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 nuclear safety 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. Ensuring nuclear reactor safety is not only a question of physical protection 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, these assets are valued only in an organizational culture that places a premium on ensuring high levels of safety, or implementing what is called an effective 'nuclear safety culture'. Principles/characteristics/factors for effective safety culture are to great extent similar between licensees and regulatory bodies and can be applied for developing RB's safety.

Safety is the primary purpose of the regulatory body, Regulator plays a significant role in the field of nuclear safety even though the prime responsibility for safety belongs to the operator, and it is the regulator which actually decides what is considered to be safe. In order to effectively implement the international principle of high level of nuclear safety, nuclear safety culture should be clearly named as an objective in international nuclear legal acts and the regulator's responsibility for promotion of nuclear safety culture should be established. 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. 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.

The operator's priorities are influenced by those matters regarded as important by the regulatory body. Thus, the regulator can stimulate the development of a safety culture by providing positive reinforcement for good performance and high quality in plant work processes, by encouraging good safety practices, by promoting the examples of operators having a good safety culture, and by recognizing initiatives of 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 the safety culture and how to promote and assess safety culture. Also, this paper sheds the light on concerned with defining the attributes of a good safety culture and describing how nuclear plant operators can develop those attributes to produce effective nuclear safety culture.

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 management issues, safety culture is a sensitive topic for regulators whose role is to ensure compliance with safety requirements and not to 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 large role in safe plant operation, but safety culture still poses a challenge for regulatory bodies [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 provide an overview of safety culture and to discuss the role of regulatory body in the field of the safety culture by determining the level of the safety culture and how to promote and assess safety culture.

2. ROLE OF THE REGULATOR IN NUCLEAR SAFETY CULTURE

Safety is the primary purpose of the regulatory body. 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 through its own example and *evaluating* the safety culture of licensees through performance or process based inspections and other methods.

2.1 The evaluation of safety culture

For the evaluation of safety culture has presented strategy of the regulatory response. It is based on assumption that early signs of safety problems may be ambiguous, but nonetheless may justify enhanced regulatory 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 Voluntary Protection Program VPP 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:

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, promotion of strong nuclear 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 field of radiation protection. In the International Basic Safety Standards (BSS) [4] 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 discussed 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, undergoing development and review within operator organizations 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].

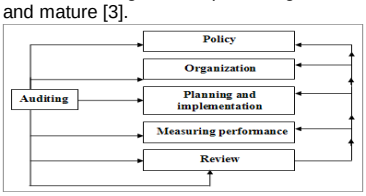

Figure 1: The Role of the regulator for establishing an effective safety culture

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 to improving safety culture [5].

Typically in poor safety cultures, indications for organization issues are: lack of pressure from external environment., inadequate resolution of problems, organizational insularity,openness, regulatory issues, corrective actions, patterns of problems, procedural inadequacies, quality of analysis of problems and changes, lack or failure of independent nuclear safety reviews, reality mismatc, employee issues, excessive hours of work, number of persons not completing adequate training, 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 seem to emerge each displaying a different awareness to emerge the effect on safety of human behavior and attitudes:

Stage 1–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 that will help the organization to succeed. The external requirements are those of national governments, regional authorities, or regulatory bodies. There is little awareness of behavioral and attitudinal aspects of safety performance, and no willingness to consider such issues. Safety is seen very much as a technical issue; mere compliance with rules and regulations is considered adequate.

StageII –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 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 applied the concept of safety performance. There is a strong emphasis on communications, training, management style, and improving efficiency and effectivenessThe process for the development of safety culture can be assisted by the use of 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 existing best practice. 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.

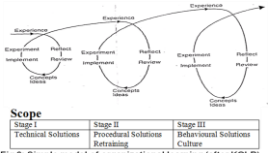

Fig 6: Simple model of organizational learning (after KOLB)

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 and balanced relation with the operator to promote not to preclude safety. Both regulator and operator should unify their efforts towards one and only one target, keep and promoting safety.

6. Refernce:

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