OVERVIEW OF
PAKISTAN'S
NUCLEAR SECURITY REGIME

Ministry of Foreign Affairs
Government of Pakistan

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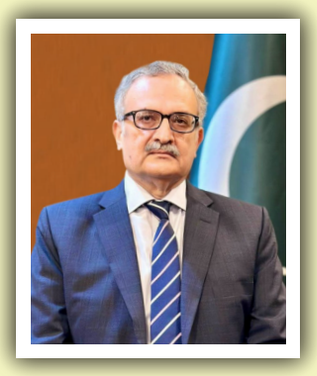
FOREWORD



Nuclear Security is a state responsibility and it receives the highest level of attention in Pakistan in accordance with our domestic and international obligations.

Pakistan has established a comprehensive nuclear security regime at par with the guidelines of International Atomic Energy Agency (IAEA) and international best practices. The regime is based on an extensive legislative and regulatory framework governing the security of nuclear materials, radioactive substances, associated facilities and activities. In addition to this, it is backed by strong institutions and organizations with the requisite authorities, resources and trained manpower for effective implementation.

Pakistan's nuclear security regime is anchored in the principle of multilayered defence for the entire spectrum of threat including insider, outsider and cyber threats and a robust Personal Reliability Program. Furthermore, the national nuclear security regime is inherently dynamic, persistently refining itself in the light of IAEA guidance documents and international best practices to attain highest possible standard of excellence.

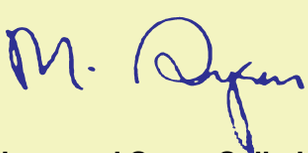
Five decades of experience of safe and secure operations of civil nuclear power plants, has enabled Pakistan to gain rich experience in the field of nuclear security through continuous engagement with the IAEA. Pakistan is determined to share its extensive experience in the area of nuclear security with other countries under the auspices of the IAEA. In this regard, it has established the Centre of Excellence and IAEA Collaborating Centre on Nuclear Security and conducts a wide-range of capacity building programs and specialized courses in the domain of nuclear security, physical protection and personnel reliability. We envision transforming our centers into regional and international hubs for imparting nuclear security related training.

Pakistan's commitment towards ensuring a comprehensive national nuclear security regime has amply been reflected in this document titled "*Pakistan's Nuclear Security Regime*", which was first published

in the form of a brochure on the sidelines of the second International Conference on Nuclear Security organized by the IAEA in 2016. The Second revised version of the document was published on the occasion of the third International Conference on Nuclear Security, held in February 2020 in Vienna.

The third iteration of Pakistan's Nuclear Security Regime (NSR) booklet provides a comprehensive overview of all advancements and enhancements implemented within the national nuclear security apparatus since 2020. I hope that it will serve as a valuable reference detailing Pakistan's efforts in the area of nuclear security, thereby fostering greater understanding and appreciation of the nation's commitment to this critical endeavor.

Pakistan employs nuclear technology in various fields such as energy, health, agriculture and industry and is determined to further enhance the peaceful application of nuclear technology for its socio-economic development in the future. In parallel, maintaining the highest standards of nuclear security shall always remain a priority.



Muhammad Syrus Sajjad Qazi
Foreign Secretary
Islamic Republic of Pakistan

INTRODUCTION

Pakistan accords paramount importance to nuclear security as prime state responsibility. Pakistan's comprehensive Nuclear Security Regime (NSR) ensures constant vigilance, perpetual preparedness and zero complacency to safeguard nuclear and other radioactive materials, associated facilities and activities. The objective of the NSR is to protect personnel, property, society and the environment from harmful consequences of a Nuclear Security Event involving nuclear and other radioactive materials in use, storage and during transport throughout their life cycle and for all facilities against unauthorized removal, sabotage and prevention of illicit trafficking. Pakistan's nuclear security regime stands on strong legislative and regulatory framework that enables robust institutions and organizations operating through standardized systems, measures and procedures. Drawing from five decades of experience in safe and secure operations of civil nuclear power plants and facilities, national nuclear security regime allows the country to harness peaceful applications of nuclear technology in diverse sectors of health, energy, agriculture and industry. Mindful of emerging threats and challenges, national nuclear security regime is regularly reviewed and updated in the light of national obligations, International Atomic Energy Agency (IAEA) guidance documents and international best practices. Consequently, a dynamic culture of nuclear security has evolved over time that, in turn, fortifies and sustains national nuclear security regime in the country.

PAKISTAN'S NUCLEAR SECURITY REGIME (NSR)

Policy Directions and Evolution of Pakistan's NSR

Pakistan's NSR has made significant progress over the years. To manage nuclear safety and security, nuclear safeguards and non-proliferation, a National Command Authority (NCA) chaired by the Prime Minister was established in February 2000.

Pakistan's NSR is dynamic in character and has intrinsic capability to meet evolving challenges/ threat environment. The institutions and organizations are established based on legal framework, while nuclear security systems and measures are developed for the prevention, detection and response to nuclear security events.

Compliance Mechanism to International Instruments on Nuclear Security

Conventions. Pakistan is party to various international instruments that are aimed at strengthening national and global nuclear security infrastructure. These include; Convention on Physical Protection of Nuclear Material (CPPNM) and its Amendment of 2005, the Convention on Nuclear Safety (CNS), the Convention on Early Notification of a Nuclear Accident (Early Notification Convention) and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention).

