South Asian Studies
A Research Journal of South Asian Studies
Vol. 33, No. 2, July – December, 2018, pp. 395 – 410

Prospects of Internationalizing Nuclear Security: An Appraisal

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ABSTRACT

Nuclear security has always been a sensitive area for international cooperation and even for sharing the best practices. States have been guarding the information about their nuclear security measures. With the introduction of terrorism phenomenon after 9/11 incident, the international community has been conscious about possibility of an act of nuclear or radiological terrorism. The US President Barack Obama undertook the task of securing the world from this new kind of terrorism and initiated process of Nuclear Security Summits (NSS)from 2010-2016 in which 53 heads of states were invited. It was the highest forum at which nuclear security was discussed; although, cautiously. NSS entrusted IAEA with the lead role in nuclear security at parallel with the nuclear safety. How the IAEA stands up to its added responsibilities in the post NSS process has to be seen in times to come. Pakistan has also come a long way in perfecting its nuclear security measures especially under the challenging scenario of Global War on Terror (GWOT) being contested within and around Pakistan's geographical borders. Despite the challenging security environments, Pakistan's nuclear security measures remained steadfast and not a single terrorist act happened. An appraisal of Pakistani nuclear security approach would be useful for nuclear technology aspirant states as a model of nuclear security best practices.

Key Words: **Nuclear Security, IAEA, Command and Control, Nuclear Security Summit (NSS), Strategic Export Controls.**

Introduction

Concerns about security of nuclear technology and related information are as old as Eisenhower's 1953Atom for Peace program. (Lavoy, 2003) Since the 9/11 tragic incident, concerns about nuclear terrorism threat has changed its status from being a remote reality to a likely possibility (Nayan, 2012) and thereafter multiple international initiatives have come up to address the challenge; for instance; "*United Nations Security Council Resolutions (UNSCRs) 1540 and 1373*", "*International Atomic Energy Agency's (IAEA) Division of Nuclear Security*", "*G-8-led Global Partnership Against the proliferation of Weapons and related Materials*", "*International Convention to Suppress the Act of Nuclear Terrorism*

(ICSANT0)", "*Global Initiative to Combat Nuclear Terrorism (GICNT)*" and above all an amended "Convention on Physical Protection of Nuclear Material (CPPNM)". However, this inconsistent work in the field of nuclear security is deficient in all-inclusiveness, acknowledgment, coordination and legitimateness. On the other hand, globalization has become so pronounced that any nuclear or radiological attack by a handful of determined terrorists could virtually paralyze the life across the globe. El-Baradei, one of the ex IAEA's Director General (DG) remarked in March 2007 that "with globalization, it is abundantly clear that insecurity anywhere is insecurity everywhere" (El-Baradei, 2007).

Besides the above listed initiatives, the world witnessed Washington led summit level engagement of all vital and relevant nuclear capable states on issues identified with nuclear security. The Nuclear Security Summit (NSS) process (2010- 2016) was brain child of the ex US President Obama (Davenport, 2017) which helped in putting the issue of nuclear security into high gear. It made the international community to share their concerns about non-state actors' possibility of acquiring radioactive and nuclear material for terrorism, which could result in economic, political and psychological consequences. (Luongo, 2012) Albeit, NSS, had enhanced the nuclear security awareness but still, a lot is required to be done. Especially the element of complacency has to be shed away for ensuring a robust nuclear security framework. The summit level events are good enough for making promises at best (Squassoni, 2012), but to make them doable, mutually acceptable and neutral monitoring effort is required. The NSS process, which culminated in 2016 after organizing four rounds of summit level meetings, should not be the end of the story but the beginning of a new era. Political commitments made at the marathon summits, await transformation into actions for making the world safe from the threat of nuclear terrorism. (Boureston and White, 2010)

This paper is an effort to identify nuclear security awareness level in the post NSS initiative. It shall highlight the common global concerns with rationale about internationalizing the nuclear security issue besides covering the dilemma of 'myth or reality' associated with the nuclear terrorism threat. It also covers a critical analysis of IAEA's capacities and impediments with respect to nuclear security and suggests a few viable recommendations as well. In the end, an exclusive appraisal of Pakistan nuclear security has been carried out, which could be a model best practices for nuclear aspirant states.

