Indian Diplomacy At Work

NUCLEAR SECURITY IN INDIA

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Nuclear security is the prevention and detection of, and response to unauthorised removal, sabotage, unauthorised access, illegal transfer or other malicious acts involving nuclear or radiological material or their associated facilities. Nuclear security thus differs from nuclear safety, which involves prevention of and protection against accidents involving such material or related facilities that could give rise to radiation risks. In common parlance nuclear security gets equated with nuclear terrorism using stolen or improvised nuclear devices and/or Radiological Dispersal Devices (RDDs). However, as the above definition used by the International Atomic Energy Agency (IAEA) shows, nuclear security deals with a broader set of threats, including sabotage, conventional attacks on nuclear or radiation facilities and breaches of regulations governing transfers of technology and nuclear or radiological materials including during transport.

The scale and scope of India's civil nuclear programme is unique for a developing country. India has twenty operating nuclear power plants, a range of fuel cycle facilities from mining of uranium and thorium to reprocessing plants and fast reactors, and a large, expert human resource in nuclear science and technology spread over a variety of research labs and institutions. Nuclear energy is slated to play an increasingly

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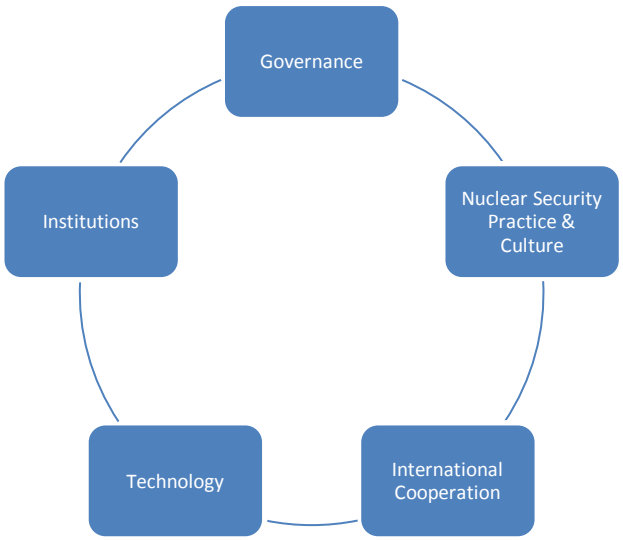
important role in India's energy security and sustainable development plans. The country is looking at a target of 60,000 MW of electricity production by 2030 from a range of reactors – indigenous Pressurised Heavy Water Reactors (PHWRs), now standardized at 700 MW per reactor Light Water Reactors (LWRs), set up in technical collaboration with foreign vendors such as the one that achieved criticality in 2013 at Kudankulam in the south of the country recently, as well as the indigenous Fast Breeder Reactors (FBRs) that can generate more fuel for the future and create the base for the utilization of the country's abundant thorium resource.This strategy calls for a significant set of measures, such as civil nuclear cooperation agreements with international partners, uranium supply arrangements, fabrication of a variety of fuels, construction of new facilities and human resource development, which are moving apace.

India is no stranger to nuclear security. At the dawn of India's nuclear power programme, Prime Minister Nehru minuted that source material for nuclear energy was not an ordinary commodity and needed to be handled with care. India

participated actively in international discussions on safeguards for the peaceful uses of nuclear energy and became a founder member of the IAEA in 1957, a year after its first reactor went critical. India has been implementing IAEA safeguards on its civilian nuclear facilities for more than four decades. Conscious of the need to protect the Indian public against exposure to harmful radiation and as party to IAEA Conventions on Nuclear Safety and Security, in particular the 1980 Convention on the Physical Protection of Nuclear Material and its amendment in 2005, Code of Conduct in Safety and Security of Radioactive Sources, 2006 it has also been following the highest international standards on nuclear and radiological safety and security.