Non-Binding Instruments/ Arrangements. Pakistan has also voluntarily subscribed to the IAEA's "Code of Conduct on Safety and Security of Radioactive Sources" and its two Supplementary Guidance on 'Import and Export of Radioactive Sources' and 'Management of Disused Radioactive Sources'. This IAEA Code

of Conduct along with its two supplementary guidance document is being used as guidelines for regulating radioactive sources. Being member of Illicit Trafficking Data Base (ITDB), Pakistan is participating in its activities. Also as a member of IAEA Advisory Group on Nuclear Security (AdSec), Pakistan actively contributes in its bi-annual meetings.

UN Security Council Resolutions. Being a responsible State, Pakistan firmly adheres to obligations outlined in UN Security Council Resolutions (UNSCRs) 1373, 1540 and 1887. Under the UN Security Council Resolution 1540 (2004), Pakistan has so far submitted six National Reports outlining the measures taken at the national level to achieve the objectives of the Resolution. In August 2018, Pakistan established inter-Agency Committee for Coordination, Review and Monitoring (CRMC), to effectively implement, supervise and monitor the enforcement of UNSC Resolution's (1540) decisions on countering the proliferation of weapons of mass destruction and to ensure their effective implementation. Pakistan has offered technical assistance, including in the form of trainings to interested states and in response to specific requests in those areas where it has gained expertise including those relating to the implementation of UNSCR 1540.

Pakistan's Offer of Assistance in Nuclear Security Training to Interested States under Auspices of IAEA

- Evaluation of physical protection system effectiveness.
- Implementation of nuclear security recommendations on physical protection of nuclear material and facilities.
- Security of radioactive sources.
- Threat assessment and risk-informed approach for nuclear and other radioactive material out of regulatory control.
- Threat assessment and design basis threat.

Engagement with Global Processes and Mechanisms

Nuclear Security Summit (NSS) Process. Pakistan has remained an active participant in the Nuclear Security Summit (NSS) process aimed at creating awareness at the leadership level about the need to strengthen global nuclear security efforts. It has participated in all the four summits and made significant contribution in the process. Pakistan also subscribed to the gift basket on Nuclear Security Support Centers and subsequently joined Nuclear Security Contact Group (NSCG).

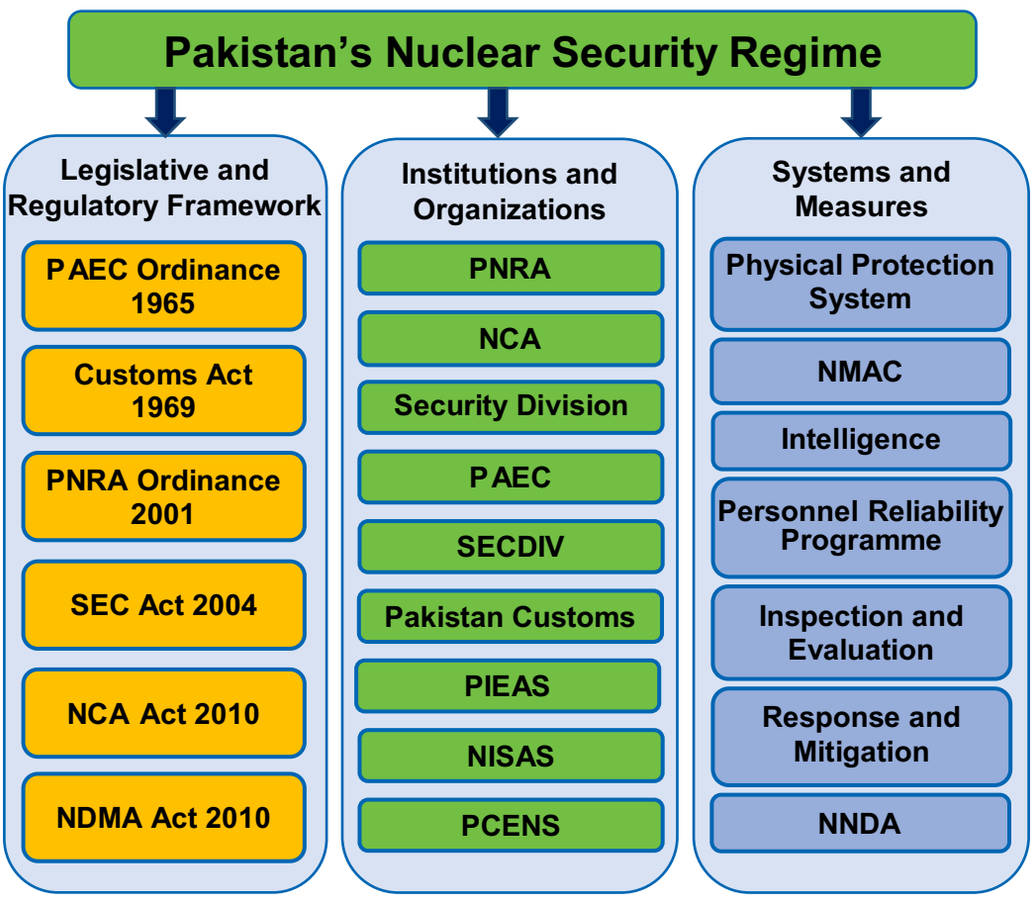
Nuclear Security Contact Group (NSCG). Pakistan joined Nuclear Security Contact Group (NSCG) in 2019 to contribute to the advancement of its work to address continuing and evolving nuclear security challenges, with the objectives of advancing implementation of nuclear security commitments and building strengthened, sustainable and comprehensive global nuclear security architecture.

