

# RISK INFORMED APPROACH TO THE SECURITY OF RADIOACTIVE SOURCES IN USE AND IN STORAGE IN PAKISTAN



Presented By

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# Presentation Layout

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- ❑ Applications of Radioactive Sources in Pakistan
- ❑ Implementation of Risk Informed Approach - Pakistan's Perspective
  - Threat Assessment for Risk Identification
  - Development of National Regulations
  - Applications of Security Measures According to Risk
- ❑ Self-assessment Program for Accountability and Control of Radioactive Sources in-use and in-storage in Pakistan
- ❑ Prevention, Detection, Response and Mitigation Measures
- ❑ Risk Minimization for DSRS in Interim Storage in Pakistan
- ❑ Conclusion

# Applications of Radioactive Sources in Pakistan

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**Cancer Treatment**



**Research and Development**



**Co-60 Gamma Irradiator**

**Irradiation of Food and Agriculture Commodities**



**Education**

# Methodology for Addressing Risk Informed Approach

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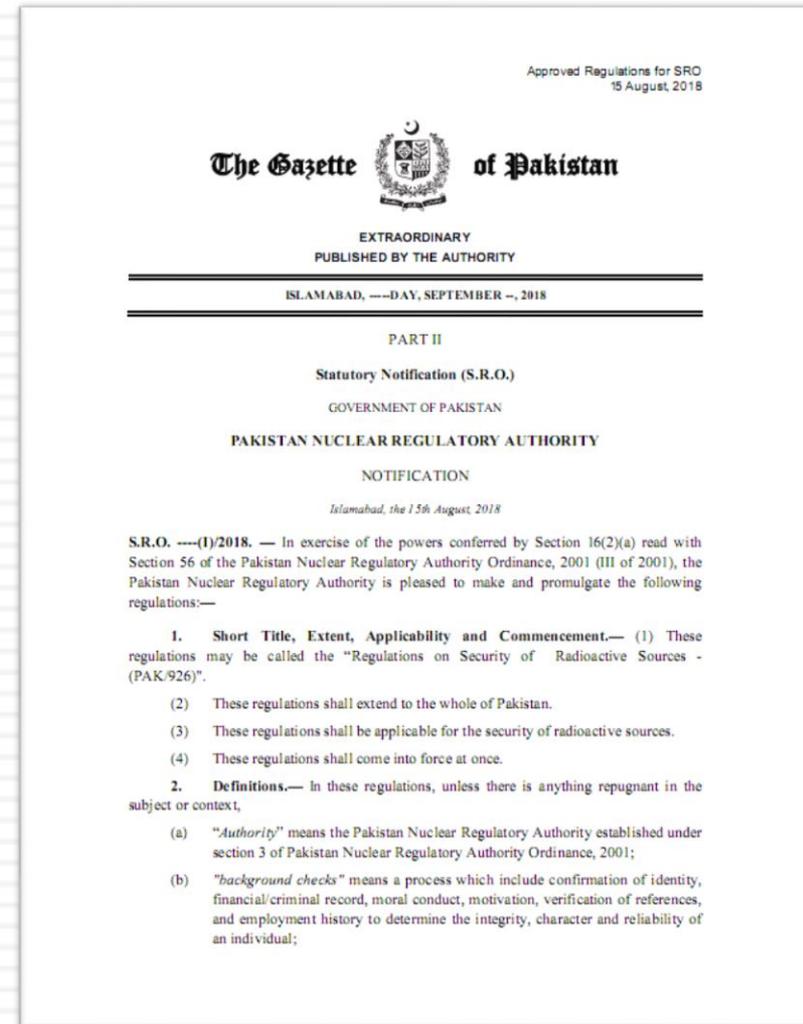
- ❑ Pakistan has voluntarily subscribed to IAEA's non-binding instrument: **Code of Conduct on the Safety and Security of Radioactive Sources**
- ❑ Pakistan's Nuclear Security Policy for Radioactive Sources is based on the Code
- ❑ National competent authority performs threat assessment for identification of risks associated with radioactive sources in use and in storage



# Development of National Regulations

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- ❑ PNRA Regulations on Security of Radioactive Source(s) — **PAK/926**
- ❑ **PAK/926 is consistent with:**
  - IAEA Code of Conduct
  - IAEA Nuclear Security Recommendations (NSS-14)
  - IAEA Nuclear Security Implementing Guide (NSS-11)