India's approach to nuclear security



Five elements of India's approach to Nuclear Security

Prototype Fast Breeder Reactor (PFBR) at Kalpakkam, India

Governance framework

Laws such as the Atomic Energy Act of 1962 and the Rules and Notifications issued under them such as Rules on Safe Disposal of Radioactive Waste (1987) and Radiation Protection (2004) form the backbone of India's framework for governance of nuclear activities. The Foreign Trade Development & Regulation Act (FTDR) of 1992 and the Weapons of Mass Destruction (WMD) Act of 2005 provide additional legal authority for controlling nuclear trade and transfers. The FTDR has been amended in 2010, inter alia, to strengthen safeguards against leakage of technology and Guidelines for Nuclear Transfers have been issued in July 2010 under the Atomic Energy Act to regulate trade by authorized entities, including foreign partners. While this is not *strict sensu* a nuclear security issue, AERB guidelines for use of radioisotope-based scientific devices have been strengthened following a safety incident involving a disused device in the Mayapuri area of New Delhi in 2010.

Institutions

Set up under the Atomic Energy Act, the Atomic Energy Regulatory Board (AERB) has been functioning independently of the nuclear power operator in India since 1983. AERB's focus has been on both nuclear safety and security of civilian facilities. Separate institutions and operating procedures exist for nuclear security at India's strategic facilities. A Nuclear Controls & Planning Wing (NC&PW) has been created in the Department of Atomic Energy (DAE) as of 2013 to integrate DAE's safeguards, export controls and nuclear security related activities. The NC&PW takes the lead on international cooperation on nuclear security in collaboration with the Ministry of External Affairs. Extensive use of information technology in various systems and growing concerns of potential attacks on these systems are addressed by the Computer Information and Security Advisory Group (CISAG) which audits the information systems periodically. It has also put in place plans and guidelines to counter cyber attacks and mitigate its adverse effects. Specific guidelines are under preparation to deal with network related risks to control and instrumentation systems used in various installations.

Nuclear Security - Practice & Culture

Nuclear security within the boundary of a nuclear facility in India has to be integrated with the technology design of the facility and is reviewed by the AERB. India has a national Design Basis Threat (DBT) document and each facility has to devise their own DBT document based on national DBT for designing physical protection system at its facility. The Indian DBT takes into account the existing threat from saboteurs, thieves, terrorists and possibly other malicious actors, their characteristic capabilities and tactics as well as possibility of collusion with insiders. A specially trained paramilitary force - the Central Industrial Security Force (CISF), which works under the Ministry of Home Affairs, is deployed at nuclear facilities and functions under a senior Indian Police Service (IPS) officer who can coordinate for additional forces as required. CISF personnel deployed at nuclear facilities are rotated regularly and undergo specific training programmes.

India can justifiably take pride in its nuclear security culture - Not a single serious security incident has taken place in more than five decades of the Indian Nuclear Programme

In addition to CISF, other national level organizations are also involved in DBT assessment and nuclear security audits. A variety of surveillance, detection, delay, response and access control measures are in place at Indian nuclear facilities in a graded manner over four layers surrounding the most sensitive parts of the facility. Physical protection system is also being regularly audited by a team of independent regulatory body (AERB). India's national system of Nuclear Material Accounting & Control (NUMAC) and personnel reliability measures play important roles in the daily practice of nuclear security.

India can justifiably take pride in its nuclear security culture, fostered by institutions such as the BARC Training School. Not a single serious security incident has taken place in more than five decades of the Indian nuclear programme and the credit in.

large measure goes to human element .

Technology

There are two aspects to the technological dimension nuclear security in India. The first is the design and deployment of portals, radiation detectors, secure communication networks, Radio Frequency ID cards, real time tracking systems for secure vehicular transport, infra-red cameras with video analytics, sensors, barriers and similar technologies. Most of these technologies have been developed in-house. The second dimension is proliferation resistant technology and procedures for nuclear fuel cycle technologies which reduce the risk of a nuclear security or safety breach. India is pursuing a closed fuel cycle with '**reprocess to reuse**' of plutonium that avoids both the buildup of stockpiles as well as the need to store large amounts of spent fuel in underground repositories that could turn into easy to access plutonium mines for malefactors in the future. Indian scientists are also working on the design and deployment of proliferation resistant reactor designs such as the Advanced Heavy Water Reactor (AHWR) using thorium and U^{233}, which is associated with high energy gamma-emitter U-232, that makes access and use by unauthorized non-state actors difficult. India has also developed technologies for vitrification of waste that have the additional benefit of making access to high level waste by terrorists wanting to fabricate a radiological device, difficult.