Global Initiative to Combat Nuclear Terrorism (GICNT). Pakistan joined GICNT in 2007 and has been proactively participating in its various activities like drafting guidance documents for its Nuclear Detection Working Group (NDWG) and Response and Mitigation Working Group (RMWG). Other activities include participation in plenary meetings, workshops and exercises under the above mentioned working groups for sharing and learning of international best practices.

ARCHITECTURE OF PAKISTAN'S NSR

Architecture of Pakistan's NSR is based on three essential elements; Legislative and Regulatory Framework, Institutions and Organizations and Nuclear Security Systems and Measures

based on domestic nuclear security requirements and international initiatives / obligations.



*Note. **NCA comprises of all relevant ministries including Foreign Affairs, Interior, Defence and Finance.**

Abbreviations

PAEC	-	Pakistan Atomic Energy Commission
PNRA	-	Pakistan Nuclear Regulatory Authority
SEC	-	Strategic Export Control
NCA	-	National Command Authority
NDMA	-	National Disaster Management Authority
SECDIV	-	Strategic Export Control Division
PIEAS	-	Pakistan Institute of Engineering and Applied Sciences
NISAS	-	National Institute for Safety and Security
PCENS	-	Pakistan Centre of Excellence for Nuclear Security
NMAC	-	Nuclear Material Accounting and Control
NNDA	-	National Nuclear Detection Architecture

ELEMENTS OF PAKISTAN'S NSR

LEGISLATIVE AND REGULATORY FRAMEWORK

Pakistan has employed a comprehensive legislative and regulatory framework that governs the security of nuclear material, other radioactive material, associated facilities and activities. The framework also stipulates regulatory roles and responsibilities, set standards, defines offenses and punishments, outline monitoring and inspection mechanisms, and include administrative measures for the reception of licenses for the handling, transportation, storing, and transferring of nuclear and radioactive materials. Additionally, the framework also covers the operations of facilities using such materials. It also ensures that the facilities must remain under strict regulatory control and in compliance with the national regulations and licensing conditions throughout their life-cycles.

Pakistan through its independent regulator Pakistan Nuclear Regulatory Authority (PNRA), maintains the regulatory framework for physical protection of nuclear material, other radioactive substances and their associated facilities. Regulations on "Physical Protection of Nuclear Material and Nuclear Installations (PAK/925)" based on the IAEA INFCIRC/225/Rev.5 and CPPNM/A lays down regulatory requirements for physical protection of nuclear material(s) and nuclear installation(s); While, "Regulations on Security of Radioactive Sources (PAK/926)" addresses the regulatory requirements on 'Security of Radioactive Sources' and is based on IAEA 'Code of Conduct for Safety and Security of Radioactive Sources' and relevant documents.

Safe and secure transportation of radioactive material within the country is covered by national regulations on transport of

radioactive material that are in line with the international requirements. Import and export of all radioactive materials/ consignments also require authorization from the national regulator.

The primary national legislations are mentioned below, which are complemented by tertiary legislations (rules and regulations), policies and procedures:-

PAEC Ordinance 1965. The PAEC Ordinance, enacted in 1965, bestows statutory status upon the Pakistan Atomic Energy Commission (PAEC), granting it essential financial and administrative authority. Under this Act, the PAEC is empowered to conduct all necessary activities, including research, aimed at advancing the peaceful utilization of atomic energy in Pakistan. Additionally, it provides for the fulfilment of international commitments, adherence to relevant standards and guidelines, including the implementation of developmental projects related to nuclear power stations and associated matters.

Customs Act, 1969. Enacted in 1969. It entrusts statutory powers to custom officials to prohibit and assist to regulate import/ export of contraband items including infringement of copyright, counterfeit goods, precious metals, hazardous goods and implementation of national laws in general at country's entry and exit control points. This also includes the prevention of unauthorized import/ export of nuclear and radioactive materials, technologies, equipment and items on the Control Lists of the Nuclear Supplier Group (NSG).

Pakistan Nuclear Regulatory Authority (PNRA) Ordinance 2001

Pakistan's independent regulatory body PNRA functions in accordance with PNRA Ordinance promulgated in January 2001. Under this ordinance, PNRA is mandated to issue regulations/ regulate the nuclear and radiation safety and physical protection aspects of nuclear installations and radiation facilities. The Ordinance authorizes the PNRA to issues licenses; and inspects all such facilities to verify that regulations are being properly implemented.

This ordinance also empowers PNRA to regulate the extent of civil liabilities in case of nuclear damage and matters ancillary thereto. In order to ensure physical protection of nuclear material against unauthorized removal during its use, storage and transport and for protection against sabotage of nuclear material, PNRA has promulgated "Regulations on Physical Protection of Nuclear Material and Nuclear Installations, (PAK/925)" on 20 April 2019. This regulation takes into consideration IAEA's Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5) and the obligations of Convention on the Physical Protection of Nuclear Material (CPPNM) and its 2005 Amendment, international best practices and national experiences.

PNRA "Regulations on Security of Radioactive Sources (PAK/926)" was promulgated on 15 August 2018, which is harmonized with the provisions of the IAEA's 'Code of Conduct on Safety and Security of Radioactive Sources' and its two Supplementary Guidance documents on 'Import/ Export of Radioactive Sources' and 'Management of Disused Sources'. All

Regulations issued by the PNRA are available on its official website.

