THE ROLE OF THE REGULATOR IN THE FIELD OF SAFETY CULTURE TO SHUN NUCLEAR ACCIDENT

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ABSTRACT:
The 2011 accident at the Fukushima Daiichi nuclear power plant in Japan has, as might be expected, led to improvements in equipment at plants around the world that have fortified safety systems and allowed for better protection against rare, extreme natural events. Equally important to the process of improving risk management is the emphasis placed on implementing quality improvements to the ‘human’ side of nuclear safety, a crucial element that is often not considered by those outside the nuclear sector. Nuclear reactor safety is not only a question of physics and engineering against all credible threats, enhancing robustness of important safety systems and increasing redundancy of back-up power and water cooling systems, but also one of making certain that qualified and trained staff are supported by effective procedures. However, the role of the safety culture in the nuclear sector has been identified in many reports, as a means of enhancing safety performance. The promotion of nuclear safety culture should be a top priority for all organizations. The role of the regulator in the field of nuclear safety is to encourage organizations to identify, understand, and apply positive steps towards improving safety culture [5].

Regulators have an obvious and legitimate interest in maintaining safety culture, and whilst it may not be practicable or appropriate for them to prescribe a safety culture, they have an important role to play in encouraging organizations to identify, understand, and apply positive steps towards improving safety culture [5].

1. INTRODUCTION
Safety culture refers to the attitudes, behaviors, and conditions that affect safety performance and often arises in discussions following incidents at nuclear power plants. As it involves both operational and managerial aspects of the field, safety culture is a sensitive topic for regulators whose role is to ensure compliance with safety requirements and not intervene in management decisions. Safety culture often arises in discussions following incidents at nuclear power plants. Although no single definition of safety culture is universally accepted, it commonly refers to the attitudes, behaviors, and conditions that affect safety performance. It is well known that human factors play a major role in achieving safe working conditions at the workplace and in building a safety culture [1]. On the other hand, regulators can become ineffective or even captured by the nuclear industry if independence is lost. Both of these situations can weaken the industry and the regulator's responsibilities to protect the public interest [2]. The objective of this paper is to assess the safety performance of nuclear industries and to discuss the role of safety culture in the field of the safety culture by determining the level of the safety culture and how to promote and assess safety culture.

2. THE ROLE OF THE REGULATOR IN SAFETY CULTURE

Safety is the primary purpose of the regulator. What is more difficult for the regulator is finding the right balance of firmness but fairness in dealing with the operator. In addition to enforcing safety regulations, the regulator should have a positive effect on the operator's safety culture by promoting the concept of safety culture throughout industry organizations. Moreover, Safety culture has been identified as having played an important role in allowing precursor conditions at Fukushima to go unaddressed, thus the main goal of this paper is to discuss the role of regulatory body in the field of the safety culture by determining the level of safety culture and how to promote and assess safety culture. Also, this paper sheds the light on defining the attributes of a good safety culture and describing how nuclear plant operators can develop those attributes to produce effective nuclear safety culture.

2.1 The evaluation of safety culture
For the evaluation of safety culture has presented strategy of the regulatory response. It is based on the assumption that early signs of safety problems may be ambiguous, but nonetheless may justify enhanced safety control attention. Various activities can be used to evaluate an organization’s safety culture. These include direct observations, assessments, Causal Factors or Root Cause Analysis, surveys, interviews, review of key safety culture related processes, performance indicator monitoring and trending, and Quality Protection Program VP-1 type assessments [3].

2.2 The promotion of nuclear safety
The regulator can promote safety culture in the operator’s organization just through the mere fact of placing it on the agenda at the highest organizational levels. Enacting the concept of safety culture throughout the organization is critical to the promotion of nuclear safety culture and creates the necessary conditions for promoting effective nuclear safety culture.

Firstly, the preamble of the Convention on Nuclear Safety expresses the will to ensure effective nuclear safety culture which means that all necessary measures should be taken in order to achieve high level of nuclear safety culture.

