

# DRIVE IN STRENGTHENING THE PHYSICAL PROTECTION REGIME OF BANGLADESH

**Dr. A K M FAZLE KIBRIA**  
**Bangladesh Atomic Energy Commission**

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- Bangladesh has been using nuclear technology in the fields of Education, research, medical and industry
- 3MW T. MARK II Research Reactor, Co-60 irradiator, etc.
- Implementation of country's first nuclear power plant (VVER,  $1200 \times 2 = 2400$  MWe) is going on and Bangladesh Atomic Energy Commission (BAEC) is the owner of the NPP
- Has 'Atomic Energy Regulatory Act, 2012'
- Has independent 'Regulatory Authority'
- Party to the amendment of CPPNM on 04 July 2017

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Uses of  
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# DRIVE IN STRENGTHENING THE PHYSICAL PROTECTION REGIME OF BANGLADESH

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- IPPAS mission was carried out in Bangladesh in 2009
- Strengthening of PPS was done in the existing nuclear and radiological facilities (Research Reactor, Radioactive Waste Management Unit, Co-60 Irradiators, etc.)
- Government declared NPP as the highest category installation
- Enhancing capability and developing human resource for maintaining PPS of NPP through:
  - ❖ Coordination among the stakeholders (Ministries, regulator, operators, intelligence and law enforcement agencies, armed forces, etc.)



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**Bangladesh Strengthening Physical Protection Regime through:**

❖ **Cooperation with IAEA**

[Integrated Nuclear Security Support Plan (INSSP)]

❖ **Cooperation with Vendor Country (Russian Federation), India, Asian countries through**

[Forum for Nuclear Cooperation in Asia (FNCA)]

❖ **USDOE/GTRI**

[Global Threat Reduction Initiative (GTRI)]



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# USES of NUCLEAR/ RADIOACTIVE MATERIALS

Bangladesh has been using nuclear technology since 1960

**ACADEMIC and SCIENTIFIC APPLICATIONS**

**MEDICAL APPLICATIONS**

**INDUSTRIAL APPLICATIONS**

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# USES of NUCLEAR/ RADIOACTIVE MATERIALS:

## ➤ **ACADEMIC AND SCIENTIFIC APPLICATIONS**

~20% enriched Uranium fuel for the research reactor, Co-60, sealed sources and disused sources



**TRIGA Research Reactor**



**Co-60 Gamma Irradiator**



**Radioactive Waste Management**

❖ **Operator organizations: BAEC, BINA, Universities, etc.**

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# USES of NUCLEAR/ RADIOACTIVE MATERIALS:



## ➤ MEDICAL APPLICATIONS

**Cobalt-60, Iridium-192, Iodine-131, Depleted Uranium as shielding material**



**Co-60 Teletherapy**



**Co-60 Brachytherapy**



**Ir-192 LINAC**

## ❖ Government Hospitals & Private Hospitals

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# USES of NUCLEAR/ RADIOACTIVE MATERIALS:

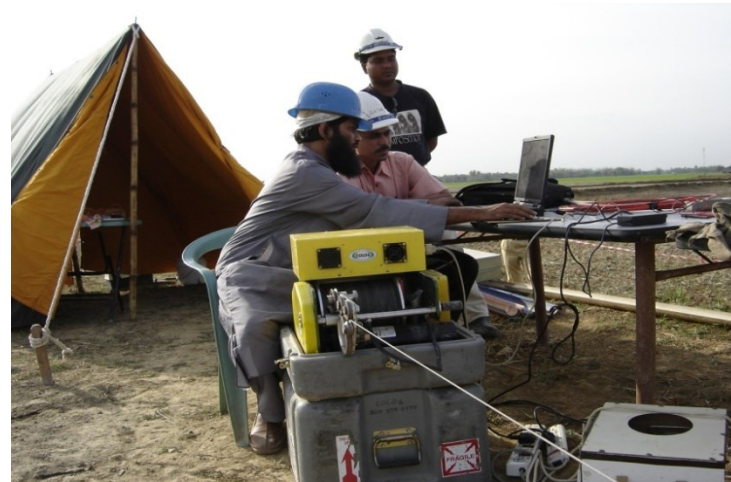


## ➤ INDUSTRIAL APPLICATIONS

Cobalt-60, Caesium-137, Iridium-192, Thorium-232, Americium-241, Americium-Beryllium (241-AmBe)



