Interface of Nuclear Safety and Security: Synergies and Conflict Areas between Nuclear Safety and Security Culture

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Abstract

This paper is focused on the interface between nuclear safety and security regime. An effort is being made to highlight the conflict areas that could create problems in achieving synergy between the two interrelated areas. Nuclear safety and security culture has been considered central to creating a sustainable regime for the safe and secure operational environment of nuclear power industry. Differences have been highlighted along with the areas of achieving synergy within the two cultures, in order to create a comprehensive picture of safety and security culture.

Key words: Nuclear Safety, Non-State Actors, Security Culture.

Introduction

The radiological releases from a nuclear accident, either due to system failure or nuclear security event, have always provided the rationale for ensuring safety and security. Accordingly, the states have taken actions to establish and implement a nuclear safety and security framework, at the nuclear power installations, in order to cater for the issues of safety and security. The two nuclear accidents at Three Mile Island and Chernobyl served as a catalyst to revitalize the safety enhancement efforts in the domain of nuclear safety.[1] However, no serious efforts have been made in the realm of nuclear

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[1]Gerd Rosenkranz, "Nuclear Power-Myth and Reality: The Risks and Prospects of Nuclear Power", *Heinrich Bol Stiftung Nuclear Issues Paper,* No. 1(February 2006).

security, as regulatory bodies lacked an impetus, to work upon nuclear security measures.

The nuclear community has always been more focused towards developing and implementing safety related measures. Ostensibly, lack of nuclear security measures highlights the risk of nuclear terrorism by Non-State Actors (NSAs). The wide consequences of 9/11 terrorist attack in the US, alarmed the international community, with the renewed risks of attacks on nuclear installations and a nuclear sabotage or theft.[2]

The entry of IS (Da'esh) in international terrorism list, and terrorist attacks around the globe highlights the need to reinforce safety and security mechanisms at nuclear facilities because the terrorist groups with deadly ideological motivation might attempt to carry out nuclear terrorism.[3] Additionally, the occurrence of Fukushima accident has highlighted the necessity of protecting safety features of a nuclear power plant.[4] The tragedy of 9/11 and Fukushima accident despite being two independent variables necessitate to correlate two ends of the spectrum of threat to address the security domain in relation to safety.

Nuclear safety has a well-established international regime, while nuclear security is in its initial phase of development having sparse set of regulatory requirements and guidance publications.[5] In order to create a comprehensive picture of safety and security, for the safe and secure working of nuclear power plants, there is a vital need to work upon the interface between nuclear safety and security, with an

[2]Jim Riccio, "Risky Business: The Probability and Consequences of a Nuclear Accident", *Greenpeace*, (March 2008), p.3. http://www.greenpeace.org/usa/Global/usa/report/2008/3/risky-business-the-probabilit-2.pdf (accessed October 5, 2015).

[3]A Report by the International Nuclear Safety Group (INSAG-24), "The Interface between Nuclear Safety and Security at Nuclear Power Plants", IAEA, Vienna (2010); p. 4.

[4]Duyeon Kim and Jungmin Kang, "Where Nuclear Safety and Security Meet", *Bulletin of The Atomic Scientists68,* no.1 (May 2013), http://thebulletin.org/2012/january/where-nuclear-safety-and-security-meet (accessed October 5, 2015).

[5]See, IAEA, "The Interface between Nuclear Safety and Security at Nuclear Power Plants", 4.

aim of safety and security obligations reinforcing each other. A combined approach for dealing with natural hazards and terrorist attacks is needed to be developed and implemented that could in fact enhance one another.

This paper deliberates upon the interface between nuclear safety and security area. An effort is being made to highlight the conflict areas that could create problems in achieving synergy between nuclear safety and security domain. Nuclear safety and security culture has been taken as a focal dimension to create a sustainable regime for the safe and secure working of nuclear power industry. Differences have been highlighted along with the areas of achieving synergy within the two cultures in order to create a comprehensive picture of safety and security work culture.

