Pakistan’s Nuclear Security Regime

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Security consciousness is an integral part of Pakistan’s nuclear program. Pakistan has established a comprehensive and an effective national nuclear security regime.

A robust nuclear security culture has evolved over a period of time that has helped strengthen nuclear security regime, which covers nuclear material and other radioactive material, and associated facilities and activities throughout their lifecycle.

**Nuclear Security**

The International Atomic Energy Agency (IAEA) defines nuclear security as prevention of, detection of, and response to, criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities, or associated activities.¹

The responsibility for nuclear security within a State rests entirely with the State, which has to ensure the security of nuclear material, other radioactive material, associated facilities and activities under its jurisdiction. A comprehensive nuclear security regime is therefore, much more than the physical aspects of nuclear security. Pakistan’s national nuclear security is built on following three pillars:

- **Legislative and regulatory framework** and administrative systems and measures governing the security of nuclear material, other radioactive material, associated facilities and activities
- **Institutions and organizations** within the State responsible for ensuring the implementation of the legislative and regulatory framework and administrative systems of nuclear security
- **Nuclear security systems and measures** meant for the prevention, detection and response to nuclear security events

### Legislative and Regulatory Framework

The legislative and regulatory framework includes establishing independent regulatory bodies with adequate legal authority to fulfill their assigned nuclear security responsibilities.

**Legislative Framework.** Pakistan has developed comprehensive legislative framework to manage nuclear and radiological matters. In order to cover the entire spectrum of activities, the *National Command Authority (NCA) Act* was promulgated in 2010. The Act has a wide jurisdiction and provides adequate legal authority to regulate

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¹ IAEA Nuclear Security Fundamentals, Nuclear Security Series No. 20.
activities of various entities working under the Strategic Plans Division (SPD) – the Secretariat of the NCA.

Pakistan Atomic Energy Commission (PAEC) Ordinance was promulgated by the President of Pakistan on 27 May 1965. Under this Ordinance, PAEC became a statutory body with requisite powers subject to the provisions of the Ordinance.

Pakistan Nuclear Regulatory Authority (PNRA) Ordinance was promulgated in 2001. PNRA regulates the nuclear and radiation safety aspects of nuclear installations and radiation facilities; grants authorization; issues licenses; and inspects all such facilities to verify that regulations are being properly implemented. PNRA also issues No Objection Certificates (NOCs) to importer and exporter of radioactive sources and Radiation Free Certificates for exportable food items. Transportation and disposal of radioactive materials also fall under the purview of PNRA, In addition, PNRA ensures that effective preparedness, coordination and measures for managing nuclear and radiological accidents and emergencies is maintained by the licensees.

Export Control Act on Goods, Technologies, Material and Equipment related to Nuclear and Biological Weapons and their Delivery Systems was promulgated in 2004. It strengthened export controls on sensitive and dual use goods/technologies particularly related to nuclear and biological weapons and their means of delivery. Salient elements of the Export Control Act include:

- Controls over export, re-export, trans-shipment and transit of goods, technologies, material and equipment covered under the Control List. Prohibition of diversion of controlled goods and technologies.
- Wide jurisdiction (also includes Pakistanis visiting or working abroad).
- Provide for an authority 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.
- Prohibition on diversion.
- Control over transfer of technology by any means.
- Comprehensive control lists and catch-all provisions.
- Licensing and record keeping provisions.
- Penal provisions: Up to 14 years imprisonment and Rs 5 million fine or both, and on conviction, confiscation of offender’s property and assets.

Regulatory Framework. Pakistan has a comprehensive regulatory framework to govern security of nuclear material, other radioactive material, associated facilities and activities. The authorization/ licensing, review and assessment, development of regulatory framework, inspection and enforcement processes are aimed at ensuring that nuclear facilities remain under strict regulatory control and in compliance with the national regulations and license conditions throughout their lives.

Safe and secure transportation of radioactive material in the country is ensured through 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.

Institutions and Organizations

The nuclear security regime in Pakistan is mainly governed by the SPD on behalf of the National Command Authority (NCA), which is 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. Several legal, administrative and institutional measures have been put in place that continue to work in synergy, to achieve national objectives.

**Strategic Plans Division (SPD)** functions as the Secretariat of NCA, and develops technical solutions, Personnel Reliability Programme (PRP), and elaborate intelligence and security setups to deal with issues related to nuclear security, non-proliferation and WMD terrorism. Two dedicated organizations, namely Security Division and Intelligence Division, function under the SPD with an objective to ensure overarching nuclear security with regards to nuclear and radiological material associate facilities and activities of entire Pakistan's nuclear program through a multi-layered defence and covers all kinds of threats including insider, outsider or a cyber threat.