Co-60 Irradiator (Commercial)



Nuclear Borehole Logging

- ❖ Spices, Tobacco, surgical accessories, etc.
- ❖ Oil, Gas, Petroleum, Fertilizer, etc.

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# LEGAL INFRASTRUCTURE

## ➤ National Legislative Framework:

- ❖ Bangladesh Atomic Energy Regulatory (BAER) Act, 2012 - A comprehensive law to regulate all nuclear and radiation related activities in Bangladesh
- ❖ Bangladesh Atomic Energy Regulatory Authority (BAERA) established in Feb. 2013

রেজিস্টার্ড নং ডি এ-১

বাংলাদেশ



গেজেট

অতিরিক্ত সংখ্যা  
কর্তৃপক্ষ কর্তৃক প্রকাশিত

মঙ্গলবার, জুন ১৯, ২০১২

বাংলাদেশ জাতীয় সংসদ

ঢাকা, ১৯ জুন, ২০১২/এ আদায়, ১৪১৯

সংসদ কর্তৃক গৃহীত নিম্নলিখিত আইনটি ১৯ জুন, ২০১২/ এ আদায়, ১৪১৯ তারিখে  
রাষ্ট্রপতির স্মৃতি লাভ করিয়াছে এবং এতদ্বারা এই আইনটি সর্বসাধারণের অবগতির জন্য প্রকাশ করা  
যাইতেছে:—

২০১২ সনের ১৯ নং আইন

পরমাণু শক্তির শান্তিপূর্ণ ব্যবহার নিয়ন্ত্রণ সংক্রান্ত বিদ্যমান আইন বাতিল ও  
সংশোধনপূর্বক নতুন আইন প্রণয়নকল্পে প্রণীত আইন



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# LEGAL INFRASTRUCTURE

## ➤ National Legislative Framework

- ❖ Enactment of the BAER Act, 2012 makes Nuclear Safety and Radiation Control (NSRC) Act, 1993 **obsolete**
- ❖ Nuclear Safety and Radiation Control (NSRC) Rules, 1997 **remains in force**
- ❖ A number of regulations under the provisions of the BAER Act, 2012 related to nuclear security and physical protection are under review



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# LEGAL INFRASTRUCTURE



- ❑ **Nuclear Safety and Radiation Control (NSRC) Act, 1993** is Bangladesh's first nuclear regulatory legal instrument enacted in 1993.
- ❑ In accordance with this Act, **Nuclear Safety and Radiation Control Division (NSRCD)** of Bangladesh Atomic Energy Commission was assigned to carry out the regulatory functions in the country.

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# LEGAL INFRASTRUCTURE



## ➤ National Legislative Framework

- ❖ Nuclear Safety and Radiation Control (NSRC) Rules, 1997 is the second nuclear regulatory instrument enforced to implement the provisions of NSRC Act, 1993
- ❖ The NSRC Rules-1997 included provision to ensure the **appropriate level of physical protection system** as the mandatory requirement for installations using nuclear material and radioactive sources
- ❖ This requirement was ensured through the process of issuance of license, permit, inspection, monitoring, etc.