Nuclear Safety and Security Interface

First of all, it is important to comprehend the terms nuclear safety and security before moving on to the subject of safety and security interface. Nuclear safety is characterized as "the achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards".[6] The protection of people and environment from the harmful effects of ionizing radiation is the ultimate objective of safety.[7] The restriction of likelihood of events that could result into radioactive releases and could harm the public and environment is the base of nuclear safety.[8] It provides freedom from physical harm, unreasonable risk and environmental damage that could occur due to operation of a nuclear power plant.[9]

Nuclear safety could also be understood in another way that it is mainly concerned with the risks originating from the system (nuclear

[6]The Committee on Nuclear Regulatory Activities (CNRA) report "The Regulatory Goal of Assuring Nuclear Safety", OECD NEA (2008), p. 11.
[7]"IAEA Safety Standards for Protecting People and the Environment: Fundamental Safety Principles," Safety Fundamentals No. SF-1, *International Atomic Energy Agency*, Vienna, 2006, 4.
[8]Rasa Ptasekaite, "The Role of the Regulator: Nuclear Safety and Nuclear Safety Culture", *International School of Nuclear Law*, Montpellier, 2011.
[9]See, "The Regulatory Goal of Assuring Nuclear Safety", 11.

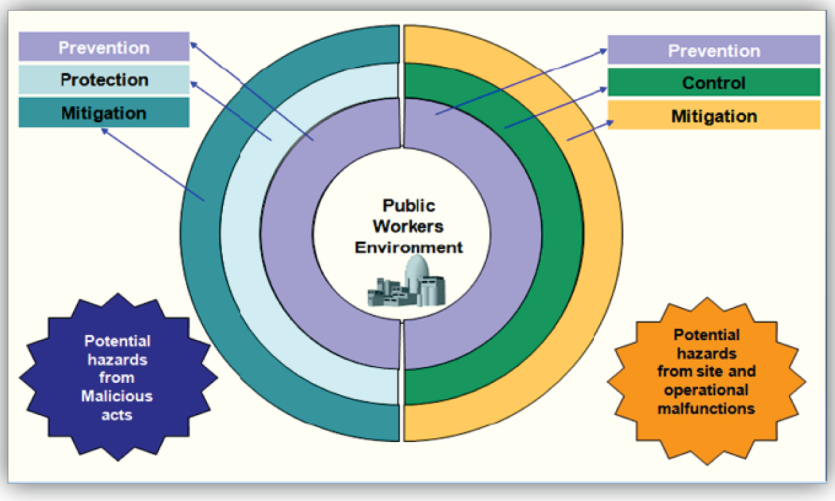
power plant) and impacting the environment.[10] It is occupied with the unintentional behaviour or system failures yielding the accidental risk. It focuses on the unintended events resulting into radiological releases from the authorized activities thus relating to the intrinsic problems and hazards of the system.[11] Safety measures encompass all those actions, taken for the prevention of incidents and arrangements being emplaced, in order to mitigate the consequences of the incidents, if they were to occur.[12] On the other hand, nuclear security is defined as "the prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities".[13] It deals with the risks originating from the environment and potentially impacting the system. It is mainly concerned with the deliberate attacks causing the malicious risk.[14] Nuclear security involves the dimension of a terrorist attack or a malicious act that is focused on the sabotage of a nuclear facility or theft of nuclear or radioactive material, and ensures the restriction of the likelihood of such an event. The measures designed for the prevention and detection of, and in turn generating response to, the theft of nuclear or radioactive material, sabotage and other malicious acts, illicit trafficking and unauthorized transfer, collectively constitute the security measures.[15]

The nuclear safety and security spheres take into account different events.[16] The safety evaluations are based on the risks that originate from the unintended events set in motion by natural occurrences, hardware failures or internal interruptions and human errors.

[10]Christian Raspotnig and Andreas Opdahla, "Comparing risk identification techniques for safety and security requirements", *The Journal of Systems and Software* 86, no.4 (April 2013):1124.
[11]"Safety of Nuclear Plants", *World Nuclear Association*, accessed October 7, 2015, http://www.world-nuclear.org/info/safety-and-security/safety-of-plants/safety-of-nuclear-power-reactors/
[12]Incidents involve initiating events, accident precursors, near misses, accidents and unauthorized acts.
[13]Ibid.
[14]Raspotnig and Opdahla, "Comparing risk identification techniques for safety and security requirements", 1124.
[15]International Atomic Energy Agency, "IAEA Safety Glossary."
[16]"The Interface between Nuclear Safety and Security at Nuclear Power Plants", *International Atomic Energy Agency*, 2010, 4.

