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BHABHA ATOMIC RESEARCH CENTRE

Building Robust Nuclear Security Culture in Nuclear Research Centers

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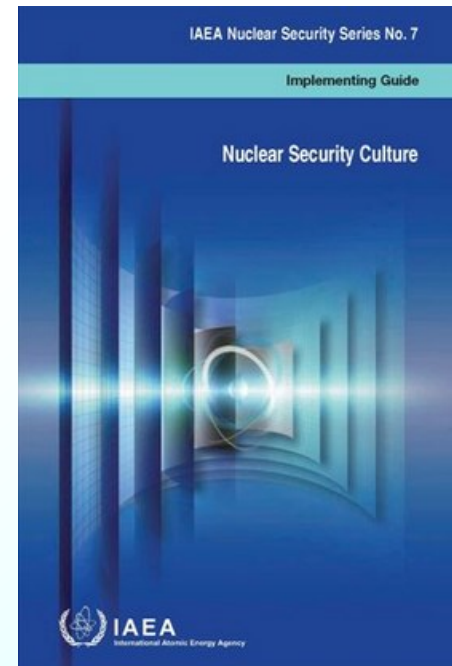
Outline of Presentation

- ❑ Nuclear security culture
- ❑ Nuclear research centers in India
- ❑ Indian nuclear security policy
- ❑ Determination of staff trustworthiness
- ❑ Enhancing security culture
- ❑ Conclusion

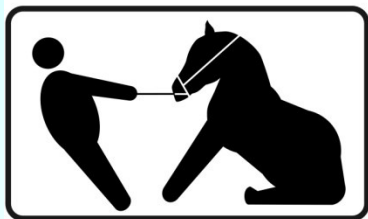


Nuclear Security Culture

- ❑ Assembly of characteristics, attitudes and behavior of individuals, organizations and institutions, which serve to support and enhance nuclear security.
- ❑ Ensures that individuals stay vigilant and be aware of what is happening in their organization
- ❑ Introduces a questioning attitude among individuals, which may help in detecting insider threat and outsider threat

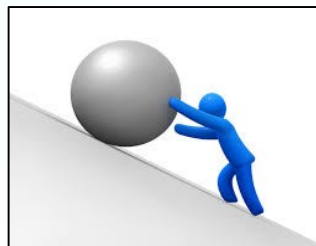
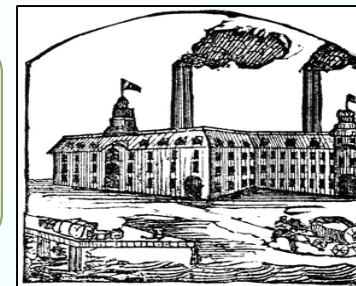


Culture Characteristics



Evolves slowly and resists change

Resistance is more for the older facilities



Needs persistent effort and frequent monitoring for improving, as well as sustaining.

Safety Culture and Security Culture

Safety Culture

- ❑ Focuses on the effects of human or mechanical error
- ❑ Emphasizes on transparency



Security Culture

- ❑ Focuses on deliberate acts intended to do harm
- ❑ Emphasizes on confidentiality



Both cultures need to co-exist in nuclear facilities to protect people and the environment from radiation.