International Cooperation

> India is party to all the 13 universal instruments accepted as benchmarks for a State's commitment to combat international terrorism. This includes the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT).

> India is party to the Convention on the Physical Protection of Nuclear Material (CPPNM) and is amongst the countries which have also ratified the 2005 amendment to the Convention.

> India supports the fifth revision of the recommendations contained in IAEA's INFCIRC/225.

> India supports the 2003 IAEA Code of Conduct on the Safety and Security of Radioactive Sources and has voluntarily adopted its provisions.

> India adheres to the Nuclear Suppliers Group's guidelines on supply of nuclear items, including for physical protection of nuclear material and facilities.

Tackling nuclear security threats, including nuclear terrorism, requires international cooperation today. India is a party to all the thirteen anti-terrorism conventions including the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT). It is party to the Convention on the Physical Protection of Nuclear Material (CPPNM) and its 2005 Amendment that among other things brought domestic transportation of nuclear material under the ambit of the Convention. India applies IAEA's guidance on physical protection of nuclear material as contained in the document INFCIRC/225/Rev 5 and adheres to the Nuclear Supplier Group (NSG) Guidelines on nuclear transfers and related conditions. India has been an active participant in IAEA's safeguards system and has voluntarily placed civilian facilities under safeguards in accordance with its safeguards agreement with the IAEA. While the World Association of Nuclear Operators (WANO) has conducted peer reviews of Indian power plants earlier, post-Fukushima, India has invited IAEA's

OSART for safety review of two units at Rajasthan; a regulatory peer review of AERB has also been requested of the IAEA. India has recently contributed USD 1 million to the IAEA's Nuclear Security Fund (NSF).

At the UN, India has sponsored a resolution since 2002 on WMD terrorism and has supported the implementation of the 2004 UN Security Council Resolution 1540 on prohibiting WMD related transfers to non-state actors. India has submitted a national report on the 1540 as well as updates to that report. An international workshop on UNSCR 1540 and new dimensions in nuclear security was hosted by India in November-December 2012.

India participates in the IAEA's Illicit Trafficking Database (ITDB), which was established in 1995 and disseminates information on confirmed reports about illicit trafficking and other unauthorized activities and events involving nuclear radioactive materials to the States. Since 2007, India is a party to the Global Initiative to Combat Nuclear Terrorism and has participated in its working groups on nuclear detection, nuclear forensics and response and mitigation. India also cooperates with the Interpol's Radiological and Nuclear Terrorism Prevention Unit and the World Customs Organization on nuclear trafficking issues.