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# LEGAL INFRASTRUCTURE



## ➤ National Legislative Framework

### ❖ The BAER Act, 2012 related to Nuclear Security and Physical Protection

- ✓ **Section 11** - Responsibilities and Functions of the Authority
- ✓ **Section 23** - Responsibilities of the Authorization Holder
- ✓ **Section 29** - Safety and Security of Radioactive Materials
- ✓ **Section 33** - Physical Protection of Nuclear Material and Installation

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# LEGAL INFRASTRUCTURE



## ➤ National Legislative Framework

❖ The BAER Act, 2012 related to Nuclear Security and Physical Protection

- ✓ **Section 34** - Safeguards and Import & Export Control
- ✓ **Section 35** - State System of Accounting for and Control of Nuclear Material (SSAC)
- ✓ **Section 36** - Information Requirements Additional to Material Accounting and Control
- ✓ **Section 37** - Illicit Trafficking



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# LEGAL INFRASTRUCTURE



## ➤ National Legislative Framework

### ❖ The BAER Act, 2012 related to Nuclear Security and Physical Protection

- ✓ Section 51- Inspection
- ✓ Section 52- Enforcement
- ✓ Section 53- Offence and Penalty
- ✓ Section 54- Trial

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# LEGAL INFRASTRUCTURE

## ❖ International Instruments:

- ✓ **Amendment to the Convention on the Physical Protection of Nuclear Material (04 July 2017)**
- ✓ **Treaty on the Prohibition of Nuclear Weapons (20 September 2017)**
- ✓ **Convention of Nuclear Safety (24 October 1996)**
- ✓ **Convention on Early Notification of a Nuclear Accident (7 February 1988)**
- ✓ **Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency (7 February 1988)**



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# LEGAL INFRASTRUCTURE

## ❖ International Instruments:

- ✓ **Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (31 August 1979)**
- ✓ **Comprehensive Nuclear-Test-Ban Treaty (CTBT) (8 March 2000)**
- ✓ **Comprehensive Safeguards Agreement (CSA) (11 June, 1982)**
- ✓ **Protocol Additional to the CSA (30 March, 2001)**
- ✓ **International convention for suppression of acts of nuclear terrorism (7 July 2007)**

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# PHYSICAL PROTECTION MEASURES & PRACTICES

- ❖ Operator/Facility Owner/Respective authorization holders are fully responsible to ensure appropriate level of **security and physical protection system** as a part of regulatory requirements according to the BAER Act 2012.
- ❖ Management of each facility usually designs and maintains physical protection system using their own budget. Besides, most facilities having Radiotherapy units and Co-60 Irradiators received **GTRI assistance for enhancements of PPS** through the bilateral cooperation agreement between BAEC and USDOE

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# PHYSICAL PROTECTION MEASURES & PRACTICES

- ❖ **Atomic Energy Research Establishment (AERE) is the major research establishment of BAEC**
  - **TRIGA MARK II Research Reactor**
  - **Radioactive Waste Management Unit**
  - **Co-60 Irradiators**
  - **Isotope production laboratory**
  - **Medical Physics Institute**



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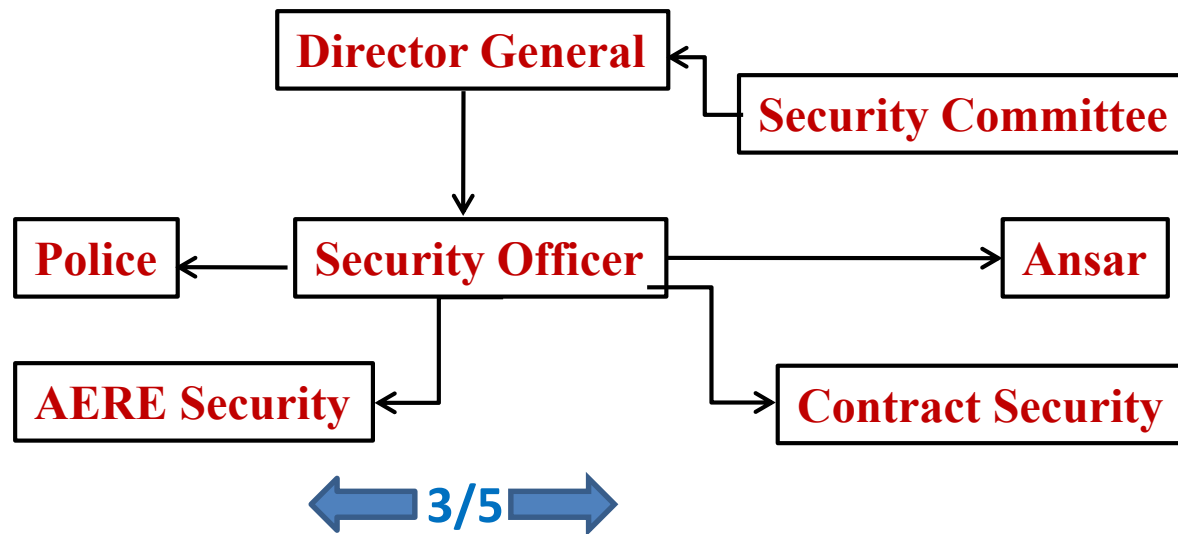
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# PHYSICAL PROTECTION MEASURES & PRACTICES