Salient Features - PNRA Regulations PAK/925

- Licensee to develop capabilities to detect, delay and respond to neutralize threats up to and including the Design Basis Threat (DBT) - Regulation 8(5).
- Safety and Physical Protection Interface are assessed and managed in a manner to ensure that they do not adversely affect each other and they are mutually supportive - Regulation 10 (1).
- Establish, maintain and implement insider mitigation measures to monitor the initial and continual trustworthiness and reliability of individuals - Regulation 18.
- Protect the computers, communication systems and networks associated with functions important to safety and physical protection from cyber attacks - Regulation 19.
- Protect technical means and procedures for access control against manipulation, falsification, or other form of compromise - Regulation 23(5), 24(2) (g) (iv).
- Control measures in inner area, protected area and limited access area as well as during transport - Regulation 25.
- Detection of unauthorized action by continuous surveillance, through two-person rule or other equivalent means, whenever an inner area is occupied - Regulation 25(2) (f).
- Physical protection system shall be designed to deny unauthorized access of persons or equipment to the targets, to minimize the opportunity to insiders - Regulation 28(2) (d).
- Control measures for protection against sabotage of equipment/ component in vital areas - Regulation 29(1).

Strategic Export Control Act (SECA) 2004. SECA was promulgated in September 2004 to strengthen non-proliferation measures including export control on sensitive and dual use goods/ technologies related to nuclear and biological weapons and their means of delivery. The act further strengthens controls on export of sensitive and dual use goods / technologies, consolidates and streamlines all previous legislative / regulatory arrangements. Salient elements of the act include:-

- Control over export, re-export, trans-shipment and transit of goods, technologies, material and equipment related to nuclear and biological weapons and their delivery system.
- Prohibition on diversion of controlled goods and technologies to unauthorized use.
- Wide jurisdiction (also includes Pakistanis visiting or working abroad).
- Comprehensive control lists and "Catch-All" provisions.
- Licensing and record keeping provisions.
- Control over transfer of technology by any means.
- Provides for an authority to Strategic Export Control Division (SECDIV) to administer rules and regulations framed under this legislation. Also provides for the establishment of an Oversight Board to monitor the implementation of this legislation.
- Penal provisions: Up to 14 years imprisonment and Rupees 5 million fine or both, and on conviction, confiscation of offender's property and assets.

NCA (National Command Authority) Act - 2010. The Act provides an over-arching cover to complete spectrum of activities under the purview of State's NSR. The Act has a wide jurisdiction and provides legal authority to regulate activities of various entities working within its domain. The Act has enabled the setting up of National Command Authority (NCA).

National Disaster Management Authority (NDMA) Act - 2010. It authorizes NDMA to:-

- Acts as the implementing, coordinating and monitoring body for Disaster Management.
- Prepares the National Disaster Management Plan.
- Implements, coordinates and monitors the implementation of the National Disaster Management Policy.
- Lays down guidelines for preparing disaster management plans by different ministries or departments and the provincial authorities.
- Provides necessary technical assistance to the provincial governments and the provincial authorities for preparing their disaster management plans in accordance with the guidelines.
- Coordinates response in the event of any threatening disaster situation or disaster.
- For any specific purpose or for general assistance requisition the services of any person and such person shall be co-opted member and exercise such power as conferred upon Chairman NNDA by the authority in writing.
- Promotes general education and awareness in relation to disaster management.

INSTITUTIONS AND ORGANIZATIONS

Pakistan Nuclear Regulatory Authority (PNRA). PNRA is the competent and independent body for the regulation of nuclear safety, physical protection, radiation protection, transport and waste safety in Pakistan. PNRA plans, develops and executes comprehensive policies and programs for the protection of life, health and property against the risk of ionizing radiation, and regulates the radiation safety. PNRA maintains a national register for all categories of radioactive sources. PNRA has an ongoing and active cooperation with various international institutes and organizations to improve its regulatory functions and to enhance competence of human resource. PNRA has issued various regulatory documents (like polices, regulations, regulatory guides, procedures etc) which are in line with IAEA guidance and international commitments.

National Command Authority (NCA). The Nuclear Security Regime in Pakistan is governed by the NCA, which has a well-defined, robust nuclear command and control structure and is chaired by the Prime Minister. It is the apex decision making body for all nuclear matters including nuclear security. All necessary legal, financial, administrative and institutional measures have been put in place for effective management of Nuclear Security Regime. NCA develops technical solutions through its Personnel Reliability Programme (PRP) and elaborate security as well as intelligence setups deals with issues related to nuclear security, non-proliferation and countering WMD terrorism.

Security Division. Security Division under NCA domain maintains a dedicated force; with integral land, airborne and sea-based response capabilities. It functions under the NCA with an

objective to ensure comprehensive nuclear security and physical protection with regards to nuclear and radiological materials and facilities through a multi-layered defence. It covers all kinds of threats based on DBT, to include; internal, external, insider, and cyber threats.

Pakistan Atomic Energy Commission (PAEC)

PAEC is the operator of nuclear facilities in Pakistan. Six (6) Nuclear Power Plants (NPPs) are currently operating in Pakistan and another NPP is under construction. Whereas, the first national nuclear power plant KANUPP-1 has entered into decommissioning phase.

The National Energy Security Plan is primarily focused upon installation of new nuclear power plants in order to meet the target of 8800 MWe of nuclear power by the year 2030 and on continued safe operation of plants.

PAEC has established three research centers for application of nuclear technology in agriculture and one for genetic engineering. Pakistan Radiation Services (PARAS) is a commercial industrial irradiator operational under PAEC which provides irradiation services to food, medical and pharmaceutical industries in Pakistan.