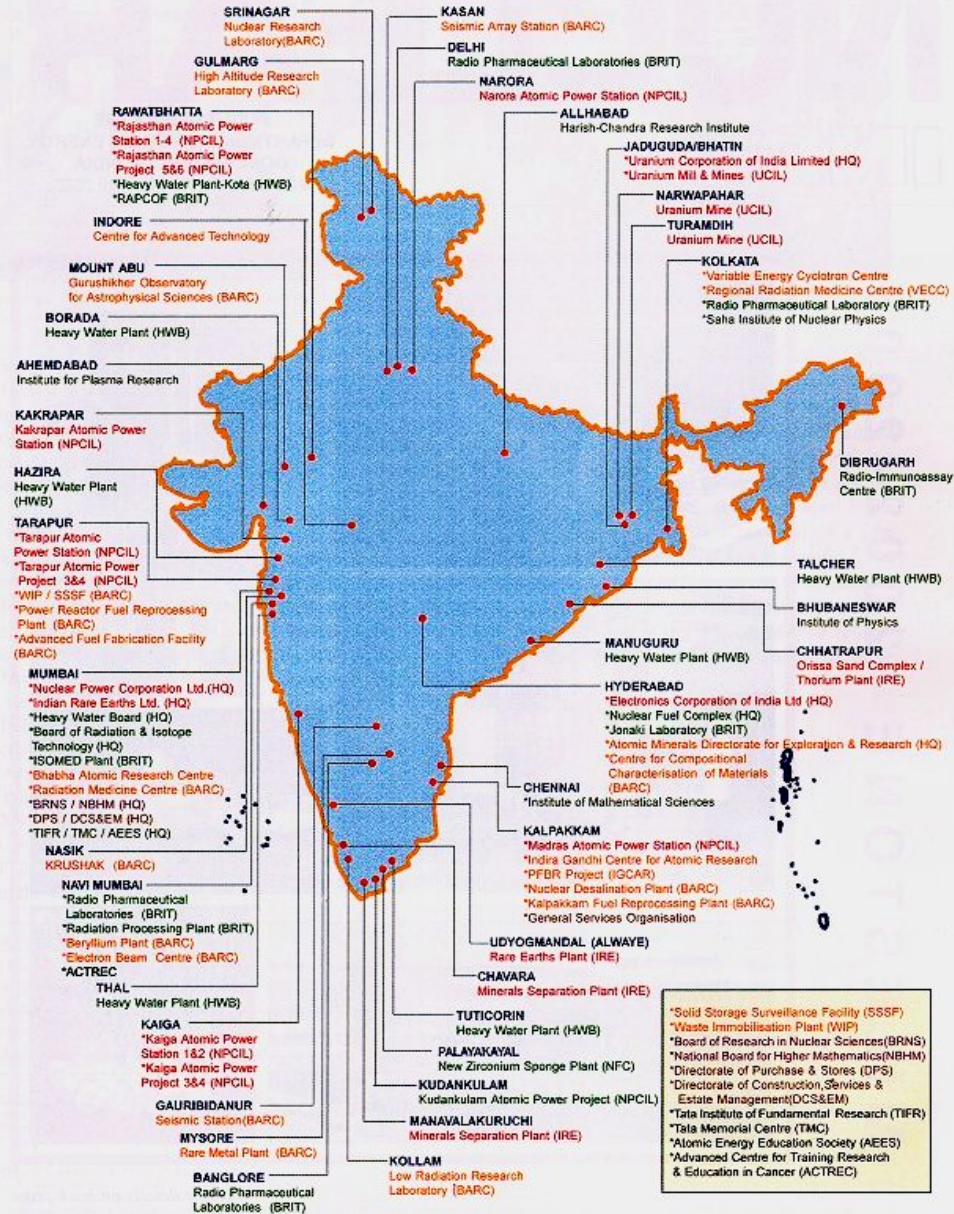


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Department of Atomic Energy: Broad Areas of Work

- ❑ Food and Agriculture
- ❑ Health Care
- ❑ Nuclear Power
- ❑ Research and Education
- ❑ Water Resources

Atomic Energy Establishments in India



Research and Development Institutes of DAE

- ❑ Atomic Minerals Directorate for Exploration and Research (AMD), Hyderabad
- ❑ *Bhabha Atomic Research Centre (BARC), Mumbai*
- ❑ Global Centre for Nuclear Energy Partnership (GCNEP), Bhahadurgarh
- ❑ Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam
- ❑ Raja Ramanna Centre for Advanced Technology (RRCAT), Indore
- ❑ Variable Energy Cyclotron Centre (VECC), Kolkata



Nuclear Research Centers: Characteristics

Places, where the modern technologies are borne, grow and mature, before their induction into field of utilization

- ❑ Diverse facilities
 - Research Reactors, Nuclear Fuel Cycle Facilities, Accelerators, Radiological Labs...
- ❑ Employees
 - Scientists, engineers, workers, managers, administrative staff, contract workers, ...
- ❑ Visitors
 - Diverse categories, considerable number
 - Students, researchers and faculty members from universities
 - Various users of radioisotopes

As these factors change with time.

Threat Perception:

Different from those of nuclear power reactors or fuel cycle facilities

India's Approach to Nuclear Security

1. Governance
2. Institutions
3. International Cooperation
4. Technology
5. Nuclear Security Practice and Culture



1. Governance Framework

- Atomic Energy Act -1962
 - Governs the activities related to radiation and radioisotopes
- The Atomic Energy (Radiation Protection) Rules, 2004
 - Emphasize the importance of the security of radioactive material, in addition to radiological safety.
- + many more rules

- Additional acts providing legal authority for controlling nuclear trade
 - Foreign Trade Development & Regulation Act (FTDR), 1992 (amended 2010)
 - Weapons of Mass Destruction (WMD) Act, 2005
 - ...

