http://www.economist.com/news/21567422-links-between-violent-sectarian-groups-and-pakistani-taliban-are-growing-escalation).

12. R. Barrett, The al-Qaeda-Taliban Nexus. *Counc. Foreign Relat.* (2009), (available at http://www.cfr.org/pakistan/al-qaeda-taliban-nexus/p20838).

13. B. Raman, How Significant is Khalid Sheikh's arrest? *Rediff.com* (2003), (available at http://www.rediff.com/news/2003/mar/03raman.htm).

14. I. Tharoor, Why al-Qaeda is opening a new wing in South Asia. *Wash. Post* (2014), (available at https://www.washingtonpost.com/blogs/worldviews/wp/2014/09/03/why-al-qaeda-is-opening-a-new-wing-in-south-asia).

15. AQIS Clarifies Targets of Karachi Naval Yard Attack as U.S., Indian Navies. *Site Intell. Group* (2014), (available at https://news.siteintelgroup.com/Jihadist-News/aqis-clarifies-targets-of-karachi-naval-yard-attack-as-u-s-indian-navies.html).

16. IAEA Incident and Trafficking Database (ITDB): Incidents of nuclear and other radioactive material out of regulatory control (2016), (available at http://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf).

17. Incident and Trafficking Database (ITDB), (available at http://www-ns.iaea.org/security/itdb.asp).

18. IAEA, Nuclear Safety and Security, (available at http://www-ns.iaea.org/security/itdb.asp).

19. C. D. Ferguson, *Nuclear energy: what everyone needs to know* (Oxford University Press, Oxford ; New York, 2011), *What everyone needs to know*.

20. MacArthur Foundation, *Harvard's Matthew Bunn on Nuclear Terrorism: Enhancing Nuclear Security | MacArthur Foundation* (2012; https://www.youtube.com/watch?v=6QBarfleQ-A).

21. H. Khan, K. P. S. Menon, Agreement between India and Pakistan on the prohibition of attack against nuclear installations and facilities (India-Pakistan non-attack agreement) (2016), (available at http://www.nti.org/media/pdfs/aptindpak.pdf).

22. Lahore Declaration (2016), (available at http://www.nti.org/media/pdfs/aptlahore.pdf).

23. S. Padder, The Composite Dialogue between India and Pakistan: Structure, Process and Agency. *Heidelb. Pap. South Asian Comp. Polit.* **65** (2012) (available at http://archiv.ub.uni-heidelberg.de/volltextserver/13143/).

24. M. Kugelman, R. Hathaway, Pakistan-India Trade: What Needs to Be Done? What Does It Matter? *Wilson Cent.* (2013), (available at https://www.wilsoncenter.org/publication/pakistan-india-trade-what-needs-to-be-done-what-does-it-matter).

25. S. Sengupta, India and Pakistan Open Kashmir Trade Route. *N. Y. Times* (2008), (available at http://www.nytimes.com/2008/10/22/world/asia/22kashmir.html).

26. India-Pakistan border post opens for business. *Al Jazeera* (2012), (available at http://www.aljazeera.com/news/asia/2012/04/201241343825570512.html).

27. Countering Nuclear Terrorism: How DNDO Supports Detection and Forensics | Tactical Defense Media. *Tactical Def. Media* (2016), (available at http://tacticaldefensemedia.com/countering-nuclear-terrorism-how-dndo-supports-detection-and-forensics/).

28. IAEA Nuclear Security Series No. 2: Nuclear Forensics Support. *IAEA.org* (2006), (available at http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1241_web.pdf).

29. Global Initiative to Combat Nuclear Terrorism Fact Sheet. *GICNT* (2016), (available at http://www.state.gov/documents/organization/145499.pdf).

30. Global Initiative to Combat Nuclear Terrorism (GICNT). *NTI.org* (2015), (available at http://www.nti.org/learn/treaties-and-regimes/global-initiative-combat-nuclear-terrorism-gicnt/).

31. IAEA Nuclear Security Series No. 15: Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control. *IAEA.org* (2011), (available at http://www-pub.iaea.org/MTCD/publications/PDF/Pub1488_web.pdf).

32. D. Smith, Development of a National Nuclear Forensics Library (2015).

33. Nuclear Forensics: Role, State of the Art, Program Needs (2016), (available at http://www.aps.org/policy/reports/popa-reports/upload/nuclear-forensics.pdf).