# Applications of Security Measures According to Risk (1/2)

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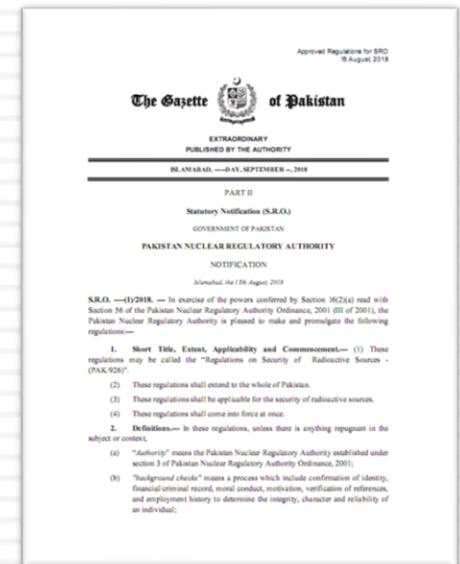
- ❑ IAEA's methodology for categorization is adopted to follow an internationally harmonized basis
- ❑ Security levels are defined in national regulations PAK/926
- ❑ Application of a graded approach to the regulatory control of radioactive sources according to associated risk

Risk Level	Category	Security Level
High	1	A
	2	B
Medium	3	C
Low	4 & 5	D

# Applications of Security Measures According to Risk (2/2)

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- ❑ Submission of a physical protection plan to PNRA for high and medium-risk associated sources
- ❑ The physical protection plan is tested and evaluated at regular intervals
- ❑ Using risk informed approach, the physical protection system is enhanced with the change in threat and notified to PNRA



# Nuclear Security Upgrades in Pakistan

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- ❑ Security Upgrades for High-Risk Associated Sources used for Cancer Treatment at Nuclear Medical Centers
- ❑ Provision of **multiple monitoring stations** for early detection and response capabilities
- ❑ Automatic notification of alarm via **redundant and diverse means**

# Accountability & Control of Radioactive Sources

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- ❑ PAEC is exercising an in-house self-assessment program for accountability & control of radioactive sources in use and in storage for compliance with PAK/926
- ❑ Assessment of Technical and Administrative Measures for security of radioactive sources
- ❑ Identification of Areas for Improvements (AFIs)
- ❑ Periodic follow-up assessments to verify compliance

# Assessment of Technical Security Measures

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## Salient Measures include:

- ❑ Electronic Access Control System
- ❑ Intrusion Detection System
- ❑ Provision of access delay barriers (Secure Containers, Secure Enclosures, Robust Doors)
- ❑ Tamper Indication Devices (TIDs)
- ❑ Scheduled and breakdown maintenance of PPS equipment and system
- ❑ Performance testing of physical protection system



# Assessment of Administrative Security Measures – Security Management

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## Salient Measures include:

- Physical protection plan
- SOPs
  - ▣ facility access
  - ▣ access control and key issuance
  - ▣ alarm Assessment and Response
  - ▣ temporary storage of disused radioactive sources
- Security contingency Plan and implementing procedures
- Human Reliability and trustworthiness program
- Sensitive information security
- Quality assurance measures

# Interior Detection

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- Deployment of radiation detection equipment at major entry/exit points of country
- CSI compliant Integrated Cargo Container Facility at Port Qasim, Karachi



# Emergency Support Mobile Labs

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# Radiological Assessment Teams

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- Initial Assessment of Radiological hazards
- Radiation protection for first responders
- Make on-scene recommendations for protective actions



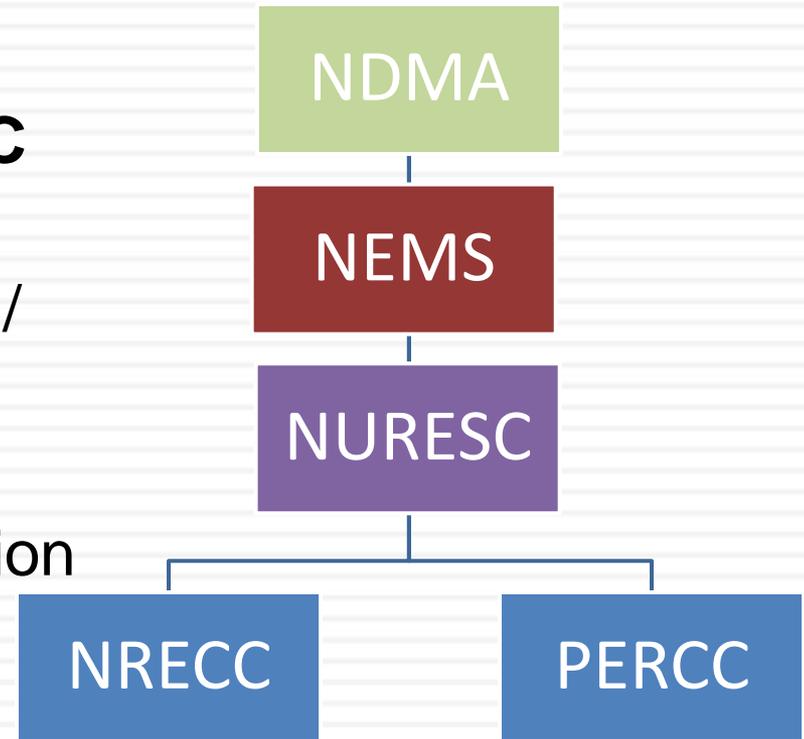
# Nuclear Emergency Management System

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## Administrative Coordination - NDMA