Global awareness of nuclear security after NSS

The NSS process has considerably been instrumental in breaking the international inertia affiliated with the open discussions on nuclear security. However, despite being a summit level initiative, it had only relatively modest successes. (Bunn, 2010) Notwithstanding the limitations of NSS process and criticism by some of the states on the issue of "exclusivity", it did contribute towards building perception that the threat of nuclear terrorism is quantifiable, if not emergent.

The NSS process has also been quite successful in shedding off the pre-Prague mindset about nuclear security which was based on the perception that unless the terrorists become rich enough and attain technical perfection in developing a sophisticated nuclear device, it is not probable that they could cause 'mass destruction'. The process has however been successful in making the states realize that even if, there is no mass destruction, an incident of radiological terrorism can surely cause inconceivable 'mass disruption,' (Bunn, 2011) but the point is that associating "mass disruption" phrase to the radiological terrorism should be seen in right perspective and should not lead to creating an "alarm", as even the crude conventional "Pressure Cooker Bombing" at Boston can lead to same effect. (Bly, 2013)

Increased realization by the NSS participating states regarding threat associated to Highly Enriched Uranium (HEU) in civilian use was one of the success stories of the NSS process. Participating states realized that it would be sooner the better to switch from Highly Enriched Uranium(HEU) to Low Enriched Uranium (LEU) in the research reactors, once it is "technically and economically feasible". (Seoul NSS Communiqué, 2012) The caveat of feasibility proved to be the sigh of relief for those states which were carrying out research and development (R&D) projects using HEU. It is an open secret that in the present information technology era, information about making a crude gun-type nuclear device or dirty bomb is widely available and probably attainment of HEU or radiological material remains the one of the major hurdles. (Coleman and Siracusa, 2007) If the enriched Uranium falls into the wrong hands, it would logically make the terrorists' job easy.

The NSS process gave an impetus to the different nuclear security initiatives like amended CPPNM, ICSANT, GICNT and G-8 Global Partnership. Before the NSS process, these initiatives were working in isolation with no common voice to support their efforts at global level. Besides these initiatives, issues like nuclear forensics and the information security also got traction; albeit, with irritants and political resistances. It was the NSS initiative, where states made political pledges for early ratification of the two nuclear security conventions and took necessary steps at political, legal and organizational levels to further strengthen the nuclear security regime. (NSS Communiqué, 2016) Entry into force of the amended CPPNM is a success story for the NSS.

Secretive legacy of the nuclear material, nuclear facilities, nuclear information and the procedures/ tactics, naturally makes the states to resist any intrusive initiative. (Fidlay, 2011) However, the NSS process did make progress in generating much needed awareness among the states to create a balance between the issue of a state's sovereignty and its moral obligation to play its part in eliminating the threat emanating from menacing nuclear terrorism. Besides that, the NSS participating states also endorsed the need to have more strict control over nuclear materials under their jurisdiction, develop nuclear security culture and protection of sensitive information. (Summary report of the Workshop on Building Transparency in Nuclear Security, 2013)

Notwithstanding the attributed successes, the situation of tackling the issue of nuclear security cannot be graded as 'rosy; in its entirety due to certain number of global concerns associated with the issues related to the nuclear security.

International approach about the transformation of nuclear security issues from national to international level

Although two years earlier the NSS process was over, yet it proved to be useful in moving towards developing nuclear security as a global norm; (Toma, 2011) however, most of the developing states looked at the process as mere '*coalition of willing*'. (Pomper and Warren, 2012) Albeit, the ultimate result of the NSS process completely reaffirmed that measures to reinforce nuclear security won't hamper the privileges of states to develop and use nuclear energy for peaceful purposes, (Seoul NSS Communiqué, 2012) yet the nuclear aspirant states feared that they would be deprived from accessing the civil nuclear technology by implying further legal and political commitments under the garb of nuclear security. (Turpen, 2010) For instance, Egypt; categorically cautioned in their national statement during the 2010 Washington Summit, that "any unjustified restrictions" would hamper cooperation in the field of nuclear security.