Nineteen nuclear medicine and oncology centres function under PAEC and are actively involved in the national cancer awareness, prevention, and diagnostics and treatment program. PAEC Nuclear Medical Centres (NMCs) are contributing up to 80% in the treatment of total cancer patients in the country. Over one million visits are made to these medical centres each year. Physical protection measures in these medical centres and a

Nuclear Power Plant have been upgraded with the assistance of IAEA. PAEC has established academic and on-job training institutes namely, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Karachi Institute of Power Engineering (KINPOE) and CHASHNUPP Centre of Nuclear Training (CHASCENT). Pakistan Institute of Nuclear Science and Technology (PINSTECH) is the premier R&D setup of PAEC and is operating 2 x Research Reactors. The scientists and engineers at PINSTECH also participate actively in joint research projects with various international scientific organizations including IAEA.

Strategic Export Control Division (SECDIV). Pursuant to Strategic Export Control Act, SECDIV was established in 2007 as part of the Ministry of Foreign Affairs to administer export controls. An Oversight Board was also set up in 2007 to monitor the implementation of Strategic Export Control Act 2004, including the formation and functioning of SECDIV. The national control lists are periodically reviewed to make these consistent with the lists and scope of export controls maintained by the Nuclear Suppliers Group (NSG), Australia Group (AG) and Missile Technology Control Regime (MTCR). SECDIV organizes international seminars/ conferences on various topics related to Strategic Trade Management. The latest such seminar on "Promoting Strategic Trade Controls through International Cooperation" was held in September 2022 which was attended by more than 200 participants including 36 foreign delegates.

Pakistan Customs. Within NCA domain, Pakistan Customs undertake operational management of National Nuclear Detection Architecture (NNDA) for prevention, detection, investigation and prosecution of all cases of attempt of illicit trafficking of nuclear or

radioactive material. It develops and enforces comprehensive SOPs to investigate, document and report all cases of innocent alarms, false alarms and actual alarms to NuRESC Directorate, for further reporting to IAEA through PNRA.

Pakistan's Centres of Excellence (CoEs). CoEs with its affiliated institutes i.e. Pakistan Institute of Engineering and Applied Sciences **(PIEAS)**, National Institute for Safety and Security **(NISAS)** and Pakistan Centre of Excellence for Nuclear Security **(PCENS)**; have grown as an important regional hub for imparting training and sharing best practices in the field of nuclear Safety, Security and Regulatory affairs.

PIEAS. PIEAS under PAEC conducts academic courses at post graduation level in nuclear security. PIEAS is successfully conducting academic courses in nuclear security to prepare young engineers/ scientists to take up nuclear security responsibilities in their future pursuits. Courses on 'Nuclear Security' and 'Physical Protection Systems' are also conducted at PIEAS on regular basis. PIEAS has been declared as an IAEA Collaborating Centre (CC) on 5 December 2019 to support Member States on research, development and capacity building in the application of advanced and innovative nuclear technologies. In addition to training in the national institutes, scientists and engineers working in PAEC are trained through fellow-ships, academic trainings and other research activities in different scientific fields with the

collaboration of IAEA and other international organizations. Master of Science (MS) in Nuclear Engineering Program with dedicated physical protection education lab at PIEAS offers courses to develop nuclear engineering expertise at post graduate level. Courses on 'Nuclear Security' and 'Physical Protection System' are a regular feature since 2009.

NISAS. NISAS functions under PNRA and organizes training courses for nuclear safety and security in the regulatory perspective for regulators and inspectors. NISAS has nuclear security labs established according to the IAEA standards. The labs include Radiation Detection Equipment Lab and Physical Protection Labs. Further, the Technical Support Unit of PNRA provides expert services for training, demonstration, and testing of radiation detection instruments. NISAS trains professionals, managers and technicians in the fields of nuclear safety and security and radiation safety. NISAS conducts a range of professional training courses, workshops and on-job trainings to build overall competency. During his visit to Pakistan in March 2014, IAEA Director General formally inaugurated NISAS. NISAS has so far conducted more than 535 training courses out of which 221 courses were related to nuclear security. Out of 221, 1 x International Training Course and 29 x National Training Courses were conducted in collaboration with IAEA and attended by 730 participants including 23 foreigners. Recently NISAS has been designated as an IAEA Collaborating Centre for nuclear security

trainings and technical support. NISAS conducts activities as per work plan agreed with the IAEA.

PCENS. PCENS conducts specialized courses in the fields of physical protection, nuclear security, threat assessment and personnel reliability program for the dedicated nuclear security force. The centre has state-of-the-art facilities including Simulation Labs, Physical Protection Interior and Exterior Laboratories, and other essential training facilities. It conducts specialized courses for the dedicated Nuclear Security Force functioning under Security Division, with a focus on physical protection of nuclear facilities, nuclear and radiological material at site and during transport, intelligence, Personnel Reliability Program (PRP), Material Control and Accountancy, Security Culture and Cyber Security. So far, 156 foreign participants from over 40 IAEA Member States have participated in various nuclear security training activities organized at PCENS. This is a reflection of collaboration between the IAEA and Pakistan, and demonstrates strong credentials in the realm of nuclear security. Pakistan is working to further develop and expand these training programs in collaboration with the IAEA to cover additional technical aspects with increased participation from countries of the region and beyond. Based on availability of training facilities, IAEA will conduct an annual, flagship Contingency Response Performance Testing (CRPT) Training Course for International students. PCENS also hosted the annual meeting of Nuclear Security Support Centre (NSSC)

Network in March 2016. It was the first time that IAEA held NSSC Network meeting outside Vienna. It was attended by 56 participants from 29 countries. About 4000 persons are trained in various nuclear security and physical protection subjects every year. Since its inception in 2014, about 42299 persons have been trained at PCENS.