- ✓ AERE is the 'Key Point Installation (KPI)' by the Government
  - ✓ National Security Intelligence (NSI) force periodically assesses the threat level and provides recommendations to AERE for appropriate measures if necessary
- ❖ **Committee responsible for the security of AERE:**



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# PHYSICAL PROTECTION MEASURES & PRACTICES

❖ **Physical protection** of AERE is maintained by a group of security people consisting of

- **Police** [Deployed by the Ministry of Home affairs]
- **Ansar** [Deployed by the Ministry of Home affairs]
- **Own Security Guards**

❖ **Physical Protection System** of all facilities has been designed incorporating three basic principle

- ✓ **Detection**
- ✓ **Delay and**
- ✓ **Response**



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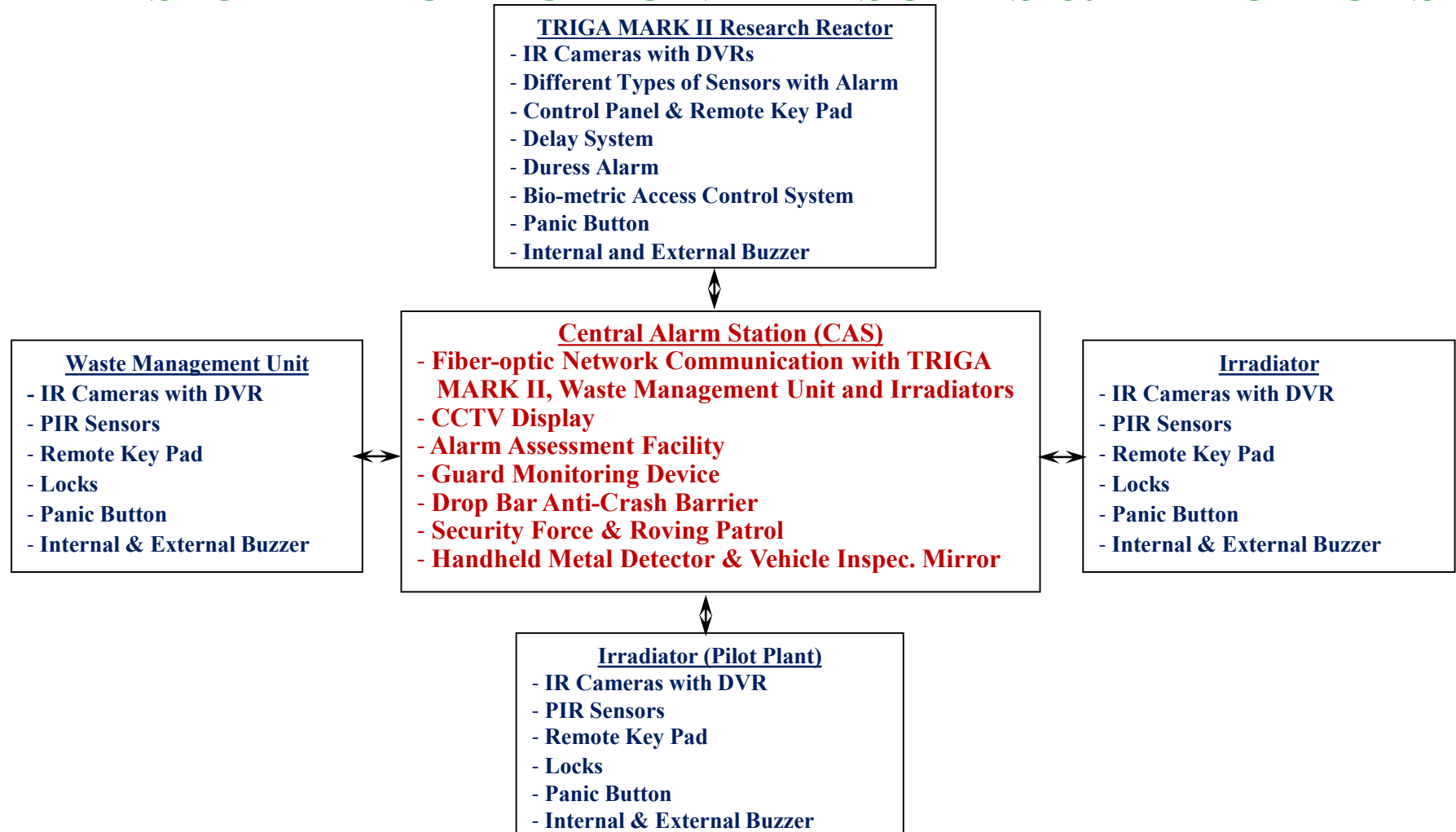
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# PHYSICAL PROTECTION MEASURES & PRACTICES