Lack of global acceptability for synergizing the issues of nuclear safety and security was also one of the major concerns i.e. taking the issue of nuclear security out in international arena from a close door status. Many states had skepticism about the issue of transparency, which is like soul to the body with regard to nuclear safety; while the same can't be applied to nuclear security. To be simple, approach of 'one size fits all' with regard to treating nuclear safety with nuclear security was alarming. On the contrary, nuclear safety-security synergetic approach believers professed that the synergy between the two would further ensure the security of nuclear installations as it would involve by default a mixture of hardware (security devices), procedures (including the organization of guards and their performance), and facility design (including layout). **(**Kim and Kang, 2012**)**

Developing and nuclear aspirant states also viewed the internationalization of nuclear security with suspicion from national security perspective. They believed that the major nuclear powers want to monopolize the nuclear technology and basically want to get an insight about a state's actual nuclear capability and the kind of nuclear security practices being observed. For instance, encouragement of sharing the nuclear forensics data at the NSS level was suspected to be used for use of force against a state, even if any non-state actor, having no state sponsorship, commits an act of radiological/ nuclear terrorism. (White paper by SAGA Foundation, 2008)

On part of nuclear related security, states jealously guard their locations and nuclear best practices from any outside influence or knowledge. One of the concerns of internationalizing the nuclear security was that such practice could

lead sovereign states to out-source their security matters for external reviews. The Western approach on security, especially the nuclear security, is bit different with what the East has. Military alliance like NATO can create a kind of feasible or supportive environment wherein, states having the assured security may afford to share their best practices but a state with history of wars, security instability and mistrust, can't enjoy the same luxury. States while confronting the realpolitik environment fear that the information shared could be used by the hostile intelligence agencies to exploit the weaknesses in the defenses themselves or may pass on the same to determined non-state actors to settle the strategic scores. (Nayan, 2012) Such a pessimistic approach even delayed and hampered the universalization of even IAEA's International Physical Protection Advisory Services (IPPAS) doubtful. (Mrabit, 2012)

Is the nuclear terrorism threat a myth or reality?

The phrase "nuclear/ radiological terrorism" was not very common until the 9/11 Commission Report was published which stated, "The greatest danger of another catastrophic attack in the US will materialize if the world's most dangerous terrorists acquire the world's most dangerous weapons". (9/11 Commission Report, 2004) For instance, over 2000 incidents of theft or loss of radioactive sources have been reported to IAEA's Incident and Trafficking Data Base (ITDB) (IAEA, 2012) since 1995, out of which there were only a few reported cases involved unauthorized possession of nuclear weapon-useable HEU. Astonishingly, there have been neither credible nuclear terrorism threats by the terrorist organization, (Meserve, 2002) nor any incident of nuclear or radiological terrorist attack, for the reasons well known to terrorist only. In his book "*The Four Faces of Nuclear Terrorism,*" William C. Potter identified implementation challenges, philosophical or moral issues, response fears and the insufficient capability, as the four most probable factors which kept the terrorists away from exercising such an option. Mohamed El-Baradei, in March 2007 said that the number of illicit trafficking incidents manifests that the threat is not just hypothetical, its race against time and it's not certain whose door the victory would knock first; terrorists or the global community. (El Baradei, 2007) William C. Potter (William and Potter, 2004) and the July 2007 U.S. National Intelligence Estimates, both qualified Al-Qaeda as the lead terrorist network which could pursue the option of nuclear terrorism. It is argued that since the elimination of OBL, Al-Qaeda has almost been strategically defeated (Bumiller, 2011) and hence the risk of nuclear terrorism has been reduced. While internationally coordinated blows to al Qaeda must be appreciated; however, the international community should not lower its guard. (Bunn, Harrell and Malin, 2012)

Notwithstanding the above, there is a need to maintain a sober approach towards the issue as the increased focus on nuclear terrorism is also problematic. (Chari, 2012) It is conceivable that terrorists might not risk losing their limited public sympathy by launching a nuclear catastrophe. In the end, one can conclude

that the possibility of nuclear terrorism is utterly low due to stringent security controls over nuclear or radiological related materials; however, can't be taken as non-existent. (Forest and Salama, 2009)

Suggested approach for making the nuclear security issue more inclusive and sustained

Nuclear security will remain an enduring responsibility for as long as nuclear/radiological materials continue to exist. (Harrell, 2012) Nuclear security remains the national responsibility; however, any act of such terrorism will have international repercussions. To mitigate the possibilities of nuclear terrorism, an integrated three-tiered nuclear security strategy could be useful i.e. by aligning authorities, capabilities, and resources to address global nuclear threats at the site, country, and global levels. (Brennan, 2012) The first two tiers of nuclear security strategy (site and country) could remain the national responsibility while the third tier (global)could include compliance with the states'(voluntary) international commitments i.e. making use of best practices shared in IAEA's INFCIRC/225 Rev5. (IAEA Nuclear Security Series No. 13) Notwithstanding, an analytical discourse, based on the nuclear security related precedence, revealed following minimum common denominators for addressing the nuclear security issues at international level.

