



---

# **Strengthening National Regulatory Infrastructure by Promoting Self Regulation**

Mohammad Shakilur Rahman  
Pakistan Nuclear Regulatory Authority (PNRA)

**Keynote Lecture Presented at IRPA 12  
Buenos Aires Argentina**



# Introduction

---

- Sharing of PNRA experience in regulation of radiation facilities in Pakistan
- Establishment of PNRA in 2001
- Utilization of experience of NPP in regulation of radiation facilities
- Development of modified strategy



# National Radiological Program

---

➤ Full-fledged nuclear medicine centres	32
➤ Radiotherapy centres	05
➤ Industrial radiography facilities	34
➤ Nuclear gauge facilities	105
➤ Oil well logging facilities	06
➤ Irradiator facilities	09
➤ Nuclear research institutes	48
➤ Diagnostic X-ray facilities	1600
➤ Radiation workers	~5000



# Organization for Regulating Radiation Facilities

---

- Area of Pakistan is 803,00 Sq Km
- Population of the country is 160 Million
- Division of the country into three regions
- Establishment of three Regional Nuclear Safety Directorates (RNSD) of PNRA
- Provision of sufficient number of trained and qualified inspectors at each RNSD

# PAKISTAN





# National Nuclear Regulatory Infrastructure

---

- PNRA Ordinance 2001
- National Regulations mostly based on IAEA standards
- Regulatory guides based on national practices
- Code of practices – licensee procedures and manuals based on national regulations and guides



# Lesson Learned from Regulatory Experience

---

- Need to achieve better radiation protection performance
- Desired results can be achieved through self regulation
- Self regulation stems from awareness, education and safety culture



# Modified Strategy

---

Promoting self regulation through  
creating awareness among the licensee





# Modified Strategy

---

- Fulfilment of basic requirements
- Revised regulatory inspection program
- Training of radiation workers and other professionals
- Public awareness program
- Inculcating safety culture in radiation facilities
- Enforcement and incentives



# Fulfilment of Basic Requirements

---

- Availability of qualified and trained manpower
- Proper design of radiation facility
- Adequate radiation shielding
- Provision of documented procedures
- Arrangements for handling radiation emergency
- Provision of personal and area dose monitoring
- Safety and security arrangements for radiation sources
- Safety culture program
- Training of radiation workers including nuclear physicians and radiologists



# Revised Regulatory Inspection Program

---

- Routine inspections (Announced)
- Un-announced inspections
- Reactive inspections
- Confirmatory or follow-up inspections



# Training of Radiation Workers and other Professionals

---

- Training courses on legislation/regulations for management of radiation facilities.
- Training courses on radiation protection for industrial radiation workers
- Training courses on radiation protection for medical professionals
- Training courses on safety and security of radiation sources for radiation handlers (customs, civil aviation).
- Dissemination of information regarding incidents/accidents in radiological facilities
- Training courses on radiation emergency management for first responders to an emergency (fire brigade, police, and medical rescue team)
- Briefings by PNRA inspectors to professionals and radiation workers during inspections



# Public Awareness Program

---

- Lectures in educational institutions
- Electronic and print media campaign
- Posting radiation safety related information in radiation area
- Briefings by PNRA inspectors to patients and general public during inspections



# Enforcement and Incentives

- Formulation of enforcement regulations
- Penalties for violators and defaulters
- Incentives for best licensees in different categories
- Awards for best performing licensees



# Inculcating Safety Culture in Radiation Facilities

---

- Justification of practices
- Optimization of doses-ALARA
- Proper calibration/maintenance of radiation apparatuses
- Minimization of contamination and radioactive waste
- Reduce error potential- Do It Right the First Time
- Self protection versus serviced protection
- STAR - stop, think, act and review
- Continuous training of radiation workers



# Conclusions

---

- New strategy is in implementation stage
- Increase in compliances of PNRA directives has been observed
- Decrease in number of complaints by general public against radiation facilities is observed
- An environment of better understanding and trust is developed between regulators and stakeholders
- Licensees are frequently sharing their problems and experiences with the regulatory body