## Technical Provisions-PNRA / PAEC

- NURESC- focal point at national level, Implementing arm of NEMS / NNDA
- NRECC – PNRA Nuclear & radiological emergency coordination center
- PERCC – PAEC emergency response coordination center



# PAEC Emergency Response Coordination Center –PERCC (1/2)

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# PAEC Emergency Response Coordination Center – PERCC (2/2)

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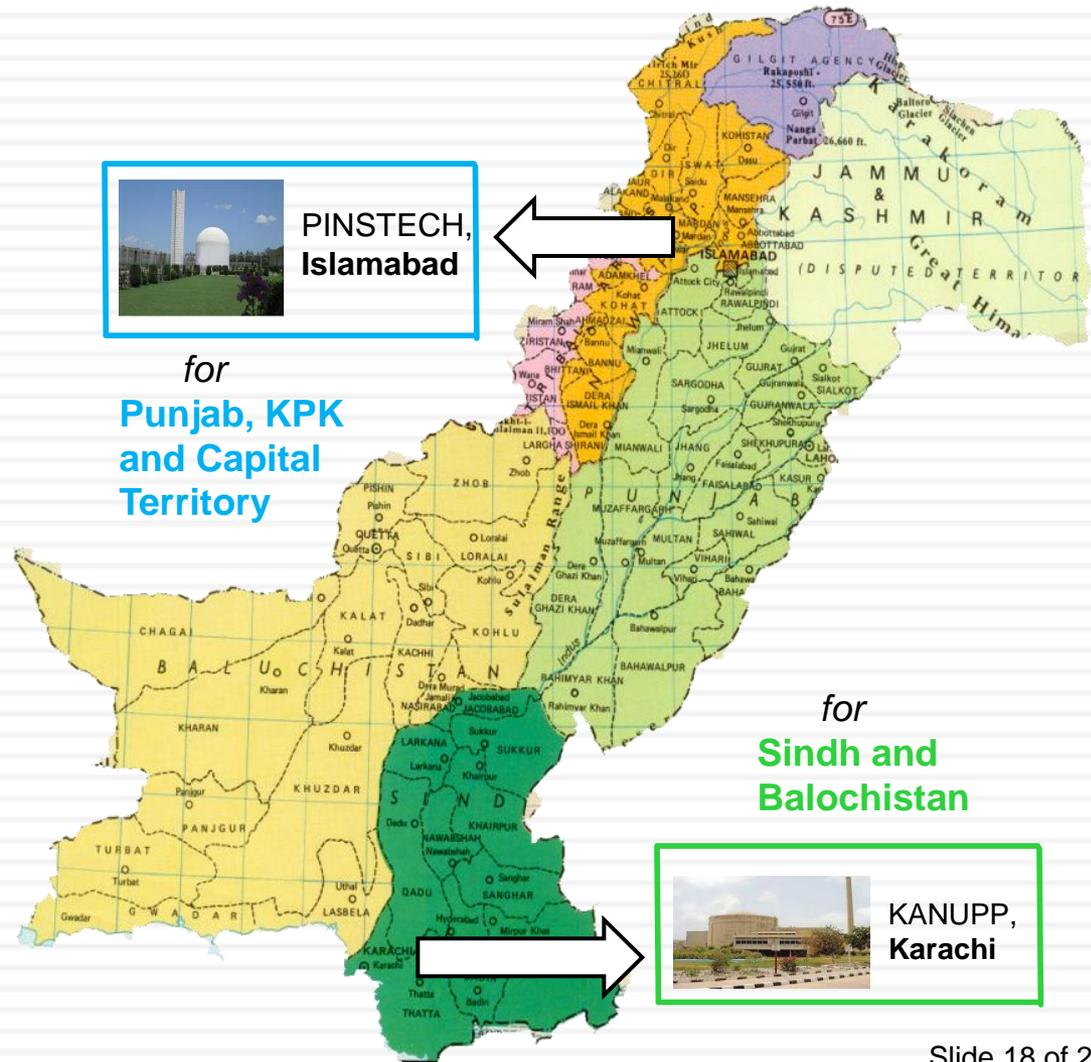
- **Emergency Response and Coordinator Center**
  - Round-the-clock operation
  - Interface with facilities, NURESC and NRECC
- **Drills/Exercises**
  - Planned Scenarios for operators and coordinating bodies
  - Conducted periodically



# Risk Minimization for DSRS in Interim Storage

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- Risk Reduction by minimizing transport distance of DSRS from source to interim storage
- Special arrangements by designating two sites for interim storage of DSRS



# Conclusion

- Potential systems and measures are identified which are deployed to reduce risk of any malicious act having nuclear security implications
- Security Measures are applied commensurate to the risk
- Pakistan has adopted comprehensive measures to cater for security risk associated with radioactive sources in-use and in-storage in line with IAEA guidance and national regulations
- Forums should be developed and promoted for exchange of good risk-reduction practices worldwide

*Thank you*

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