Training Areas Offered by PCENS

- **Protective Force and Physical Protection**

  Security Soldier Basic Course, Quick Response Force, Special Response Force, Basic Level Physical Protection Course, Design Basis Threat Training, Vulnerability Assessment and Performance Testing, and, Security of Radiation Sources.

- **Security and Intelligence**

  Nuclear Security Culture, Cyber Security, Security Familiarization Training, Security and Counter-Intelligence and Intelligence Familiarization Training

- **Delay and Response**

  Passive and Active Barriers, Engagement, Communication to Response Force, Deployment of Response Force, Threat Neutralization, Personnel Reliability and Transportation of Nuclear Materials.

SYSTEMS AND MEASURES

Pakistan has deployed nuclear security systems and measures in accordance with national and international obligations. Multi-layered defence is the cornerstone of Pakistan's nuclear security architecture. A concept of 5Ds is followed to respond to these threats. These 5Ds include: deter, detect, delay, defend, and destroy.

Physical Protection System (PPS)

Physical protection of nuclear material, facilities and personnel is one of the important aspects of Pakistan's nuclear security architecture. A combination of performance based and prescriptive regulatory approach has been implemented at all nuclear installations that are based on the current evaluation of threat. PPS has been evolved suiting domestic environment, which is aligned with IAEA Nuclear Security Series Guidance and international best practices, suitably modified according to national/ local design basis threat requirements.

Dedicated force with core competencies is readily available for implementation of PPS. Pakistan has deployed modern technological solutions for physical protection measures including detection, delay and response at nuclear and radiation facilities and for transportation of nuclear and radioactive material.

Physical protection measures are comprised of personnel, equipment and procedures intended to prevent, detect, delay and extend appropriate response to neutralize a malicious act. This includes installation of intrusion detection systems, access control systems, delay barriers, search systems and Central Alarm Station. Physical protection measures are deployed in security areas that include limited access area, protected area, isolation zone and vital areas at nuclear installations. In addition, the airborne and sea-borne response capabilities of the force have also been strengthened.

Sustainability of PPS is ensured through allocation of required annual funding, enrolment of human and technical resources to cater for wastage and through a comprehensive and progressive training and re-training regime. An effective integrated

management system including quality management system has been developed and maintained to contribute towards sustainability of Pakistan's NSR. All organizations responsible for nuclear security and physical protection are encouraged to apply fundamental principles of physical protection as suited to their specific environment.

Nuclear Material Accounting and Control (NMAC). NMAC is an integral part of physical protection regime (IAEA INFCIRC/ 225/Rev. 5). Pakistan is implementing this program in accordance with its national requirements and international obligations. The goal is to have a holistic approach encompassing physical protection, nuclear security, safety, accounting and verification. A modern 'Material Control Accounting and Physical Protection' training facility is planned to be developed at PCENS for training of stakeholders and security personnel in this important area of Physical Protection Regime.

Intelligence. Timely detection calls for accurate intelligence of the threat. For this, NCA regime has an integral intelligence capability to help in identification of threat at the formative stage for an effective response. It has helped make the physical protection regime more pro-active and responsive.

Personnel Reliability Program (PRP). Pakistan has instituted a comprehensive Personnel Reliability Program in NCA regime which is aimed at identification of at-risk employees before they become a threat to nuclear safety and security. It ensures that personnel engaged in sensitive assignments are balanced in personality, behaviour, mental / physical health and professional traits, thus meeting the highest standard of reliability. Its ambit also encompasses that all individuals on induction are filtered

through the program and only suitable individuals from mental and psychological health perspective are selected.

Inspection and Evaluation. Pakistan has a comprehensive inspection and evaluation regime wherein all elements of physical protection system are regularly evaluated against the standards and design of the system against the DBT. Based on findings of the evaluation process, required improvements are affected.

Response and Mitigation. Nuclear Emergency Management System (NEMS) has been put in place to respond and manage nuclear or radiological emergencies. Under this system, the technical expertises are provided by PAEC and PNRA; administrative coordination is done by National Disaster Management Authority (NDMA); while NCA through Nuclear and Radiological Emergency Support Centre (NuRESC) offers its support to address nuclear or radiological emergency. NEMS aims at addressing complete spectrum of nuclear and radiological emergencies and issues of illicit trafficking with all stakeholders on board. It is based on ownership of responsibility, centralized control and decentralized execution. NuRESC, PERCC (PAEC Emergency Response Coordination Centre) and National Radiation Emergency Coordination Centre (NRECC) works in sync for a coordinated response to a nuclear and radiological emergency.

Nuclear and Radiological Emergency Support Centre (NuRESC). Under this system, all constituent organizations of NCA work in sync to combine their technical expertise, material resources and administrative coordination to address complete spectrum of nuclear and radiological emergencies through NuRESC being the implementing arm of NEMS. NuRESC also

coordinates and facilitates activities of its geographically deployed capabilities which include: Radiological Assistance Groups (RAGs), Hazard Assessment and Advisory Teams (HAAT), Aerial Survey and Surveillance Teams (ASST) and Radiation Emergency Medical Assistance Teams (REMAT). It also deters, detects, prevents and combats any attempt at illicit trafficking of nuclear and radiological materials through, National Nuclear Detection Architecture.