**Pakistan Atomic Energy Commission (PAEC)** is the operator of nuclear facilities in Pakistan. It is operating three nuclear power plants (NPPs). Four more NPPs are under construction. It has established three research centres for application of nuclear technology in agriculture and one for genetic engineering.

Eighteen nuclear medicine and oncology centres function under PAEC and it is actively involved in the national cancer awareness, prevention, and diagnostics and treatment programme. PAEC cancer hospitals are contributing up to 70% in the treatment of total cancer patients in the country. More than 0.7 million visits are made to these hospitals each year. For development of human resource, PAEC has established academic and on-the-job training institutes namely, the Pakistan Institute of Engineering and Applied Sciences (PIEAS), Karachi Institute of Power Engineering (KINPOE) and CHASNUPP Centre of Nuclear Training (CHASCENT). PIEAS has started a program on Nuclear Security Education as a sub-speciality of MS Engineering in 2009. Courses on ‘Nuclear Security’ and ‘Physical Protection Systems’ are also being run at PIEAS on regular basis. In addition to training in the national institutes, scientists/engineers working in PAEC are trained through fellowships, academic trainings and other research activities in different scientific fields with the collaboration of IAEA and other international organizations.

**Pakistan Institute of Nuclear Science and Technology (PINSTECH)** is the premier R&D setup within PAEC. It has some of the most advanced operational research facilities and carries out multidisciplinary research. The scientists and engineers at PINSTECH also participate actively in joint research projects with various international scientific organizations including IAEA.
Pakistan Nuclear Regulatory Authority (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 programmes for the protection of life, health and property against the risk of ionizing radiation, and regulates the radiation safety. Pakistan also has an ongoing and active cooperation with various international institutes and organizations to improve its regulatory functions and to enhance competence of human resource.

Strategic Export Control Division (SECDIV) was set up 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 Export Control Act 2004, including the formation and functioning of SECDIV. The Control Lists that are periodically reviewed are 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).

Pakistan Centre of Excellence on Nuclear Security (PCENS) is a state of the art training facility which has been established to train dedicated security force, with a focus on
security, intelligence, counter-intelligence and technical training. Major areas that form part of nuclear security training at PCENS include:

- **Protective Force and Physical Protection**: Courses offered in this module are 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**: Courses taught in this module are Nuclear Security Culture, Cyber Security, Security Familiarization Training, Security and Counter-Intelligence, Intelligence Familiarization Training etc.

- **Material Control and Accounting**: This includes training on intrusion sensing, alarm communication, alarm assessment, entry control, measurements, radiation monitoring and inventory.

- **Delay and Response**: Training in this module is focused on passive and active barriers, engagement, communication to response force, deployment of response force, threat neutralization, Human Reliability Programme (HRP), and, transportation of nuclear materials.

At the 2012 Seoul Nuclear Security Summit (NSS), Pakistan offered its PCENS to act as a regional and international hub for capacity building of officials and security personnel. Various national and international courses are being conducted at PCENS in collaboration with the IAEA. PCENS 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 its headquarters in Vienna. It was attended by over 50 participants from 33 countries. The key themes of the event underscored that NSSC establishment can lead to enhancement of national human resource development capabilities, strengthen technical and scientific support programmes, and build robust national capacity in nuclear security. IAEA itself acknowledged that “Holding the meeting in Islamabad provided Network members an opportunity to gain first-hand experience of an NSSC and to receive an account of lessons learned by Pakistan in establishing the centre.”

![Figure 4 - During his visit to Pakistan in March 2014, IAEA Director General Yukiya Amano met with Prime Minister Nawaz Sharif and visited Pakistan's nuclear security facilities, including PCENS.](image)

**National Institute of Safety And Security (NISAS)**, functioning under PNRA, trains professionals, technicians and managers in the fields of nuclear safety and security and radiation safety. NISAS conducts a range of professional training courses, workshops
and on-the-job trainings to build overall competency. During his visit to Pakistan in March 2014, IAEA Director General Yukiya Amano inaugurated NISAS.

Following graph depicts the trainings conducted by PNRA focused at nuclear safety and security:

### Systems and Measures

Multi-layered defence is the cornerstone of Pakistan's nuclear security architecture. It covers all kinds of nuclear threats, be it insider, outsider or cyber threat. A concept of 5Ds is followed to respond to these threats. These 5Ds include: deter, detect, delay, defend, and destroy. Various systems and measures have been introduced for the prevention, detection and response to nuclear security events.
**Prevention.** Physical protection of nuclear material and nuclear facilities is one of the important aspect of over all nuclear security arrangement. The genesis of physical protection of nuclear material and nuclear facilities and security of radioactive sources goes back to decades when safety and security was being managed by the Pakistan Atomic Energy Commission (PAEC). IAEA document INFCIRC/225, “Physical protection of Nuclear Material and Nuclear Facilities” is being used as the basis for regulating and licensing of nuclear power plants. IAEA Code of Conduct on Safety and Security of Radioactive Sources is also being used as a guideline for regulating radioactive sources.

