

An enhancement of Regulatory Functions and Activities of PNRA by Implementing IAEA Safety Standards

Muhammad Nadeem¹, Sukho Lee²

¹ Department of Nuclear and Quantum Engineering, Korea Advanced Institute of Science and Technology
(Sr. Scientific Officer, Pakistan Nuclear Regulatory Authority)

² Korea Institute of Nuclear Safety (KINS)

*Corresponding Author E-mail Address: rananadeem@kaist.ac.kr



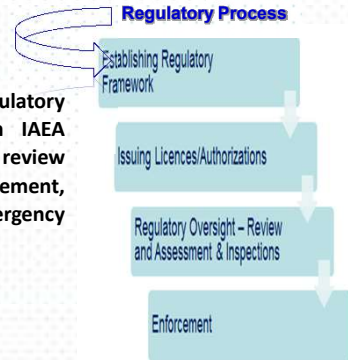
Introduction & Objectives of the Study

- The Pakistan Nuclear Regulatory Authority is an independent regulatory body, empowered with full scope of regulatory powers required by IAEA standards.
- The PNRA Ordinance 2001 and associated regulations provides binding legal framework for nuclear and radiation safety in Pakistan
- The PNRA is responsible for controlling, regulating and supervising all matters related to nuclear and radiation safety in Pakistan.

PNRA Regulatory Model



- This study highlights the PNRA regulatory functions and arrangements with IAEA practices including authorization, review and assessment, inspection, enforcement, regulatory guides and emergency preparedness.



Results and Discussion

I. Authorization of Nuclear Facilities

Pakistan has five operating nuclear power reactors, the Karachi Nuclear Power Plant (CANDU) and four PWR Chashma Nuclear Power Plants. The PNRA also licenses two research reactors, PARR-1 and PARR-2. The Regulation PAK/909 governs the licensing of all nuclear installations in Pakistan. The PNRA only grants operating licenses for a period of 10 years. At the conclusion of the 10-year period the licensee must submit a periodic safety review (PSR) for the PNRA review. In the case of operation beyond the design life, the licensee must submit a PSR along with an update to the documents submitted for the initial license.

II. Review and Assessment

The PNRA internal working procedure PNRA-WP-11005 provides guidance for the review and assessment. The PNRA review process includes utilization of Technical Support Organization (TSO) called "Centre for Nuclear Safety (CNS)" to conduct reviews of submissions such as Site Evaluation Report (SER), Safety Analysis Reports, Periodic Safety Review Reports, Quality Assurance Programs, Radiation Protection Program, Pre-service inspection (PSI) and In-service Inspection (ISI) program etc. PNRA performs safety reviews and assessment for nuclear power plants during siting, design, construction, modification and operation of NPPs. The PNRA also performs reviews of PSR required every ten years as part of the process for revalidation of the operating license.

III. Inspection

PNRA internal working procedure NSD-WP-001-R1 is the basis for the development of inspection programs for nuclear power plants. The PNRA has a graded-approach for evaluating system performance including significance of issues. The majority of the inspections are planned and announced. Reactive inspections are conducted in response to unplanned, unexpected events.

IV. Enforcement

The PNRA regulation PAK/950 defines the enforcement actions. The PNRA enforcement actions may include written notification, imposition of additional regulatory requirements and conditions, written warnings, penalties and, ultimately revocation of the authorization. For all cases of NPP non-compliance, PNRA conducts discussions, regulatory meetings, and further assessment of the issue through follow-up inspections, etc.

V. Emergency Preparedness and Response

The PNRA issued requirements on management of a nuclear or radiological emergency in PAK/914. The licensee's proposal on establishing the appropriate size of emergency zones has to be submitted to PNRA for approval. PNRA advises the government for public protection and other related issues in case of an emergency. The PNRA also assists off-site response organizations and licensees in radiological assessment by deploying its radiation monitoring teams located at its regional offices and headquarters.

Enhancement from IAEA standards

- A formal documented process to allow appeals against its decisions regarding granting of an authorization to a facility (Basis: GSR Part 1 para. 4.32 & para. 2.5 (11))
- The PNRA has developed guidance for licensing submissions defining format and content for nuclear facilities (Basis: GSR Part 1 para. 4.62)
- Involvement of public in the authorization and licensing processes for NPPs (Basis: SSG-12 para. 2.44 (d)).
- Areas of improvements include the definition of formal implementation plans after promulgation of new regulatory requirements, the development of enhanced guidance documents, and refined implementation of application the graded approach.
- The PNRA has inspectors which are extremely well trained in the simulator along with the licensed operators (Basis: GSR Part 1, Req. 11, para. 2.36).
- A mechanism to allow the licensee a right of appeal is being developed. (Basis: GSR Part 1 para. 2.5 (11) & para. 4.32)).
- Operational Interventional Levels (OILs) are being revised (Basis: GS-R-2 para. 4.71 & 5.13).
- The roles and responsibilities of on-site and off-site emergency response organizations are regularly exercised. Training courses, table top and field exercises have been performed to train the first responders like fire fighters, rescue, medical doctors, police, security agencies and border monitoring personnel.

Conclusion

The PNRA has progressively established a regulatory framework covering activities licensed in Pakistan. This includes internal processes to review applications and submissions, and documentation of the basis for recommendation on licensing decision. This study is helpful for regulatory bodies to enhance regulatory requirements for nuclear safety in the light of IAEA requirements.