Whereas, security assessments take into consideration the risks or events arising from the malicious acts, carried out intentionally for the theft or sabotage and causing harm through circumventing of protective measures. But at the same time, nuclear safety and security share many common elements and both strive to protect the plant and limiting the risks, with the fundamental objective of protecting, the people, society and environment from radioactive material and associated facilities.[17] Many mutual links exist between nuclear safety and security and both subjects should be treated as interrelated, mutually fortifying each other. Both are implemented through the common philosophy of defence-in-depth, having similar layers of protection that are prevention, control or protection and mitigation. For a more clear understanding of the interface between safety and security, see figure 1 given below.

Figure 1: Interface of Nuclear Safety and Security



Source: Anwar Habib, "Nuclear Safety and Security Culture in Pakistan" (Presentation, Pakistan Nuclear Regulatory Authority, Islamabad, http://slidegur.com/doc/1359472/nuclear-safety-and-security-culture-in-pakistan accessed October 8, 2015).

[17]Ibid., 4.

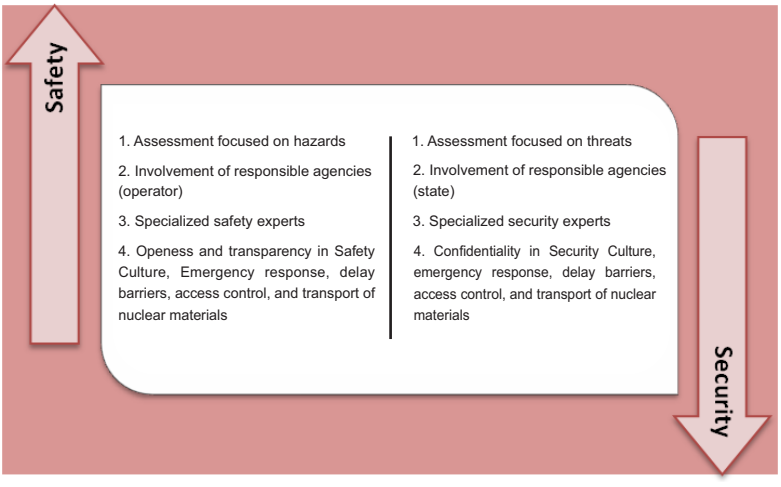
Nuclear Safety and Security Synergies

As the terrorist attacks of 9/11 highlighted the risks that NSAs pose to international security, it is all the more crucial to strategize connections between the safety and security – with a focus on synergizing safety and security measures. Safety and security measures are needed to be designed and implemented in an integrated manner.

Here an effort has been made to outline the contradictory areas between the two fields, while highlighting the common grounds at the same time before focusing on the nuclear safety and security culture. The grounds of nuclear safety and security are based on different paradigms; incorporating assessments focused towards hazard and threat assessment, with varying level of involvement of responsible agencies, and, specialized safety and security experts working in isolation, within discreet environment.[18] Albeit the realms of nuclear safety and security overlap at many points but at the same time, both realms have contradictory requirements. These contradictory requirements can be seen in the areas of culture, emergency response, delay barriers, access control, and transport of nuclear materials[19] (see figure 2).

[18]Global Nuclear safety and Security Network, Coordination, "Interface and Synergy between Safety and Security", International Atomic Energy Agency, https://gnssn.iaea.org/Pages/SynergySafetySecurity.aspx (accessed October 11, 2015).
[19]Sonal Gandhi and Jungmin Kang, "Nuclear Safety and Nuclear Security Synergy", *Annals of Nuclear Energy* 60, (June 2013):358.