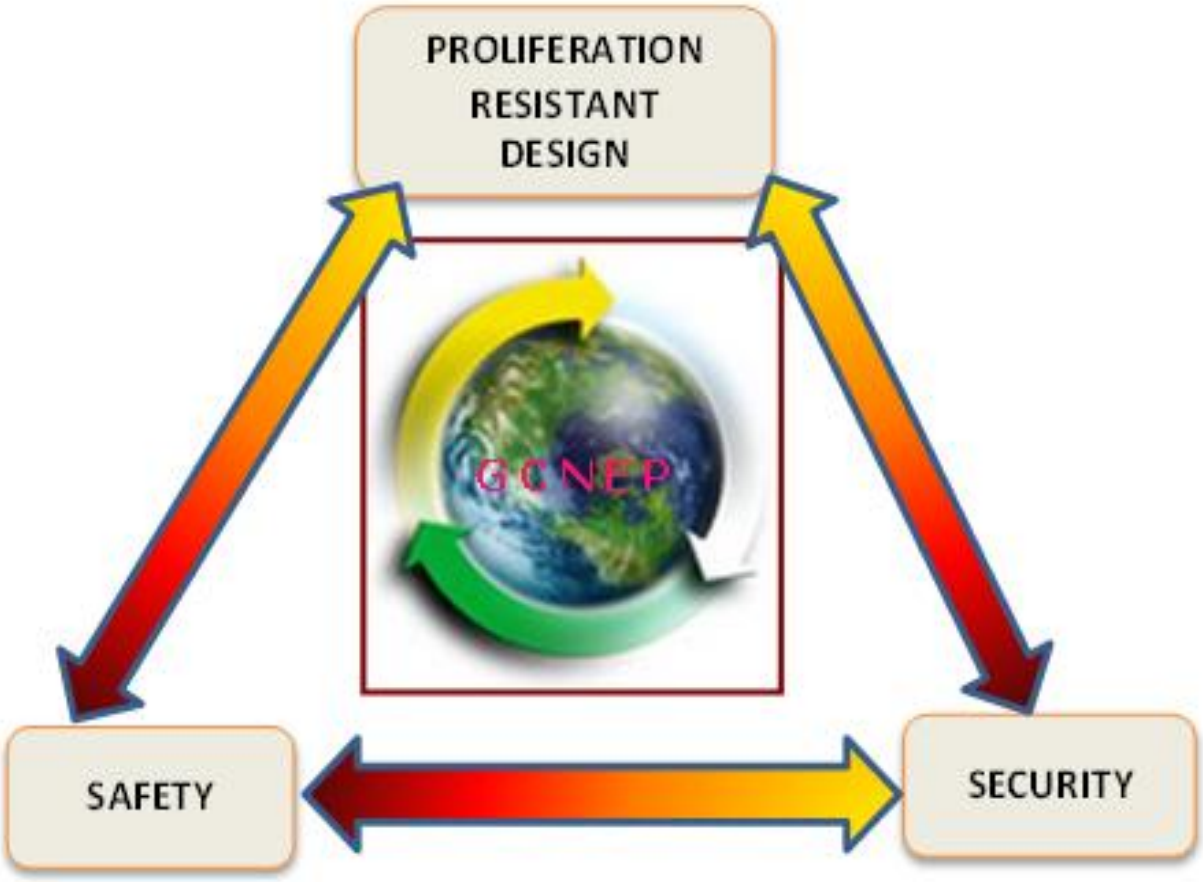
India has an impeccable record on nuclear nonproliferation

Apsara Research Reactor

Nuclear Security Summit communiqués have underlined the need to reduce reliance on Highly-Enriched Uranium (HEU) for research reactors. India has taken the lead by taking out the enriched uranium based fuel in its oldest research reactor, APSARA, and moving it to a safeguarded facility in December 2010. APSARA will use indigenous fuel which is not high enriched uranium.

A significant current aspect of India's international cooperation is its participation in the Nuclear Security Summit (NSS). The Prime Minister Dr Manmohan Singh participated at the 2010 Washington and 2012 Seoul Summits and India hosted a meeting of the NSS Sherpas in New Delhi in January 2012. At the 2010 Summit, PM announced the setting up of a Global Centre for Nuclear Energy Partnership (GCNEP), as a centre of excellence on nuclear security.

Global Centre for Nuclear Energy Partnership (GCNEP)



The foundation stone was laid on January 3, 2014 at Kheri Jassaur in Haryana state after completing the acquisition of 234 acres of land for the campus for GCNEP. Off-campus courses have begun as of end-2011. They include courses on topics such as vulnerability assessment and physical protection. MoUs on cooperation on GCNEP have been signed with the IAEA, France, Russia and the U.S. and a draft MoU is under finalization with the UK. The Centre is expected to begin on-campus operations by end-2015.