- Nuclear security within a state should remain a national responsibility and within this framework, the international community may explore space for cooperation.
- More stringent and intrusive security approaches could be seen with suspicion and may not help in moving towards the internationalization of the issue.
- Duplication in the nuclear security related activities should be avoided being counterproductive, both financially and politically.
- Global nuclear security efforts should not raise the operational cost of nuclear technology in civilian use.
- Last but not the least, there is a need for global assurances, for which guarantors and modalities can be identified; that the information sharing either through the IAEA's ITDB or IPPAS missions, nuclear industry or through forensics data would not lead to criticism, sanctions, penalties (Biden, 2007) or use of force but the constructive and corrective measures through international cooperation.

An appraisal of iaea's nuclear security capacity and suggested measures for increased inclusiveness

NSS process also charged the IAEA with central role in strengthening the international nuclear security framework. (NSS Communiqué, 2007) First of all, in order to universalize and address the states' ambivalence regarding IAEA's

nuclear security role, there is a need to bridge the trust deficit. Enhancing the IAEA's nuclear security role would require tangible efforts to brush aside the misperception that IAEA is under the influence of the US or for that matter its likeminded states, being the lead donors to the IAEA's regular budget. Common perception of 'US exceptionalism would keep dragging the response. (IAEA-G77, 2009) This perception has evolved over a period due to dictating attitude of the US towards rest of the world and especially the developing states. For political comfort of its most of the member states, the prime objective of the IAEA should be to explicitly demonstrate nonaligned stewardship of its Nuclear Security Division.

Matthew Bunn opined in 2001 that being a global issue, nuclear security demands global response and instead of re-inventing the wheel, make use of existing unilateral best practices, bilateral and multilateral initiatives. (Bunn and Bunn, 2001) While thinking of an existing working system for the purpose, IAEA naturally catches the eye, having technical as well political strengths in terms of acceptability and trust. (Boureston and White, 2010) Given its mandate, technical competence and wide membership, IAEA is the unique platform for its member states to consider proposals for auditing and fortifying the worldwide system on nuclear security. However, for its perceived enhanced nuclear security role, the IAEA has to be given 'more resources and authority.' (Horner and Davenport, 2014)

It is commonly perceived that the Agency's statute empowers it with an authority to advise and govern the three Ss: i.e. nuclear safeguards, safety, and security. (Commission Report, 2008) However, literature review tells the different story. To be straight forward, IAEA's Statue doesn't address nuclear security directly. IAEA's International Law Series No 4 on 'The International Legal Framework for Nuclear Security' clearly mentions that IAEA derives its nuclear security mandate from Article II of its Statute, which states, '*to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world.*' (The International Legal Framework for Nuclear Security) Although, Article II is all about the civil nuclear technology, yet, IAEA extracted role of nuclear security indirectly for itself, seemingly on the pretext of nuclear safety and security synergy in the perspective of technical cooperation. (Amano, 2013) Besides this derived mandate from Statute, the IAEA probably also seeks legal cover for its enhanced nuclear security role through different resolutions passed by the IAEA's General Conference (GC)/ the Board of Governors (BoG), Nuclear Security Plans of 2002, 2005 and 2009, and the United Nations Security Council Resolutions (UNSCRs) 1373 (2001) and 1540 (2004) adopted under Chapter VII.

Notwithstanding, still the information about nuclear security measures by nuclear powers or aspirants, as debated above, are jealously guarded and even IAEA mandate is seen by some with skepticism. Although, IAEA Nuclear Security Division is working with dedication to improve the overall nuclear security standards at global level through publishing guidelines and extending advisory

services, yet a lot has to be done for strengthening IAEA's mandate for looking after global nuclear security efforts as stipulated in IAEA Action Plan released after NSS 2016. (Action Plan in Support of the International Atomic Energy Agency, 2016) States do argue that IAEA has the nuclear safety role as predominant while the nuclear security should remain sovereign responsibility as the IAEA has very less capacity to handle security while safety itself is a daunting task for its inspectors and technical experts. It is considered that if the IAEA has to be truly empowered to take over the mosaic of nuclear security issues as identified also by the NSS process, it has to have formal legal strength.