Figure 2: Contradictory Areas between Nuclear safety and Security



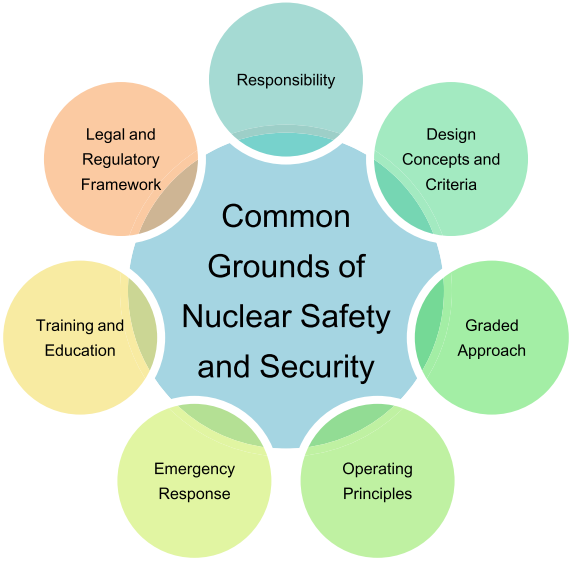
Within these areas, confidentiality is requisite for achieving security while having more delay barriers, limited access, secure areas and secure transportation without an intention to make the local population aware. Whereas, transparency and openness is mandatory for attaining safe operating conditions, with full access to all locations, lesser delay barriers for carrying out emergency response and usage of safety indicators, to create public awareness regarding transportation of nuclear material.

Even though contradictory requirements do exist in the realms of nuclear safety and security but these realms also share *common grounds* in the areas of operating principles, routine testing and maintenance programs, operating experience feedback, legal and regulatory framework, training and education.[20]

The areas in which synergy between safety and security could be enhanced include: legal and regulatory framework, responsibility, design concepts and criteria, graded approach, operating principles, emergency response, and training and education[21] (see figure 3).

[20]Shokr, A.M., "Synergy between Nuclear Safety and Security for Research Reactors" (Presentation, Safety of Research Reactors, Vienna, 2012).
[21]See, "The Nuclear Safety and Nuclear Security Synergy", 358.

Figure 3: Areas in which synergy between nuclear safety and security could be enhanced



A well-articulated legislative and regulatory framework is complimentary for ensuring effective oversight and implementation of nuclear safety and security at the same time. The regulatory body should be focused towards ensuring equivalent commitment of the facility managers concerning nuclear safety and security. The regulatory body should work towards achieving a strong safety-security culture with the help of selective competence, and human and financial resources. Within the sphere of responsible agencies for ensuring safety and security, synergy between safety and security could be enhanced by further state involvement in ensuring the safety of the site and not just security alone.

It can be noted that the design concepts that include defense-in-depth, single failure criteria, redundancy and diversity, fail safe criteria, passive systems being applied to nuclear safety are also equally applicable to nuclear security. Henceforth, these safety designs and systems can potentially reinforce protection against

malicious acts and could equally provide the fortifying layers against Design Basis Threat (DBT).[22]

In the safety domain graded approach is applied to ensure that all the safety requirements are followed in stringent terms, so in the similar fashion, the graded approach could also be applied to the security. Synergy in the operating principles for safety and security could be achieved in the areas of testing and maintenance, operation experience feedback, sharing of best practices, periodic review, and operating procedures, leading to more coordinated and harmonized operations of safety and security systems.

The radiological emergency plan ensued for a hazard should address malicious acts being committed against the nuclear facility. Excessive efforts have been made on formulation of emergency plans in the area of safety. In the same way, after taking into account the worst possible scenario, efforts should be made to emplace emergency response procedures for security related emergency.

For both safety and security personnel, adequate periodic trainings should be given, in order to provide each distinct group, a deeper understanding of the complementary roles and responsibilities. Both safety and security personnel should be trained adequately to understand and resolve the conflicting issues, in order to achieve the overriding aim of ensuring public safety.

Interface of Nuclear Safety and Security Culture

Nuclear safety and security culture gained paramount importance after the Chernobyl accident and growing frequency of terrorist attacks. These incidents have highlighted the importance of organizational issues and human factors.[23]

[22]Design Basis Threat (DBT) is a description of the attributes and characteristics of potential insider and/or external adversaries who might attempt unauthorized removal of nuclear material or sabotage against which a physical protection system is designed and evaluated.

[23]Giustino Manna, "Human and Organizational Factors in Nuclear Installations: Analysis of available models and identification of R&D issues", JRC Scientific and Technical Reports, 2007, http://iet.jrc.ec.europa.eu/senuf/sites/safelife.jrc.ec.europa.eu.senuf/files/files/documents/eur-23226.pdf (accessed October 15, 2015).