National Radiation Emergency Coordination Centre (NRECC). It is placed at PNRA, which coordinates for the response to nuclear accidents or radiological emergencies, both at national and international level. NRECC is a functional focal point to meet national and international responsibilities set under the obligations of the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, to which Pakistan is a State Party. It is equipped with dedicated and diverse communication facilities, radiation detection equipment, personnel protective equipment, mobile radiological monitoring laboratories and technical support teams. Among other activities, NRECC performs the technical assessment of information received from facilities and evaluation of recommendations for protective measures to ensure the protection of public and environment.

PAEC Emergency Response Coordination Centre (PERCC). Similar to NuRESC and NRECC, PAEC, being operator of nuclear facilities in Pakistan, has also established PERCC which operates round the clock, throughout the year. It has an interface with PNRA and other organizations working under the umbrella of NEMS. It also coordinates for the response to all safety and

security related events at PAEC facilities. PERCC acts as the central hub of communication and coordination in order to facilitate and streamline the process of timely information dissemination to stakeholders to arrange response efforts to affected PAEC facilities. PERCC is equipped with sophisticated communication equipment and supplemented by radiation detection equipment. Ten Mobile Labs are available to facilitate response actions during and after a nuclear or radiological emergency. As per need, PERCC renders support by providing Radiological Assistance Groups (RAGs) managed by PAEC at various sites and deployment of mobile labs. PERCC also arranges additional support from PAEC's sister organizations or from civil administration and Armed Forces through NuRESC Directorate, as per requirement.

National Nuclear Detection Architecture (NNDA). Pakistan is in the process of deploying NNDA to combat illicit-trafficking of nuclear and other radioactive materials. While such detection architects fully functional within NCA Regime, all entry/ exit points of the country are also being equipped with radiation detection equipment to detect and prevent illicit trafficking of nuclear and radioactive material. 'Technical Reach Back Support' is available to each entry/ exit point for assessment of detected consignment, its removal/ storage and testing/ maintenance and calibration of radiation detection equipment. An integrated Cargo Container Control (IC-3) facility is functional at Container Security Initiative (CSI) compliant Port Qasim near Karachi since 2007. RAGs have also been established which provide on-site support for radiation dose rate measurements, isotope identification of unknown sources, surface contamination checks and large-scale search and rescue of radioactive material out of regulatory control.

PAKISTAN AND IAEA

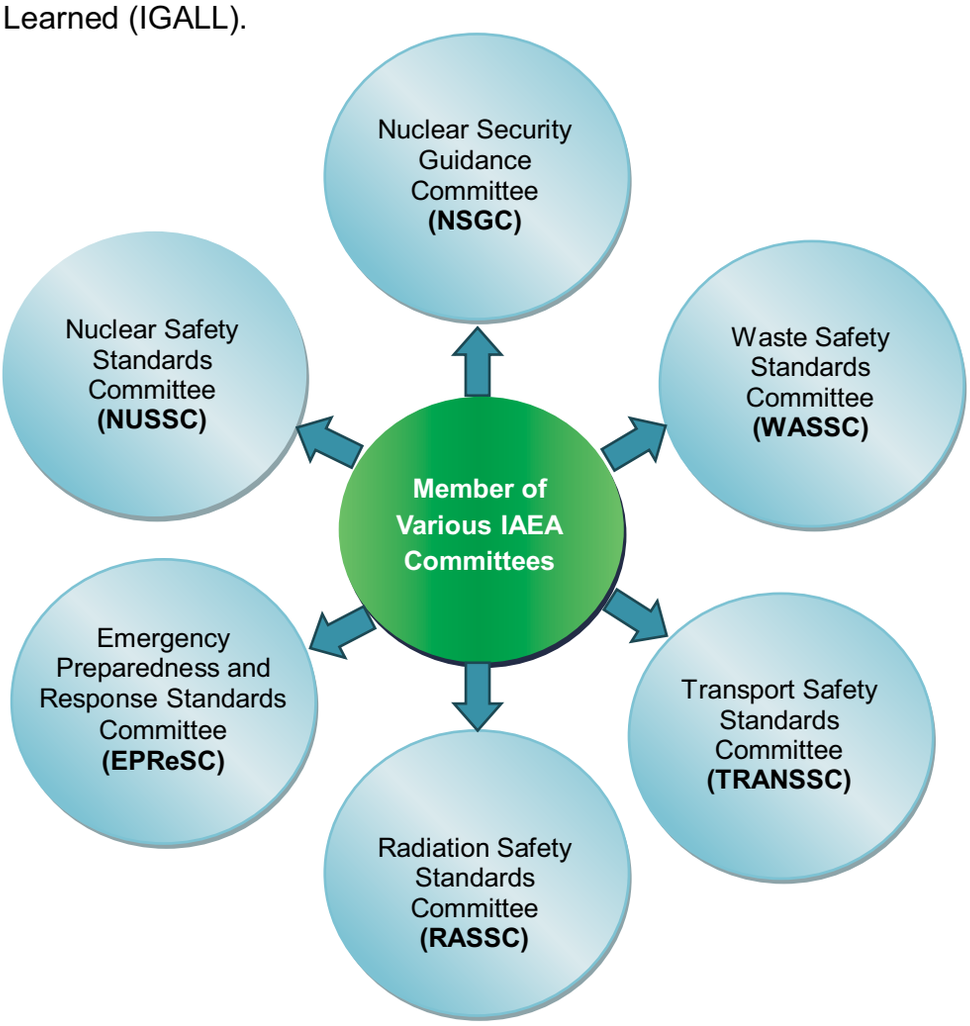
As a founding member of the Agency, Pakistan plays an active role in furthering the IAEA's initiatives to enhance nuclear, radiation, transport, and waste safety and security. This participation involves membership in various IAEA safety standard committees, commissions, and related forums/networks. Additionally, Pakistan engages in the activities of the International Nuclear Event Scale (INES) and International Reporting System (IRS). Pakistan voluntarily participates in IAEA's ITDB program and continues to support its objectives. Pakistan has contributed in the IAEA's Nuclear Security Fund and supports bolstering of IAEA's Nuclear Security Division.