There could be two possible options to address the drag. *First*, obtain a mandate through the UN forum. But, the problem is that IAEA is not a subsidiary of the UN. It came under UN voluntarily and it is not dictated by UN. It only submits its report to United Nations Secretary General (UNSG) on voluntary basis. *Second*, IAEA's own strong working system i.e. GC and BoG can be used to take decision of empowering the IAEA as they did while raising its Office of Nuclear Security in the past.

Welcomingly, the NSS process led to raise the status of IAEA's Office of Nuclear Security to the Division level, which has addressed the issue of status within IAEA bureaucratic hierarchy, but without potent organizational changes, increased share from regular budget and increase in staff members, the newly raised division will not be able to increase its capacity to handle the much demanding requirements of nuclear security. As a first step, it is suggested that mandate for the Nuclear Security Division may be drafted afresh with consent of IAEA's member states besides considerably increasing the amount of regular budget for IAEA led nuclear security activities.

Currently, IAEA's Nuclear Security Division is maintained through a meager amount from IAEA's regular budget whereas most of its financial requirements are met by the uncertain voluntary contributions. As per the IAEA's annual report of 2016, Nuclear Security Fund (NSF) had a share of just US Dollars 53, 84,357 (1.48%) of the total regular IAEA budget i.e. US Dollars 361,999,788. (IAEA Annual Report, 2016) Due to limited regular budget funding, the IAEA's Nuclear Security Division relies heavily on the voluntary contributions from member states to the NSF. For instance, as published in IAEA's annual report of 2016, the Nuclear Security Division had the highest extra budgetary NSF i.e. US Dollars 31,536,668 (32.7%) out of the IAEA's total extra budgetary fund of the US Dollars 96,375,290. (IAEA Annual Report, 2016) The management of the extra-budgetary NSF requires additional efforts by the Nuclear Security Division personnel, not only in 'fund raising' efforts, but in reporting to donors and distribution of funds, some of which can only be spent in donor' specified geographic areas or on efforts defined by them. (Moore, 2013) Politically such kind of funds comes with strings of vested interests attached to them, thereby undermining the independency of the IAEA's nuclear security division.

Moreover, in order to meet the daunting challenge of funds shortage, IAEA would need taking innovative measures. For instance, IAEA can conserve its budget for framing the various guideline documents by making use of different internationally recognized forums like the World Institute of Nuclear Security (WINS) or GICNT. These initiatives are already working under their independent budgets for developing different guidelines documents. (Reaching New Heights, 2013) However, IAEA has to remain and prove its neutrality. The guideline documents which are negotiated at these two limited membership forums, should be put up to the IAEA's "Nuclear Security Guidance Committee" for an objective review before processing it with IAEA's GC/ BoG for granting them status of universalized IAEA's documents based on the '*consensus rule*'.

To encourage states for enhanced nuclear efforts in their respective jurisdictions, cost effective, innovative and mutually acceptable ways and means have to be found. For instance, IAEA may not let monopoly of the few select multi-national companies or advanced states over nuclear security equipment. It should be the discretion of the respective state to decide the right vendor for it, even if the equipment is being provided by the IAEA under its "Nuclear Security Action Plan (NSAP)". The IAEA may facilitate the bilateral trade agreements and encourage the seller party for Transfer of Technology (ToT) of costlier equipment to the buying state. It would not only help the states to build confidence in the IAEA but shall also contribute towards cost effective solution to combat the threat of nuclear/ radiological terrorism.

Cooperation between the IAEA and INTERPOL is growing. The developing states generally remain skeptical of the INTERPOL's involvement even with IAEA's political assurances. Interpol's chemical, biological, radiological, and nuclear and explosives (CBRNE) terrorism prevention programme work closely with IAEA by sharing the data under the IAEA's ITDB. It needs to be further transparent. INTERPOL's Project Geiger, which also collaborates with the IAEA, is also viewed with concern because it was raised with data and financial support from the US Federal Bureau of Investigation (FBI). Amore explicit approach in this regardwould be beneficial for IAEA's credibility.

