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Regulatory Oversight of Safety Culture - Korea's Experience and Lessons Learned

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Synopsis

In Korea, regulatory oversight program of safety culture was launched in 2012 to establish regulatory measures against several events caused by weak safety culture in the nuclear industry. This paper is intended to introduce the preliminary regulatory oversight framework, development and validation of safety culture components, pilot safety culture inspection results and lessons learned. The safety culture model should be based on sound understanding of the national culture and industry characteristics where the model will be applied. The nuclear safety culture oversight model is being developed and built on the Korean regulatory system to independently assess the nuclear power operating organizations' safety culture.

The model is developed to focus on the organizational capabilities to maintain, improve and recover the integrity of key elements which play a major role in implementing the concept of defense-in-depth. The four basic areas of prime focus and 13 components are derived as cross-cutting factors. These are decision making, work management, work practice, and resource management for the human performance area, operating experience feedback, problem identification & resolution, and diagnosis and improvement in the management for improvement area, employee protection, information sharing, and just culture for the safety conscious working environment area, and leadership for safety, organizational competency, and change management for the leadership and organizational control area. It is expected that these 13 SC elements shall be managed by licensee's safety culture management system which itself is composed of 3 components. For each SC components, characteristics which represent regulatory expectations and reference standard are developed.

The safety culture is defined as an assembly of behavioral patterns, core values and basic beliefs shared by individuals in organization about the importance of safety. The SC of an organization is expected to have meaningful and desired relationship with the nuclear operating organization's safety performance. Therefore, the validity of the SC components are examined with survey data from nuclear power plant employees. Based on the survey on NPP employees in Korea, and statistical analysis using SPSS with the survey result, content, construct, and criterion-related validity are confirmed. The hypothesis of 'safety culture is related to safety performance' is verified as statistically significant in the analysis of survey data. Many promising safety performance metrics are developed, and the relationship structure between SC components and safety performance metrics is identified.

The preliminary oversight program for licensee's safety culture is composed of daily on-site observation, periodic SC inspection, in-depth assessment, and periodic review. For example, the resident inspectors observe the works and activities of managers and employees in daily inspections. Periodic audit on licensee's SC system and activities is carried out. These field observation and inspection results are reviewed to find improvement areas. When safety culture related event happens, in-depth assessment will be carried out and root causes of the event will be analyzed. These observation, inspection, and assessment results will be accumulated into safety culture database. And long-term change of safety culture will be monitored and assessed in every 10 years taking an opportunity of periodic safety review.

Until now, safety culture inspections were carried out at 9 NPP sites in Korea and KHNP head office, for 2 or 3 days at each sites. The objective of pilot inspections is to verify the feasibility and effectiveness of regulatory oversight and to obtain baseline data of licensee's SC status. And to develop infrastructure within both regulators and operators. After several pilot inspections, some areas for improvement compared to current regulatory expectations are identified. For example, in the 'change management' component, it is recommended that organizational changes should be managed properly considering the effects on safety. Also, the oversight of licensee's head office is crucial for successful development of alignment of SC management system in the whole organization, because safety leadership, management, policy and behavioral model come from top level of the corporate. Legal basis of SC oversight will be established in 2016 according to recommendation of IRRS follow-up mission accomplished in December 2014.

Country or International Agency

Republic of Korea

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