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# NUCLEAR POWER PROGRAM of BANGLADESH

## HISTORY:

- ❖ Establishment of a NPP was proposed in 1961
- ❖ Rooppur site was selected in 1963 and land was acquired



Progress of Rooppur  
Nuclear Power Plant  
(RNPP)

Attempts to Strengthen  
Physical Protection  
Regime for RNPP

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# NUCLEAR POWER PROGRAM of BANGLADESH



- ❖ In 2010, National Parliament approved NPP project
- ❖ In 2011, Bangladesh signed an Inter Government Agreement (IGA) with Russian Federation for the construction of NPP with 2 VVER units, each of 1000 Mwe which has later been decided to be 1200 MWe



Signing of IGA

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# NUCLEAR POWER PROGRAM of BANGLADESH

- ❖ Nuclear Power Plant Act 2015 was enacted On 16 Sept. 2015 and Nuclear Power Plant Company Bangladesh Limited (**NPCBL**) was established
- ❖ On 25 December 2015, the General Contract for RNPP construction was signed between BAEC and **Joint-Stock Company Atomstroyexport**



**Signing of General contract**



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# NUCLEAR POWER PROGRAM of BANGLADESH

- ❖ Bangladesh Atomic Energy Regulatory Authority issued site licence for NPP on 21 June 2016
- ❖ Design and Construction licence for Unit-1 is going to be issued on 04 November 2017