IAEA's negotiated amended CPPNM entered into force on 08 May 2016, (IAEA-CPPNM, 1980) courtesy the NSS process which pushed states to ratify the amended CPPNM. It is suggested that the responsibility of organizing 'CPPNM Review Meetings' (authorized as per Article 16 of the CPPNM) on the pattern of Convention on Nuclear Safety (CNS) Review Meetings, may be assigned to the Nuclear Security Division for further enhancement of its stature as an important organ of the IAEA. Pakistan has also ratified amended CPPNM which demonstrates its confidence into managing its nuclear material and devices during domestic transfers. (Qutab, 2016)

Pakistan's nuclear security measures – a model for international best practices

Pakistan's primary stance around which its nuclear security policies pivot is that nuclear security within a state boundaries is a 'national responsibility' and any internationalization effort or cooperation in this regard should be remain 'voluntary' and within the 'sovereign framework'. (Pakistan's National Statement on NSS, 2010) While delivering the Pakistan's national statement at the 2010 NSS, Prime Minister categorically manifested the sovereign value of nuclear security efforts. He stated:

> "……share, on a voluntary basis, expertise and experiences in nuclear security, to learn from best practices, to share information and intelligence, in a non-binding, non-prescriptive manner to enhance capabilities to fight nuclear terrorism, and to enhance capacities to respond to nuclear security incidents." (2010)

Security consciousness has remained an integral part of Pakistan's nuclear program, since its inception. Complacency has been rejected at all tiers and continuous evaluation of different threat scenarios both from insider and outsider elements have been the hallmark of Pakistan's nuclear security contingency planning. General Kidwai, ex DG Pakistan's Strategic Plans Division (SPD) said that Pakistan's nuclear security is world class and is not an issue with regard to international common concerns about Pakistan's nuclear devices falling into the wrong hands. Since the AQ Khan episode, which is a close chapter now in Pakistan's nuclear history, Pakistan has come a long way ahead in organizing its nuclear security which is based on the basic principle of 'multi-layered defence'. (Kidwai, 2015) Pakistan's response strategy to a threat, whether it is insider or outsider, revolves around 5D approaches i.e. 'deter, detect, delay, defend, and destroy'. (Pakistan's Nuclear Security Regime, MOFA)

Moreover after the 1998 overt nuclearization, Pakistan has institutionalized the nuclear security regime which rests on four main pillars, i.e. a well-organized and whole encompassing command and control system, comprising the National Command Authority (NCA), the SPD, and the Strategic Forces Commands, *second*, robust regulatory regime to exercise stringent controls on nuclear and radiological materials, *third*, establishment of a viable export control regime to avoid any chances of proliferation and *lastly*, voluntary international nuclear security cooperation in accordance with its national needs, policies and legal international obligations. (Pakistan's National Statement on NSS, 2010)

With respect to hard core physical nuclear security, SPD's Security Division has a well-trained dedicated nuclear security force comprising of over 20,000 troops duly equipped with state of the security equipment. The Security Division is primarily responsible for the physical protection of facilities carrying nuclear and radiological material. The Security Division troops are not only trained to look

after the outsider threat but also have a close monitoring of personnel employed at these facilities through the best possible technical means besides human intelligence practices. In order to continuously keep the Security Division's troops informed about dynamic threat, SPD has established a dedicated Training Academy at Chakri (CJCSC Opens SPD Training Academy, 2012) which conducts extensive training courses on nuclear security besides refresher cadres for the already trained personnel so as to fight the human tendency of complacency.