34. J. Goldberg, M. Ambinder, The Pentagon's Secret Plans to Secure Pakistan's Nuclear Arsenal (2011), (available at http://www.nti.org/gsn/article/the-pentagons-secret-plans-to-secure-pakistans-nuclear-arsenal/).

DOI: 10.7290/V77D2S2Q

35. A. Gul, As Pakistan Expands Nuclear Program, China Seen as Most Reliable Partner. *VOA* (2014), (available at http://www.voanews.com/a/as-pakistan-expands-nuclear-program-china-seen-as-most-reliable-partner/1912529.html).

36. Z. Jiegen, China-Pakistan Nuclear Relation after the Cold War and Its International Implications. *Program Strateg. Stab. Eval.* (2016), (available at http://www.posse.gatech.edu/sites/default/files/pubfiles/China-Pakistan%20Nuclear%20Relation%20after%20the%20Cold%20War%20and%20Its%20International%20Implications.pdf).

37. T. V. Paul, Chinese-Pakistani Nuclear/Missile Ties and the Balance of Power. *Nonproliferation Rev.* (2003), (available at http://www.nonproliferation.org/wp-content/uploads/npr/102paul.pdf).

38. J. Bajoria, E. Pan, The U.S.-India Nuclear Deal. *Counc. Foreign Relat.* (2010), (available at http://www.cfr.org/india/us-india-nuclear-deal/p9663).

39. S. Amer Latif, U.S.-India Counterterrorism Cooperation: Deepening the Partnership: Statement before the House Foreign Affairs Committee, Subcommittee on Terrorism, Nonproliferation, and Trade. *Cent. Strateg. Int. Stud.* (2011), (available at https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/ts110914_Latif.pdf).

40. U.S.-India Joint Statement □□□□□ □□□□□□ - □□□□ □□□□□" – "Shared Effort; Progress for All." *whitehouse.gov* (2015), (available at https://www.whitehouse.gov/the-press-office/2015/01/25/us-india-joint-statement-shared-effort-progress-all).

41. A. Aneja, India, U.S. discuss n-safety issues. *The Hindu* (2016), (available at http://www.thehindu.com/2002/03/30/stories/2002033002061100.htm).

42. Mobile Radiological Laboratory. *Dep. At. Energy* (2016), (available at http://dae.nic.in/?q=node/303).

43. Electronics Corporation of India Limited: Radiation Detectors and Instrumentation Division. *Electron. Corp. India Ltd.* (2016), (available at http://www.ecil.co.in/RID_Images/RID_Prouct_Profile.pdf).

44. J. Shenoy, Portal radiation monitors to give India a radiation shield at exit points - Times of India. *Times India* (2014), (available at http://timesofindia.indiatimes.com/city/mangaluru/Portal-radiation-monitors-to-give-India-a-radiation-shield-at-exit-points/articleshow/38622584.cms).

45. S. Mishra, M. Ahmed, Cooperative Measures to Support the Indo-Pak Agreement on Reducing Risk from Accidents Relating to Nuclear Weapons. *Sandia.gov* (2014), (available at http://www.sandia.gov/cooperative-monitoring-center/_assets/documents/sand2014-2607.pdf).

46. Pakistan Nuclear Regulatory Authority, School for Nuclear and Radiation Safety, (available at http://www.pnra.org/snrs/SNRS%20Brochure.pdf).

47. United Nations Security Council Resolution 1540 (2016), (available at http://www.un.org/en/sc/1540/).

48. NTI, U.S.: President Signs Nuclear Forensics and Attribution Act. *NTI.org* (2012), (available at http://www.nti.org/analysis/articles/us-president-signs-nuclear-forensics-and-attribution-act/).

49. H.R. 730 (111th): Nuclear Forensics and Attribution Act. *GovTrack.us* (2010), (available at https://www.govtrack.us/congress/bills/111/hr730/text).

50. D. P. Fidler, S. Ganguly, India Wants to Join the Non-Proliferation Treaty as a Weapon State. *YaleGlobal Online* (2010), (available at http://yaleglobal.yale.edu/content/india-wants-join-non-proliferation-treaty).

51. PTI, `Modi may use military option if terror attack traced to Pakistan'. *Hindu Bus. Line* (2015), (available at http://www.thehindubusinessline.com/news/modi-may-use-military-option-if-terror-attack-traced-to-pakistan/article6864786.ece).

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