Siting Licence Ceremony



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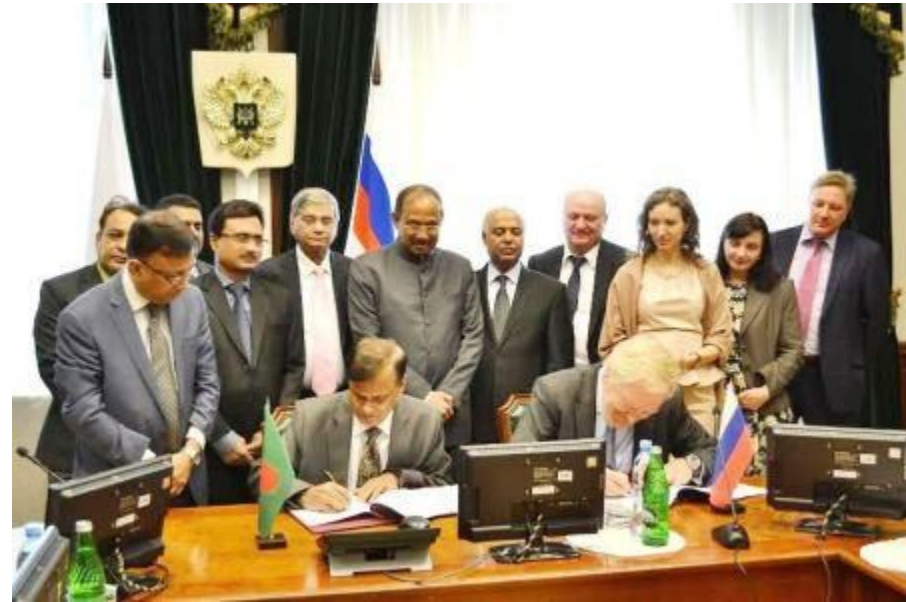






# NUCLEAR POWER PROGRAM of BANGLADESH

- ❖ **Inter-Governmental State Credit Agreement financing for the construction of RNPP signed with Russian Federation on July 26, 2016**
- ❖ **The 1<sup>st</sup> unit of RNPP is expected to be come into operation by 2022 and the 2<sup>nd</sup> unit by 2023.**



**Signing of State Credit Agreement**

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# NUCLEAR POWER PROGRAM of BANGLADESH



➤ Ensuring security from the site works to the operation phase of RNPP is taken as the top priority

❖ Eight Sub-Groups formed by the Ministry of Science and Technology to help the Technical Committee by identifying and implementing the sequential works of RNPP properly

❖ One Sub-group is taking care of the issues of international obligations, legal and regulatory aspects and nuclear safety, security and physical protection

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# NUCLEAR POWER PROGRAM of BANGLADESH



❖ **Nuclear security and physical protection** sub-group consists of representatives from:

- ✓ **Prime Minister's office**
- ✓ **Ministry of Foreign Affairs,**
- ✓ **Ministry of Environment and Forest**
- ✓ **Ministry of Home Affairs**
- ✓ **Division of legislative and parliamentary affairs**
- ✓ **BAERA**
- ✓ **BAEC and**
- ✓ **RNPP Management**



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# NUCLEAR POWER PROGRAM of BANGLADESH

- ❖ **Government declared RNPP as the “1ka” type Key Point Installation (KPI) the highest category installation on January 2015**
- ❖ **A local team headed by the Divisional Commissioner engaged to monitor and cooperate the security of RNPP**
- ❖ **National seminar on ‘Basic Approaches to Developing of NPP Physical Protection System’ with the help of Atomstroyexport, Russian Federation**



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# NUCLEAR POWER PROGRAM of BANGLADESH



❖ A **Technical Group** formed on October 2015, to design ‘Security and Physical Protection System (PPS) of RNPP’. The **group** included representatives from:

- ✓ Ministry of Science and Technology (MOST)
- ✓ **Ministry of Defense**
- ✓ **Ministry of Home Affairs**
- ✓ Ministry of Disaster Management
- ✓ **Directorate General of Forces Intelligent (DGFI)**
- ✓ **National Security Intelligence (NSI)**
- ✓ **Armed Forces Division**
- ✓ **Law Enforcement Agencies**
- ✓ **BAERA**
- ✓ **BAEC and**
- ✓ **NPCBL**



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# NUCLEAR POWER PROGRAM of BANGLADESH

**According to the decision of Technical Working Group:**

- ❖ A dedicated **‘Composite Security Force’** led by the **‘Bangladesh Army’** was formed for developing the security and physical protection system of RNPP
- ❖ It was proposed that the members of the **‘Composite Security Force’** will be deputed permanently in the RNPP to serve the purpose



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# NUCLEAR POWER PROGRAM of BANGLADESH

- Drive in Enhancing expertise of the **‘Technical Working Group’** and **‘Composite Security Force’** on the PPS of RNPP:
  - ✓ **Technical Working Group** carried out a number of visits to the NPPs of India and Russian Federation in 2016 to acquire practical knowledge on PPS
  - ✓ **‘Composite Security Force’** members are being offered trainings to familiarize with the PPS of the vendor country and concurrently to understand the relevant IAEA principles, international standards, codes, guidelines, etc.