Establishment of "Pakistan Centre for Excellence for Nuclear Security (PCENS)" facility at Chakri Training Academy is yet another feather in the cap of SPD's Security Division which has established an international repute for conducting national and international training courses on multi-disciplinary nuclear security issues including physical protection of nuclear materials and facilities, transport security, personnel reliability and [sensitive] material control and accounting, etc. (Gen Raheel Sharif, 2015) Pakistan's nuclear security confidence is explicitly visible from its offer of facilities at PCENS as 'regional and international hub for imparting nuclear security education and training to the international community'. (Pakistan's National Statement on NSS, 2012) DG IAEA, Mr Amano's two visits to Pakistan (2014 and 2018) reflects IAEA's confidence in Pakistan's nuclear safety and security measures, high standards and best practices. During his 2018 visit to the PCENS, he recognized the 'robust nuclear safety and security measures put in place by Pakistan. (MOFA, 2018) In 2014, during his visit to the PCENS, he appreciated its contribution towards assisting IAEA in capacity building of the regional countries by providing experts besides offering and hosting IAEA recognized hosting nuclear security training courses. He said, "It is very impressive that you organize the training in a very systemic and operational manner". (ISPR, 2014)

Pakistan manages an extra ordinary system of Personnel Reliability Program (PRP) and the Human Reliability Program (HRP) under which it monitors and regulates its scientific community dealing with nuclear sensitive knowhow. Besides the regulation of human resource to mitigate any challenge of intangible transfers, Pakistan keeps a strict eye on each gram of its nuclear and radiological material from the moment it enters into Pakistani borders till the time it is managed as a waste i.e. strictly following the concept of "cradle to grave". (Khar, 2012)

Pakistan Nuclear Regulatory Authority (PNRA) in collaboration with Pakistan's Federal Board of Revenue (FBR)/ Customs is in process of equipping airports, dry ports, seaports and land international border crossing with Special Nuclear Material (SNM) portals, which would ensure zero illicit trafficking of sensitive goods and material across Pakistani borders. (FBR, PNRA to Jointly Combat Nuclear Trafficking, 2008)

Besides above, without going into the details, Pakistan uses Permissive Action Links (PALs) and two men rule for physical safety mechanisms and firewalls both with respect to command and control as well as nuclear devices. (Pakistan National Statement on NSS, 2010) Pakistan is also voluntarily implementing

IAEA's 'Supplementary Guidance and Code of Conduct on the Import and Export of Radioactive Sources' which demonstrates its responsible attitude towards its commitment to implement international standards in the areas of nuclear non-proliferation, safety and security. (MOFA, 2018)

Pakistan's strategic export control is yet another appreciable milestone. A Strategic Export Control Division (SECDIV) was established under the Export Control Act of 2004. Its mission is to "Contributing towards non-proliferation and security through effective export management of sensitive goods and technologies". (SECDIV-MOFA, 2017) The SECDIV through its relentless outreach efforts has made a significant achievement i.e. exponentially increasing the awareness about dual use items' regulation among the industry, government agencies including border control agencies besides the academia. One of the celebrated achievements of SECDIV is to inculcate 'compliance culture' of export control responsibilities among the 'entities, institutions, companies, exporters and others involved in the export chain' by encouraging them voluntarily to evolve 'an effective system of self-regulation' through establishment of their respective 'Export Compliance Programme (ECP)' within entity/ organization. In this regard, the ECP guidelines prepared by the SECDIV have been influential. (MOFA, 2014) Besides that, Pakistan has been the only country which has revised its National Export Control Lists (NCLs) three times so as to keep its control lists updated in accordance with the control lists of the international export control cartels. The NCL is available on the SECDIV web site which helps the exporters for self-regulation. (SECD-MOFA, 2017)

Conclusion

NSS had increased the awareness and breaking the taboo related to discussing nuclear security internationally at Summit level. The NSS process did recognize the IAEA as a lead agency to address the global nuclear security efforts having better acceptability ratio as compared to numerous standalone nuclear security initiatives. However, the big powers have to be mindful of states' sensitivities attached to the nuclear security which primarily remains the domestic and sovereign issue. Any intrusive effort even through the IAEA platform could be detrimental to the successes achieved so far. Famous Roman philosopher Lucius Annaeus Seneca proverbial phrase rightly identified the phenomenal approach by stating that "Whatever has overstepped its due bounds is always in a state of instability" (Seneca).

With regard to Pakistan nuclear security efforts, over a period of time nuclear security has been instilled as a culture among the stake holders and the progress it made is being appreciated at international level. Complacency is strictly resisted and dynamics of evolving threat is continuously appreciated for preparing viable and effective response. It was the Pakistani nuclear security robustness that protected its nuclear sites from any act of terrorism amid GWOT. Thus, Pakistan's

nuclear security measures could be a model for nuclear aspirant states that primarily rests on the principle of sovereignty.

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