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Safety and Security Interface

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Safety and Security Interface

IAEA/ICPT School of Nuclear Energy Management

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Security and Safety Interface

- Introduction
- Responsibilities for Safety and Security
- Basic Principles
- Safety and Security at the NPP Lifetime

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Introduction

Specificity of Nuclear Power

NPP operation

Inventory of radioactive materials

Radiation hazards to workers, public and the environment

Proliferation Issues

Nuclear Safety & Nuclear Security

Protect people and environment against the risks of radiation

Common Purpose

Safeguards

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Definitions

- **Nuclear Safety**
  - The achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards.

- **Nuclear Security**
  - The prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities."

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Events on Each Sphere

Safety

Security

Risks arsing from unintended events

- Natural occurrences (earthquake, tornadoes,etc)
- Hardware failures (pipe break, I&C defects, etc)
- Internal events (flood, fire, etc)
- Human mistakes (incorrect alignment, etc.)

Risks arising from malicious acts with the intent of steal material or cause damage

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Interface Safety - Security

- **Synergies**
  - Elements or actions in one area enhances also the other area

Safety: serves to prevent a significant release of radioactive material to the environment in the event of an accident

Security: provides a robust structure that protects the reactor from a terrorist assault.

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Interface Safety - Security

- **Challenges**
  - **Elements or actions in one area may be antagonistic to the other area**

Delay barriers for security reasons can limit rapid access to respond to a safety event or can limit emergency egress by plant personnel

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Responsibilities for Safety and Security

Government

- The State must set up an appropriate legislative and regulatory framework to ensure control of nuclear power plants and thus require safety and security provisions

- The State must designate a regulatory authority or authorities in both the safety and security fields and provide the regulator(s) with the authority, competence and the financial and human resources

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Regulatory Body

- The regulator (or regulators) must define the requirements to be satisfied by the operator for both safety and security

Question:

(1) Would you prefer for your country a single or two different regulators for safety and security?

(2) Can you identify the advantages and disadvantages of each option?

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Operators

- The operating organization has the prime responsibility for the safety and security of the nuclear power plant
- In the case of security, the operator's responsibility may be limited to defence against a Design Basis Threat (DBT)

DBT outlines the set of adversary characteristics for which the Operators and State organizations together have protection responsibility and accountability

A clear description of this threat is an essential prerequisite for assured and effective physical protection

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Basic Principles

Defense-in-Depth

- Several lines of protection

1. **Prevention**
2. **Early Detection**
3. **Mitigation**
4. **Emergency Planning**

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Defense-in-Depth

Safety

1. **Prevention**
   - Robust Design, safety margins
2. **Early Detection**
   - I&C systems
3. **Mitigation**
   - Safety Systems
4. **Emergency Planning**
   - **For unintended events**

Security

1. **Prevention**
   - Deterrence steps to discourage the aggressor
2. **Early Detection**
   - Security systems (alarms)
3. **Mitigation**
   - Recovery actions
4. **Emergency Planning**
   - **For malicious acts**

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Leadership and Management

- Leadership and management has to be demonstrated at the highest levels
- Effective management system to ensure proper balance and coordination

Issues:

-Handling information (transparency against restricted)

- Safety and security cultures

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Optimization of Protection

- Radiation risks must be kept as low as reasonably achievable, taking social and economic factors into account

All risks should be assesses and re-assessed both in the design phase and in operation

-Risks from natural events, equipment failure or human errors relies on deterministic and probabilistic methods
- Risks on the security domain relies on deterministic methods only

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Safety and Security at the NPP Lifetime

Siting

Safety

- Assess the frequency and severity of various external natural and human induced events that could affect the safety of the NPP
- Assess the feasibility of an emergency plan

Security

- Assess the vulnerability to assault of the site. For certain types of threat, the location and layout of the plant site may limit the likelihood that particular on-site areas will be affected
- Assess the areas of the country that are more prone to terrorists or activists or near the border with an unfriendly country

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Design

Synergies

- **Passive Systems**
- **Single failure criteria**
- **Doors and barriers**

Antagonisms

- Heavy bunkering
- Doors and barriers

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Construction

- Oversight of the construction is intended to ensure that the plant is constructed as designed, thereby serving both safety and security purposes

- For security, the oversight is aimed at preventing the inadvertent or intentional introduction of weaknesses that could result in a radiological release during operation. Such oversight can present a major challenge because of the large number and diversity of workers entering the site during a construction period.

Operation

Synergies

- Feedback from operating experience (sharing of information may differ)
- Access and control measures

Antagonisms

- Maintenance, surveillance and inspections
  - Disabling systems in one area may impact the other (e.g. electric supply)
  - External man-power to conduct the activities

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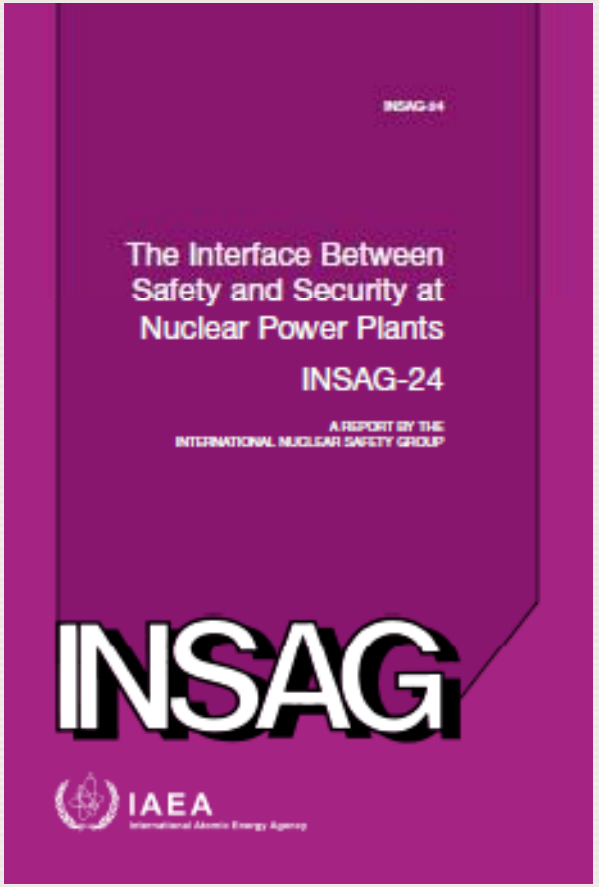
Reference Document

The International Nuclear Safety Group (INSAG) is a group of experts with high professional competence in the field of safety working in regulatory organizations, research and academic institutions and the nuclear industry

http://goto.iaea.org/insag



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Thank you for your attention

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