2. Institutions

- ❑ Atomic Energy Commission
 - The governing body responsible for formulation of DAE Policies
 - Established in 1948
- ❑ Department of Atomic Energy (DAE)
 - Responsible for development of nuclear power technology and application of radiation technology
 - Prime Minister directly heads the ministry concerned with DAE.
 - Chairman, Atomic Energy Commission, who is also Secretary to DAE, is responsible for nuclear security.
- ❑ Regulatory Bodies

2. Institutions...

- ❑ Nuclear Controls and Planning Wing (NC&PW)
 - Integrates DAE's safeguards, export controls and nuclear security related activities
- ❑ Computer Information and Security Advisory Group (CISAG)
 - Audits information systems periodically
- ❑ National Disaster Management Agency (NDMA)
 - Responsible for disaster mitigation and relief

2. Institutions...

- ❑ Central Industrial Security Force (CISF)
 - Monitor movement of staff, access control, etc.
 - Participate in emergency drill
- ❑ State Police
 - Security of the outer periphery of nuclear installations
- ❑ Intelligence Bureau (IB)
 - Identify threats and warn facilities
- ❑ National Disaster Relief Force (NDRF)
 - Response force of NDMA

3. International cooperation

- India is a party to all universal instruments to combat international terrorism
 - International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT)
 - Convention on the Physical Protection of Nuclear Material (CPPNM) and its amendment-2005
 - IAEA's guidelines on physical protection of nuclear materials (INFCIRC/225)
 - Adheres to Nuclear Supplier Group (NSG) guidelines on nuclear transfer and related conditions
 - ...

4. Technology

- ❑ Follow the technology reducing proliferation risk
 - E.g., Closed fuel cycle: Reprocess and reuse of Pu
- ❑ Track people and material
 - Indigenous technology
 - Portals, radiation detectors, secure communication networks, RF ID cards, real time tracking of vehicles, infra-red cameras, sensors, barriers, etc.
- ❑ Cyber security
 - Addressed by CISAG
 - Restrict use of internet, USB, smart phones, etc. in sensitive areas

5. Nuclear Security Practice and Culture

- ❑ Technology and legal framework improve security.
- ❑ However, security culture is essential for taking these rules seriously by individuals.

Design Basis Threat

- ❑ India has national Design Basis Threat (DBT) document.
- ❑ It considers the existing threats from
 - Saboteurs, thieves, terrorists, insiders, etc.
- ❑ Each facility has its own DBT document, based on national DBT for designing PPS.



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IAEA Nuclear Security Series No.7

Nuclear Security Culture: Implementation Guide

- Defines the Roles and Responsibilities of
 - The State
 - Organizations
 - Managers in Organizations
 - Personnel
 - The Public
 - The International Community
- for implementing Security Culture

Regulators

- ❑ Ensure incorporation of nuclear security aspects at design stage itself
- ❑ Review and improve nuclear security at various stages:
 - Siting, design, construction, commissioning and operation
- ❑ Review nuclear security aspects during licensing and subsequent renewal of authorization.

Insider Threat

- ❖ **May hold any position in an organization.**
- ❖ **Can easily defeat security barrier.**

- Insider may have

- **Access** to many areas of facility, systems and equipment
- **Authority** over operations or personnel
- **Knowledge** of facility layout, transport arrangements, physical protection, safety systems and other sensitive information
- **Technical skills** and expertise
- **Authority** to acquire and ability to use tools, equipment, weapons or explosives



Trust Worthiness: Screening Process

Matched to the risks and threats related to specific role and responsibility

- ❑ Conducted on a regular basis
- ❑ Applied to all levels of the organization
 - Temporary staff, contractor personnel, visitors, ..
- ❑ Considered the factors that might lead to degradation of trustworthiness
 - Mental illness, substance abuse, workplace violence or criminal and aberrant behavior



Nurturing Nuclear Security Culture

- ❑ Homi Bhabha National Institute (HBNI)
 - Main means of recruiting scientists and engineers *especially for nuclear research centers*
 - One-year training program
 - Safety and security are parts of curriculum
- ❑ Training programmes
 - Nuclear facilities and regulators conduct of regular seminars, workshops or refresher courses on safety and security.



Global Center for Nuclear Energy Partnership (GCNEP)

- ❑ Hosts five schools on various aspects of nuclear program.
- ❑ One of the schools is **School of Nuclear Security Studies (SNSS)**
- ❑ Train security agencies on application of physical protection system and response procedure, to enhance physical security of nuclear facilities



Programs of SNSS

- ❑ Development of technology tools for physical security
- ❑ Explosives and other contraband detection
- ❑ Formal education and training
- ❑ Nuclear security computer simulation
- ❑ Personnel reliability studies
- ❑ Physical Protection System analysis and evaluation tools
- ❑ Surveillance, video analytics and advanced video tools
- ❑ Systems for personnel and material access control & intrusion detection
- ❑ Vulnerability studies



Conclusion

- ❑ Nuclear industry in India has completed more than six successful decades of functioning
without any major failure of nuclear security.
- ❑ The credit goes to the nuclear security culture prevailing in these facilities.



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Thank You

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