GCNEP Schools

1.School of Advanced Nuclear Energy System Studies (SANESS)
2.School of Nuclear Security Studies (SNSS)
3. School on Radiological Safety Studies (SRSS)
4. School of Nuclear Material Characterization Studies (SNMCS)
5. School for Studies on Applications of Radioisotopes and Radiation Technologies (SARRT)

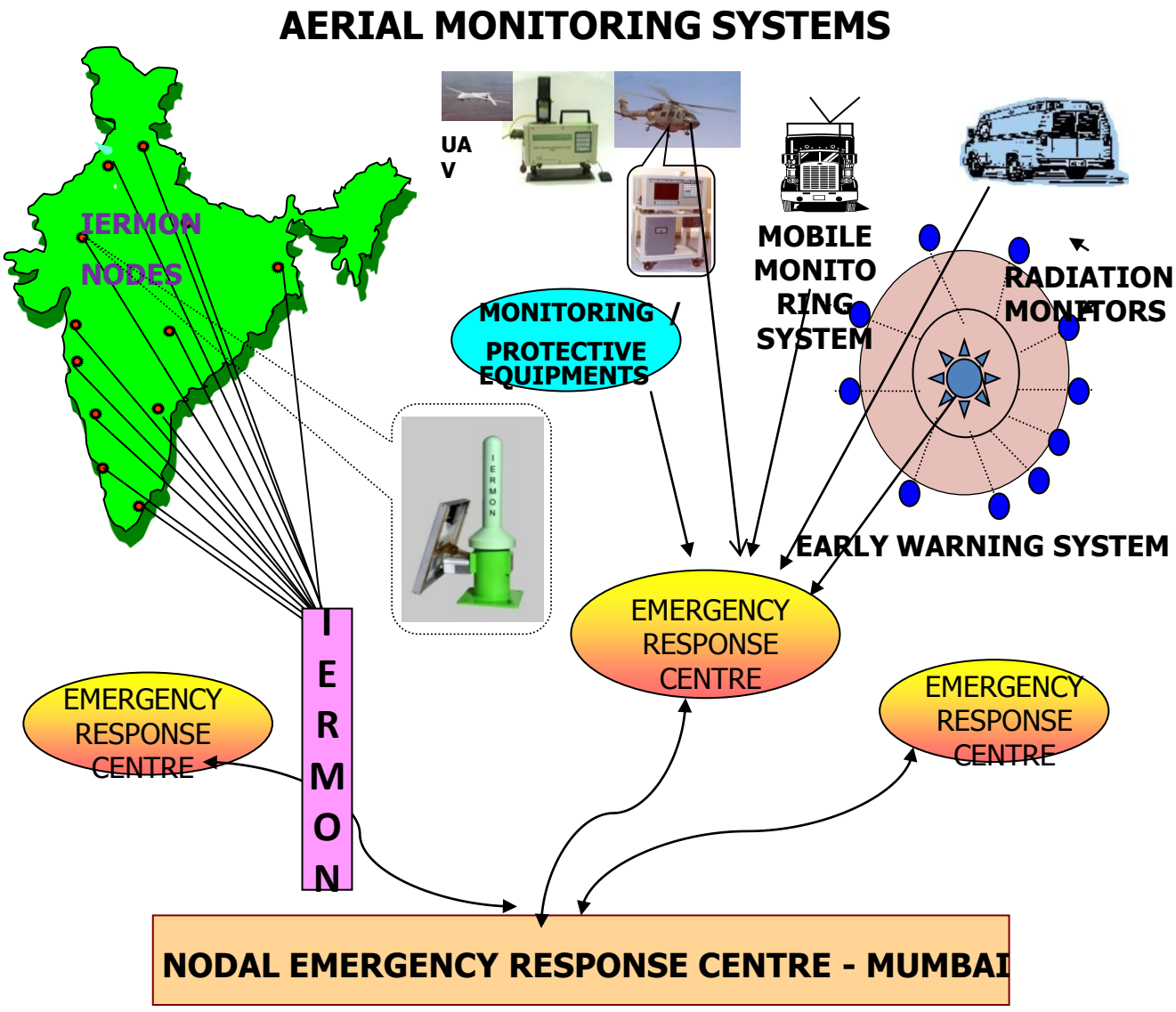
Courses conducted so far

Three international training courses on **Nuclear Security, 11** national training courses on Food Irradiation, Prevention and Response to radiological threats, nuclear security , nuclear material accounting and control , radiochemistry and application of Radioisotope and two public outreach programme conducted so far.