Management, organization, and, shared assumptions and beliefs can significantly affect the overall working of safety critical organizations.[24] Organizational Culture[25] acts as a key ingredient in overall success of an organization and can positively influence human performance as well as safety and security performance of operating installations.[26] Safety culture is defined as "the assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance".[27] While, nuclear security culture is defined as "the assembly of characteristics, attitudes, and behaviour of individuals, organizations and institutions which serves as a means to support and enhance nuclear security".[28]

The fundamental objective of safety and security culture is to limit the risk originating from the radioactive material and associated facilities and is based on common principles of questioning attitude, rigorous and prudent approaches, as well as effective communication and open two way communication. Both safety and security culture are subsets of the overall organizational or professional culture that can drastically alter the presiding culture of an operating power plant (see figure 4). Safety and security cultures need to reinforce each other rather than having ascendancy over the other.

[24]Teemu Reimana, Pia Oedewalda, and Carl Rollenhagenb, "Characteristics of organizational culture at the maintenance units of two Nordic nuclear power plants", *Reliability Engineering and System Safety* 89, (2005):331.

[25]Organizational culture can be defined as the shared basic assumptions that are developed in an organization as it learns and copes with problems. The basic assumptions that have worked well enough to be considered valid are taught to new members of the organization as the correct way to perceive, think, act, and feel. Culture is the sum total of a group's learning. Culture is for the group what character and personality are for the individual.

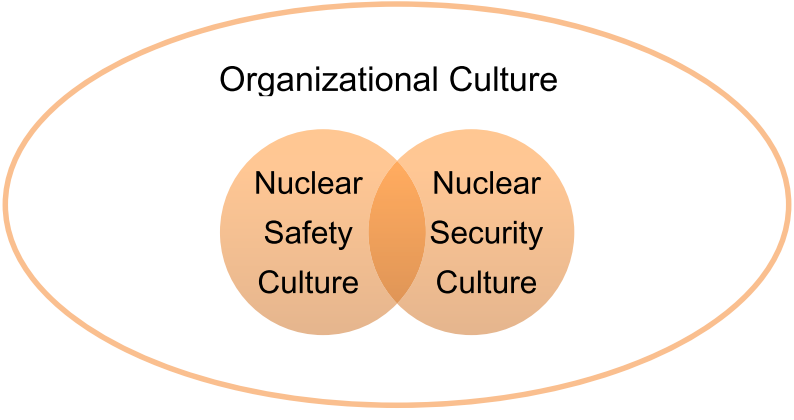
[26]"Principles for Strong Nuclear Safety Culture", *INPO*, November 2004, http://www.nrc.gov/about-nrc/regulatory/enforcement/INPO_PrinciplesSafetyCulture.pdf (accessed October 21, 2015).

[27]"IAEA Safety Standards for Protecting People and the Environment: The Management System for Facilities and Activities", Safety Requirements No. GS-R-3, International Atomic Energy Agency, Vienna, 2006.

[28]Igor Khripunov, "A culture of security: Focus for the next Nuclear Security Summit?", *Bulletin of Atomic Scientists*, (June 2015), http://thebulletin.org/culture-security-focus-next-nuclear-security-summit8428 (accessed October 23, 2015).

The organization (Nuclear Facility) has to foster an approach that integrates safety and security in a mutually supporting manner as they share the common objective of limiting the risk.

Figure 4: Synergy of Nuclear Safety and Security Culture



Source: Anwar Habib, "Nuclear Safety and Security Culture in Pakistan" (Presentation, Pakistan Nuclear Regulatory Authority, Islamabad, http://slidegur.com/doc/1359472/nuclear-safety-and-security-culture-in-pakistan accessed October 8, 2015).

Similarities and Differences between Safety and Security Culture

Nuclear safety and security culture dwells upon the similar principles, organizations and elements that are involved within the implantation of these two.[29] The three neutral elements that can be utilized for promoting and strengthening safety and security within an organization (nuclear power plant) include: overarching policy; measures taken to implement the policy; and attitude of the organization and individuals to implement the policy[30] (see figure 5). If a proper management system is developed to follow the safety and security policy that embodies an

[29]Denis Winter, "Security Culture in the Nuclear Field", in *Nuclear Security Culture: From National Best Practices to International Standards,*I. Khripunov et al. (Eds.) (Amsterdam: IOS Press, 2005), 70.