Follow up IRRS Mission to Pakistan was conducted in 2022, which commended Pakistan's significant improvements in its regulatory infrastructure and for making it more efficient and effective. Pakistan is also preparing for IAEA IPPAS Mission and IAEA is being requested for 2nd IAEA IPPAS Workshop in 2nd Quarter of 2024.

Pakistan actively engages in joint international projects with IAEA, United Nations Scientific Committee on Effects of Atomic Radiation (UNSCEAR), and International System of Occupational Exposure (ISOE) to improve the national infrastructure for radiation protection. Pakistan is member of several IAEA's committees on safety and security including Advisory Group on Nuclear Security (AdSec) and Nuclear Security Guidance Committee (NSGC).

Pakistan is also a member of Nuclear Safety Standards Committee (NUSSC), Transport Safety Standards Committee

(TRANSSC), Waste Safety Standards Committee (WASSC), Radiation Safety Standards Committee (RASSC), Nuclear Security Guidance Committee (NSGC), Global Nuclear Safety and Security Network (GNSSN) and Commission on Safety Standards (CSS). Pakistan also coordinates with other forums like Response and Assistance Network (RANET), Regulatory Cooperation Forum (RCF), Radiation Safety Information Management System (RASIMS) and Ageing Management of Nuclear Power Plants: International Generic Ageing Lessons Learned (IGALL).



CONCLUSION

Pakistan remains mindful that nuclear security warrants continuous vigilance and unwavering commitment within an institutionalized framework. As a prime state responsibility, nuclear security assumes highest priority within the national security framework of the country. Pakistan nuclear security regime is also a dynamic, sustainable architecture incorporating both technological solutions and a well-trained human resource base. Developed and refined over time, this regime is adept at addressing diverse challenges and aligns closely with international guidelines and best practices.

The measures articulated in this document underscore Pakistan's unequivocal commitment to the objectives of nuclear security. Pakistan staunchly supports IAEA's role in coordinating international nuclear security efforts and assisting member states upon their request, affirming its dedication to this shared objective.

PICTORIAL VIEW

Glimpse of IAEA Dignitaries Visit to Pakistan's CoEs

Inauguration of NISAS by Ex Director General Yukiya Amano 14 Mar 2014

Inauguration of Physical Protection Exterior Labs at PCENS by Mr. Juan Carlos Lentijo, DDG IAEA on 14 Mar 2016

Signing of NISAS as an IAEA Collaborating Centre by DDG NSS IAEA and Chairman PNRA

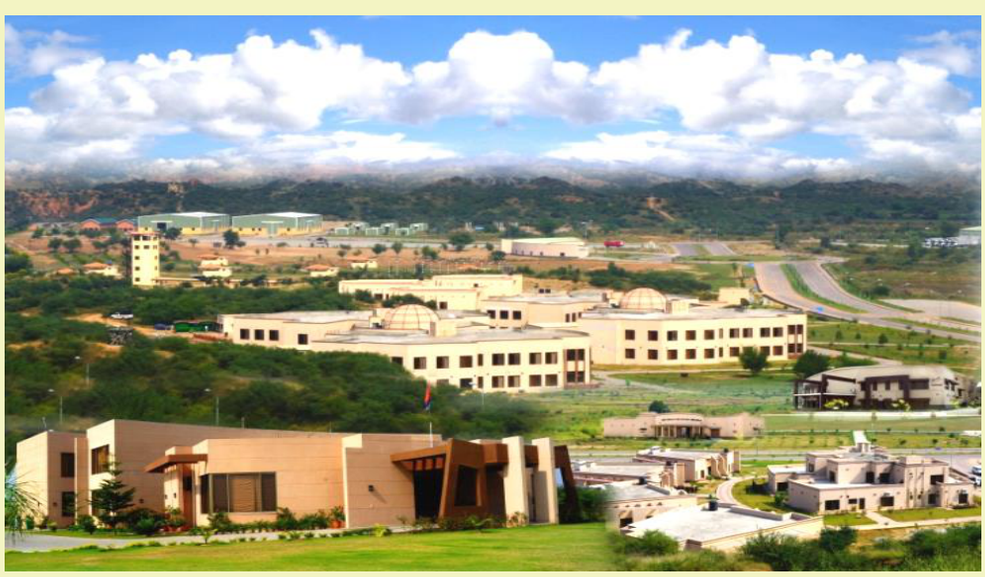
Visit of Dr Elena Buglova,Dir NSNS Jan 2023

Visit of DG IAEA Rafael Mariano Grossi Feb 2023

Pakistan's Centres of Excellence (CoEs)

Pakistan Institute of Engineering and Applied Sciences (PIEAS)

National Institute for Safety and Security (NISAS)



Pakistan Centre of Excellence for Nuclear Security (PCENS)

Glimpse of Training Activities at Pakistan's CoEs