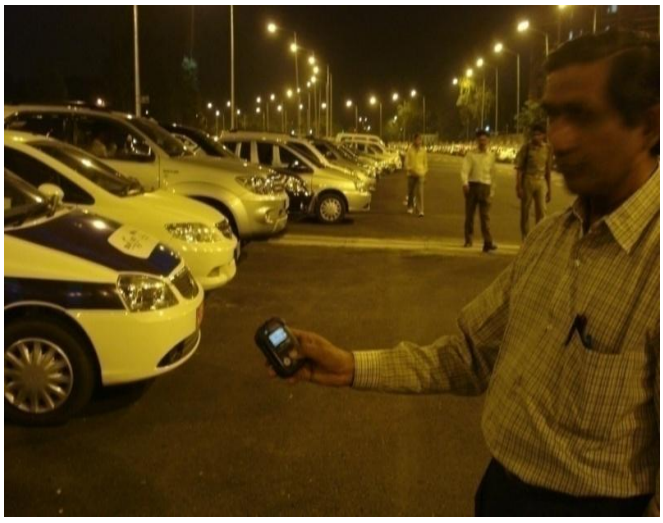
At SNSS -Regional Training Course for Design & evaluation of physical protection system for nuclear material and facilities from 18 -22 Nov, 2013 at Mumbai, India

During one of its Public Outreach Programme

National Radiological Monitoring System-IERMON



BARC has established a countrywide environmental radiation-monitoring network IERMON. The network has 25 stations across the country. IERMON provides: On-line information about radiation levels at various locations in the country to emergency control rooms of DAE facilities ; data on background environmental radiation levels and long term shift in the background levels;data for environmental impact assessment following nuclear emergencies.



Ensuring Radiological Security & Safety during the Commonwealth Games at New Delhi in 2010

Aerial Gamma Spectrometry System

Development of First Responders for Response Capability at the National Level

How to handle a suspected ‘RDD’ or ‘RED’

Portable Personal Decontamination Unit

Training courses for the FIRST Responders to Nuclear /Radiological emergencies (NDRF, Police, Fire Brigade & Civil Defence)

Conclusion

It is natural for India to be an active participant in current efforts to strengthen nuclear security given its nuclear programme and expertise, its interest in expansion of civil nuclear energy in safe and secure conditions and its experience with state-sponsored terrorism. At the same time, India's efforts to secure its nuclear materials, facilities and activities did not begin with the recent rise in international awareness about the dangers of nuclear terrorism. Instead they have a long history and India's record on nuclear security and safety over 350 reactor years speaks for itself.

India's nuclear security record

India has an impeccable record on nuclear nonproliferation and Indian nuclear technologies and materials have not leaked anywhere in contrast with some cases of rampant proliferation in Asia involving governments and state actors. Despite a complex closed fuelcycle with a variety of facilities and nuclear materials, nuclear material accounting and control as well as IAEA safeguards have been implemented for close to five decades without anomalies.

There has been no breach of nuclear technology security of the kind that allowed A Q Khan to access and proliferate sensitive nuclear technology and material. Indian nuclear scientists and technologists have maintained high levels of personal and professional integrity. At the same time, as the slew of recent measures shows India is not complacent about nuclear security and has taken steps to strengthen nuclear security even further. India's commitment to i

international cooperation to bolster nuclear security is underlined by its being a party to all the major nuclear security related conventions and its active participation on the these issues at the UN, the IAEA, the Nuclear Security Summit (NSS) process and the Global Initiative to Combat Nuclear Terrorism (GICNT). The planned Global Centre for Nuclear Energy Partnership (GCNEP) would provide the ideal platform to strengthen the various dimensions of nuclear security in India with international cooperation.