[30]Anwar Habib, "Nuclear Safety and Security Culture in Pakistan" (Presentation, Pakistan Nuclear Regulatory Authority, Islamabad, http://slidegur.com/doc/1359472/nuclear-safety-and-security-culture-in-pakistan accessed October 8, 2015).

inclusive approach, and the top managers and the organizational personal are committed for the implementation of those policies in coherence, than a jointly sustainable safety and security culture can be developed, that can live side-by-side with each other.

Figure 5: Neutral elements that can be utilized for the promoting and strengthening safety and security

However, there will surely be occasions where there are differences between safety and security requirements. The areas where safety culture differs from security culture have been identified with an aim to work upon to reduce the differences and promoting synergy between the two domains. These areas include: system versus intent or act, transparency versus confidentiality, legal framework, different Governmental and legislative bodies for responsible authorities, government involvement,[31] different principles and approaches for reporting and addressing threats[32] (see figure 6).

[31]See Denis Winter, "Security Culture in the Nuclear Field", in *Nuclear Security Culture: From National Best Practices to International Standards*, 70.
[32]See Igor Khripunov, "A culture of security: Focus for the next Nuclear Security Summit?".

Figure 6: Conflict areas between nuclear safety and security culture

The first major difference that exists within these two cultures is that both cultures handle different aspects; in terms of human behavioural aspect, the safety culture works upon the risk of human error and equipment failure; while the security culture revolves around the risk of deliberate acts and specifically factors in the inadvertent behaviour focused to cause harm.[33] Even though nuclear safety and security both deal with the risk of inadvertent human error, but security in particular, places an additional watch on the deliberate acts specifically intended to cause harm.[34]

As security deals with the deliberate acts, therefore security culture necessitates different attitudes and behaviour, such as confidentiality of

[33]Igor Khripunov, Nuclear Security Culture: The Case of Russia" (Presentation, Conference on Managing Nuclear Material Stockpiles in the 21st Century, Oslo, Norway, https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=0CEEQFjAFahUKEwiL7LTuvdXIAhUJVhQKHd6AAD0&url=http%3A%2F%2Fwww.nrpa.no%2Fosloconference%2FIgor-Khripunov-NSC-presentation.ppt&usg=AFQjCNErUoa07Bhh-AvYs5FuGZU5G-gk-g&bvm=bv.105814755,d.d24, accessed October 23, 2015).
[34]"Nuclear Security Culture: Implementing Guide", IAEA Nuclear Security, No. 7, *International Atomic Energy Agency*, Vienna, 2008, 5.

information and efforts to deter malicious acts, as compared to the safety culture.[35] While safety culture works upon the principles of openness and transparency and requires individuals to share information with others. The communities involved within the safety and security culture have distinctive attitudes.[36] Individuals within the safety culture are required to demonstrate a prudent, strictly vigilant questioning attitude and to actively share information with others, exhibiting an overriding concern for transparency and dialogue.[37] By contrast, within the security culture, individuals are required to react swiftly, to communicate information only to certain authorized people and a certain group of people hold special responsibility for applying it, with a requirement of protection of some confidential information.[38]

Nuclear security culture is instituted upon a solid legal framework in form of 2005 Amendment to the 1980 Convention on the Physical Protection of Nuclear Material[39] and 2004 Code of Conduct on the Safety and Security of Radioactive Sources[40] but on the other side nuclear safety culture is not endowed with a legal framework even though it has a well-developed safety regime.[41] Within the context of approaches being followed to address the safety and security risks, the safety culture very critically follows the systematic approach for dealing with the safety risk but in the realm of security culture, it clearly lacks within the perusal and development of systematic approaches for addressing security threats.[42] The concept and application of safety culture only remains limited to the system safety, lacking any if at all attention to the radioactive sources.

[35]Ibid.

[36]See Denis Winter, "Security Culture in the Nuclear Field", in *Nuclear Security Culture: From National Best Practices to International Standards,* 72.

[37]See IAEA, "Nuclear Security Culture: Implementing Guide", 6.

[38]See Denis Winter, "Security Culture in the Nuclear Field", in *Nuclear Security Culture: From National Best Practices to International Standards,* 72.

[39]This amendment within the convention calls upon the individual governments to be accountable for the implementation of security culture but it is yet to be ratified.

[40]This non-binding code of conduct urges every state to promote a culture of safety and security regarding radioactive sources.

[41]See Igor Khripunov, "A culture of security: Focus for the next Nuclear Security Summit?".