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# NUCLEAR POWER PROGRAM of BANGLADESH

- The **‘Composite Security Force’** has already set up
  - ✓ **Security fences** and identified **layers of PPS** of the site
  - ✓ **Effective measures to ensure safe, secure and peaceful environment** for the construction of RNPP.



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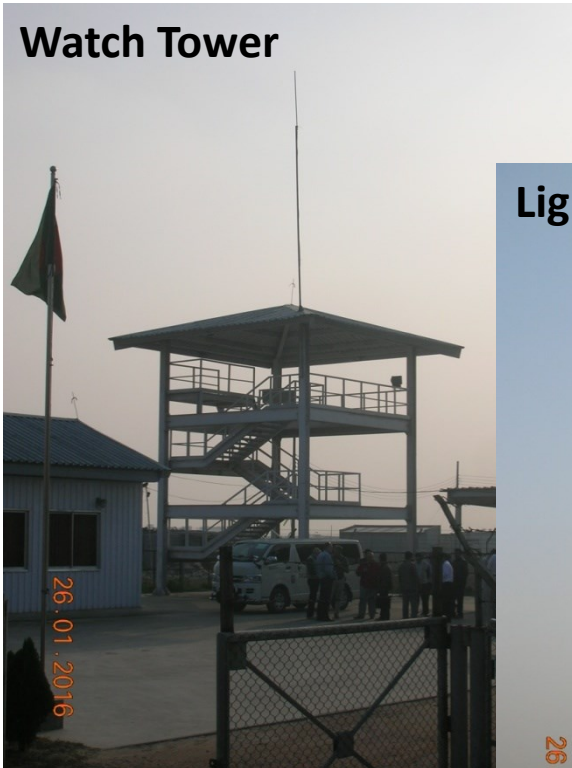
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# NUCLEAR POWER PROGRAM of BANGLADESH



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# **INTERNATIONAL COOPERATION IN ENHANCING THE PHYSICAL PROTECTION REGIME of BANGLADESH**

**Cooperation with IAEA**

**Cooperation with USDOE**

**Cooperation with Other  
Countries and Agencies**

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# INTERNATIONAL COOPERATION (continued)

## ➤ Cooperation with the IAEA:

### ❖ Meeting on the Drafting of Integrated Nuclear Security Support Plan (INSSP) for Bangladesh in May 2013



Meeting on INSSP for Bangladesh, 28-30 May 2013

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# INTERNATIONAL COOPERATION (continued)



## ➤ Cooperation with the IAEA:

- ❖ Meeting on the Finalization of INSSP Draft of Bangladesh in presence of different stakeholders on 29 Feb-03 March 2016



✓ Bangladesh Government approved INSSP in December 2016



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# Meeting on the finalization of INSSP draft of Bangladesh

**Date: 29 Feb.-03 Mar. 2016,**

**Venue: BAEC HQ, Dhaka**

**No. of participants: 35**

## Participated organizations:

- **IAEA experts (USDOE and BAPETEN)**
- **Bangladesh Atomic Energy Regulatory Authority (BAERA)**
- **Ministry of Defence**
- **Ministry of Disaster Management and Relief**
- **Department of Disaster Management**
- **Ministry of Health & Family Welfare**
- **Border Guard Bangladesh**
- **Bangladesh Coast Guard**
- **National Security Intelligence (NSI)**
- **Civil Aviation Authority**
- **University of Dhaka**
- **RNPP Project & BAEC**

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# INTERNATIONAL COOPERATION



## ➤ Cooperation with the IAEA

❖ Action plans on the nuclear security and physical protection regime were finalized by IAEA and the following events will be held in Dhaka, Bangladesh:

- ✓ National Detection Strategy
- ✓ National Workshop on DBT
- ✓ National Training on Nuclear Material Accounting and Control (NMAC) for Nuclear Security at Facilities

❖ Bangladesh availed a number of trainings on different topics of nuclear security and physical protection such as insider threat, protection of nuclear facilities against sabotage, NMAC, etc.