**Detection.** At the national level, to prevent illicit trafficking of nuclear and other radioactive materials, Pakistan has adopted certain measures to formulate national detection architecture. For timely detection of material out of regulatory control (MORC), SECDIV in collaboration with PNRA has equipped designated entry/exit points for trade/transit with radiation detection equipment, under the Nuclear Security Action Plan (NSAP). An integrated Cargo Container Control (IC-3) facility is functional at Port Qasim near Karachi since 2007. This port is CSI (Container Security Initiative) compliant.

For interior detection architecture, Pakistan is equipping its response organizations with radiation detection equipment for detection and initial response to nuclear security incident/event. *Mobile Expert Support Teams (MEST)* 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 MORC.

**Response.** *Nuclear Emergency Management System (NEMS)* has been put in place to respond and manage nuclear or radiological emergencies. Under this system, the technical expertise would be provided by PAEC and PNRA; administrative coordination would be done by National Disaster Management Authority (NDMA); while SPD would offer 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.

*Nuclear and Radiological Emergency Support Centre (NURESC)* is the implementing arm of NEMS. It is the focal point at national level to deal with entire spectrum of nuclear and radiological emergencies. NURESC coordinates and facilitates activities of its geographically deployed tools which include: Radiological Assistance Groups, Hazard Assessment and Advisory Teams, Aerial Survey and Surveillance Teams, and Radiation Medical Assessment Teams. It also deters, detects, prevents and combats any attempt at illicit trafficking of nuclear and radiological materials through enhancing capacity of National Nuclear Detection Architecture. NEMS dovetails other national stakeholders and response organizations and works with them hand in glove.

*National Radiation Emergency Coordination Centre (NRECC)* coordinates for the response to nuclear accidents or radiological emergencies, both nationally and abroad. NRECC is a fully 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, personal 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. It also maintains proportional preparedness in support of licensees and public authorities. NRECC also conducts and participates in different types of exercises/drills like Communication Test Exercises (COMTEX), Mobile Radiological Monitoring Laboratory (MRML) Exercises, IAEA Convention Exercises (Convex) to test the availability and accuracy of contact points and ability to swiftly and securely exchange information during emergency situation.

**Material Protection Control and Accounting (MPC&A) Programme.** This programme is being implemented in accordance with Pakistan’s national requirement and international obligations. The goal is to have a holistic approach encompassing physical security, safety, accountability and verification.

**International Obligations**

**Adherence to 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), 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). In March 2016, Pakistan ratified the Amendment to the CPPNM.

![Figure 5: Ambassador Ayesha Riyaz, Representative Permanent Mission of Pakistan to the International Organizations in Vienna, submitting Pakistan's instrument of ratification of the CPPNM Amended) to IAEA Director General Yukiya Amano.](image)

**UNSC Resolution 1540.** It aims to prevent the proliferation of weapons of mass destruction and its delivery systems to non-state actors. Pakistan has been proactively fulfilling its obligations under the UNSCR 1540 and has so far submitted four national
reports which provide details of all measures taken to achieve the objectives of UNSCR 1540.

**International Cooperation**

Pakistan has been actively participating and contributing in the IAEA efforts to promote nuclear, radiation, transport and waste safety and security. As a member of various IAEA safety standard committees, commissions and other related forums/networks, PNRA is working to promote nuclear safety and security. In addition, Pakistan participates in the activities of International Nuclear Event Scale (INES) and International Reporting System (IRS). Pakistan voluntarily adheres to IAEA’s “Code of Conduct on Safety and Security of Sealed Radioactive Sources.”

Pakistan also takes part 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. It also participates in IAEA programs for updating Basic Safety Standards and radiation protection practices. 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).
**Nuclear Security Summit (NSS) Process.** Pakistan has been 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 held so far and made a significant contribution in the process.

**Global Initiative to Combat Nuclear Terrorism (GICNT).** Pakistan joined GICNT in 2007 and has been proactively participating in its various activities for sharing and learning of international best practices.

**Incident and Trafficking Data Base (ITDB).** Pakistan voluntarily participates in IAEA's ITDB program and continues to support its objectives.

**Conclusion**

As a responsible nuclear weapon state, Pakistan has taken exhaustive measures for enhancing its nuclear security. Through sheer hard work and diligent efforts, Pakistan has established a comprehensive and robust nuclear security regime. Pakistan is confident of its ability to counter all kinds of nuclear security threats but is not complacent.