[42]Ibid.

The fields of safety and security are regulated and managed by different authorities having different structures and supervisory power and same framework is being followed for safety and security culture.[43] The regulatory authorities that deal with safety and security are located in different organizations, and have diverse kind of regulatory power.[44] The domains of safety and security culture have differing degrees of government involvement, both on the organizational level and individual level. The embodiment of security culture requires extensive state intervention due to the very reason of confidentiality requirements and distinctive division of responsibility.[45] State is responsible for security culture, while operator is exclusively responsible for safety culture that institutes variability in the level of commitment. Numerous government departments are concerned with security culture. Particularly, various oversight bodies have selective roles to play in protecting nuclear materials, nuclear facilities (reactors), and the transport of nuclear and radiological materials.[46]

The levels upon which safety and security personnel are trained, largely differs. The security personnel are trained on a general basis while the safety personnel have a more specified training regarding the safety systems.[47] Unique role is played by the individuals in both cultures; the safety personnel have a more questioning attitude as compared to the security personnel, as the security personnel are obligated to practice confidentiality regarding the protection of sensitive information that could compromise the safety of radiological materials, nuclear facilities, and transport of nuclear materials.

security culture should be sought and developed. Moreover, all potential mechanisms should be conceived and emplaced to provide for continual interchange between the two cultures.

[43]Ibid.
[44]See IAEA, "Nuclear Security Culture: Implementing Guide", 6.
[45]See Denis Winter, "Security Culture in the Nuclear Field", in *Nuclear Security Culture: From National Best Practices to International Standards,* 72.
[46]See, Sonal Gandhi and Jungmin Kang, "Nuclear Safety and Nuclear Security Synergy", 358.
[47]Ibid., 360.

As security culture is in its initial phase of development, attention is needed to be focused on this realm. Importantly, security culture must not exist in vacuum and it should incorporate inputs from the domain of safety culture, while the experts in both fields should not work in isolation.[48] A co-ordination mechanism should be developed at the legislative, regulatory, and operator level that can efficiently help in flourishing the management system, leadership behaviour and personal behaviour.[49] As many individuals are part of both the security and safety cultures, in order to develop a sustainable safety and security culture, combined trainings should be given to the safety and security personnel so that each group can develop a better understanding of the given roles and responsibilities.

For the constant development and maturation of security culture, operating experience feedback (learning experiences from the safety incidences) and best practices from the realm of safety culture, should be integrated and instilled within the security culture. It is critical that the nuclear managers should effectively work upon instilling the right habits and traits in the safety and security personnel for the optimal overlap of safety and security culture.

Conclusion

The objective of safety and security is identical in assuring the safety of public and environment as it is not possible to be safe when not secure. More similarities exist in nuclear safety and nuclear security nexus, even though, differences and specific requirements of each domain could no doubt lead to conflicts and communication problems in relation to the implementation of relevant activities.

However, this conflict could be potentially managed by proper coordination of methods, approaches and operating practices, with their

[48]See Igor Khripunov, "A culture of security: Focus for the next Nuclear Security Summit?".

[49]"Nexus between Nuclear Safety and Nuclear Security" (Presentation, Developing a Comprehensive Security Culture Chemical, Biological, Radiological and Nuclear (CBRN) Threat and Responses, Vienna, Austria, 2013, http://vienna.io.gov.hu/download/0/26/80000/Nexus%20Safety%20Security%20include%20culture%20%20.pdf, October 25, 2015).

implementation in such a manner that does not compromise safety over the other and vice versa.

In order to move into the future, characterized by a complex threat environment, international community should focus on organizational culture with an aim to create a sustainable safety and security regime for the nuclear power generation sector. It is prudent to identify the links between safety and security culture, in form of similarities and differences, for the purpose of development of a mutually reinforcing safety and security culture.

As far as the contradictory requirements and areas are concerned, proper consultation and coordination mechanisms should be organized between regulatory bodies and safety and security personnel for avoiding communication problems and conflicts. Nuclear plant safety and security of personnel should be coordinated in a way to efficiently understand and resolve the conflicting issues that could emerge during the implementation of safety and security culture policy. In essence, efforts are required by the nuclear power industry, not to just implant strong safety and security culture attributes but also to foster interactions between the two, with an overriding aim of ensuring public safety.