Secondly, promoting safety culture is established in the Specific Safety Requirements, however, it only requires the operator to implement it.

Thirdly, concept of the regulator’s responsibility to promote safety culture already exists in the international community. In the International Nuclear Safety Advisory Group (INSAG)’s position paper ‘Promotion of a Nuclear Safety Culture’ it is stated that the Regulatory Authority has a responsibility to require all parties involved to develop a safety culture. According to the BSS, the safety culture includes: individual and collective commitment to safety on the part of workers, management, and regulators; accountability of all individuals for protection and safety, including individuals at senior management level; and measures to encourage a questioning and learning attitude and to discourage complacency with respect to safety. Therefore, the latter regulation in the field of radiation protection could be used as an example of how the regulator’s role of promoting nuclear safety could be defined in the nuclear safety.

The relation between safety culture at nuclear power plants and regulatory authority can be defined and discuss in terms of legal requirements, guidance, international standards, routine inspections, discussions, seminars and other measures as shown in Fig.1. Defining and establishing an effective safety culture and recognizing related trends is still a recent initiative, underpinning development and review with operations and regulatory bodies. As more studies are performed and experience is gained in this area, the role of the regulator in promoting and evaluating safety culture will continue to evolve and mature [3].

Figure 1: The Role of the regulator for establishing an effective safety culture

3. DETECTION OF INCipient WEAKNESSES IN SAFETY CULTURE: Symptoms of a Weakened Safety Culture

Regulators have an obvious and legitimate interest in maintaining safety culture, and whilst it may not be practicable or appropriate for them to prescribe a safety culture, they have an important role to play in encouraging organizations to identify, understand, and apply positive steps towards improving safety culture [5].

Typically in poor safety cultures, indicators for organization issues are: lack of pressure from external environment, inadequate resolution of problems, organizational insensitivity, frequent personnel turnover, lack of feedback from the workforce, patterns of problems, procedural inadequacies, quality of analysis of problems and changes, lack or failure of independent nuclear safety reviews, reality mismatch, employee issues, excessive hours of work, and number of personnel. The concept of safety culture failure to use suitably qualified and experienced persons and understanding of job descriptions.

4. PRINCIPLES FOR A STRONG NUCLEAR SAFETY CULTURE

There are three stages of development seen emerge each displaying a different awareness to emerge the effect of safety of human behavior and attitudes:

- Stage I – Safety Based Solely On Rules and Regulations

At this stage, the organization sees safety as an external requirement and not as an aspect of conduct in an effort to gain the organization due recognition. The external requirements are those of national organizations, regional authorities, or regulatory bodies. There is little awareness of behavioral and attitudinal aspects of safety performance, and no effectiveness to consider such issues. Safety is seen very much as a technical issue; mere compliance with rules and regulations is considered adequate.

- Stage II – Good Safety Performance Becomes an Organizational Goal

An organization at this stage has a management which perceives safety performance as important even in the absence of regulatory pressure. Although there growing awareness of behavioral and attitudinal issues, this aspect is largely missing from safety management methods, which comprise technical and procedural solutions. The organization begins to look at the reasons why safety performance reaches a plateau and is willing to seek the advice of other organizations.

- Stage III – Safety Performance Can Always Be Improved

An organization at stage III has adopted the idea of continuous improvement and application the concept of safety culture throughout the organization.

5. CONCLUDING REMARKS

This paper offered a detailed discussion about safety culture from many different point of views, such as characteristics and requirements of strong safety culture. The impact of regulatory body safety culture on the organization culture on strengthening and promoting the organization’s safety culture is explained. A regulator should keep a good hand on a learning process within an organization. A simple model based on the Kolb learning cycle [5] is shown in Fig.2. A person or organization learn by reflecting on what they have experienced, formulating concepts and ideas for change while continuing existent practices. The implementation of such concepts and ideas is intended to improve performance and there by modify future experience. At an appropriate time this modified experience can itself be reviewed and lessons learned.

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