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# INTERNATIONAL COOPERATION



## ➤ Cooperation with the IAEA

### ❖ Received IAEA expert service:

- ✓ On the establishment of Radiation Detection and Response Capability for Bangladesh (May 2015)
- ✓ On the Nuclear Security Culture (June 2013)



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# INTERNATIONAL COOPERATION



## ➤ Cooperation with the US Department of Energy (USDOE)

- ❖ USDOE helping Since 2006 in developing and enhancing PPS of nuclear and other radioactive materials and associated facilities
- ❖ Upgrading PPS of Research Reactor, Radioactive Waste Management Unit, Co-60 Irradiator and radiotherapy machines having Co-60 source located in Government and Private hospitals
- ❖ USDOE helping to improve Bangladesh's capabilities in detecting illicit shipments of nuclear and other radioactive materials. Installed radiation detection equipment at the sea Port Chittagong

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# INTERNATIONAL COOPERATION



## ➤ Cooperation with the US Department of Energy USDOE

- ❖ Training/seminar on developing PP regime in home and abroad:
  - ✓ Training on ‘Search and Secure of radioactive sources’ (2012)
  - ✓ Seminar on ‘Radiological Security Awareness’ (2013)
  - ✓ Training on ‘Physical Protection & Security Management of Radioactive Sources’ (2013)
  - ✓ ‘International Radiological Assistance Program Training for emergency response’ (2015)
  - ✓ Training on ‘Source recovery for tertiary responders’ (2015)
  - ✓ Training on ‘Physical Protection & Security Management of Radioactive Sources’ in Nepal (2017)

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Uses of  
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# INTERNATIONAL COOPERATION



## ➤ Cooperation with other countries and agencies

### ❖ **Japan:** Training and fellowships especially on-

- ✓ Physical Protection of Nuclear Material and Facilities
- ✓ State System of Accounting for and Control of Nuclear Material (SSAC)

### ❖ **Republic of Korea:**

- ✓ Physical Protection of Nuclear Material and Facilities
- ✓ State System of Accounting for and Control of Nuclear Material (SSAC)

### ❖ **Russian Federation and India:** Young and recruited scientists are being sent to India and Russian Federation for training and higher educations in different subjects including PPS

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# INTERNATIONAL COOPERATION



- **Cooperation with other countries and agencies**
- ❖ **Bangladesh is participating in the FNCA's project on 'Nuclear Security and Safeguards' which is contributing in developing human resource in the fields of nuclear security and safeguards**
- ❖ **Bangladesh is also participating in the Asian Nuclear Safety Network (ANSN) and Asia-Pacific Safeguards Network (APSN) which is helping in developing human resource in the fields of nuclear safety and safeguards**



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# CONCLUSION

- **Bangladesh is committed in fulfilling the essential and obligatory needs by formulating and revising the responsibilities of its physical protection regime till achieving better sustainability**
- **Regulatory Authority, BAEC and relevant national stakeholders are working together in strengthening the physical protection regime of the country for the successful implementation of its 1<sup>st</sup> NPP**
- **The country thoughtfully setting and performing the nuclear security and physical protection tasks abiding by national laws, international obligations, and doing cooperation with the IAEA, Russian Federation, India, Japan, Republic of Korea, USDOE, etc.**
- **As a newcomer country in NPP, Bangladesh obviously requires continuous cooperation and exchange of knowledge with the IAEA and countries having NPP**

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