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Complementarity between Nuclear Security and Physical Protection System

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PLAN

physical protection systems (PPS)

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INTRODUCTION

World leaders agree that Nuclear terrorism is one of the greatest Threats facing humanity

Terrorists only need to find the weakest link in the system to get enough nuclear material to build an improvised nuclear bomb or dirty bomb



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INTRODUCTION

A **physical protection system** is the integration of people, procedures, and equipment used to protect assets or facilities against theft, sabotage, or other malicious human attacks. The PPS functions are detection, delay and response.

Nuclear security is: 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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INTRODUCTION

The objectives of the nuclear security and physical protection system is to protect nuclear facility or nuclear material against threats and terrorist. The equipment is not sufficient it must be completed with nuclear security and nuclear security culture to achieve these objectives.

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PPS Objectives

Physical protection system

- **Deter** adversary from attacking
- **Defeat** adversary if he does attack
- Security management
- Ensure that the physical protection system functions properly
- Includes measures such as verifying trustworthiness of employees and protecting sensitive security information

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PPS Objectives

1. **What must I protect?** (What is the **target** to be protected?)
2. **What must I protect against?** (What is the **threat** against which the PPS must be designed?)
3. **What level of protection is adequate?** (What is the acceptance **criteria** for the PPS?)

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PPS FUNCTIONS

The purpose of a PPS is to prevent an adversary from successful completion of a malevolent action against a facility.

. There are several functions that the PPS must perform to accomplish this objective

. The primary PPS functions are :
detection, delay, and response.

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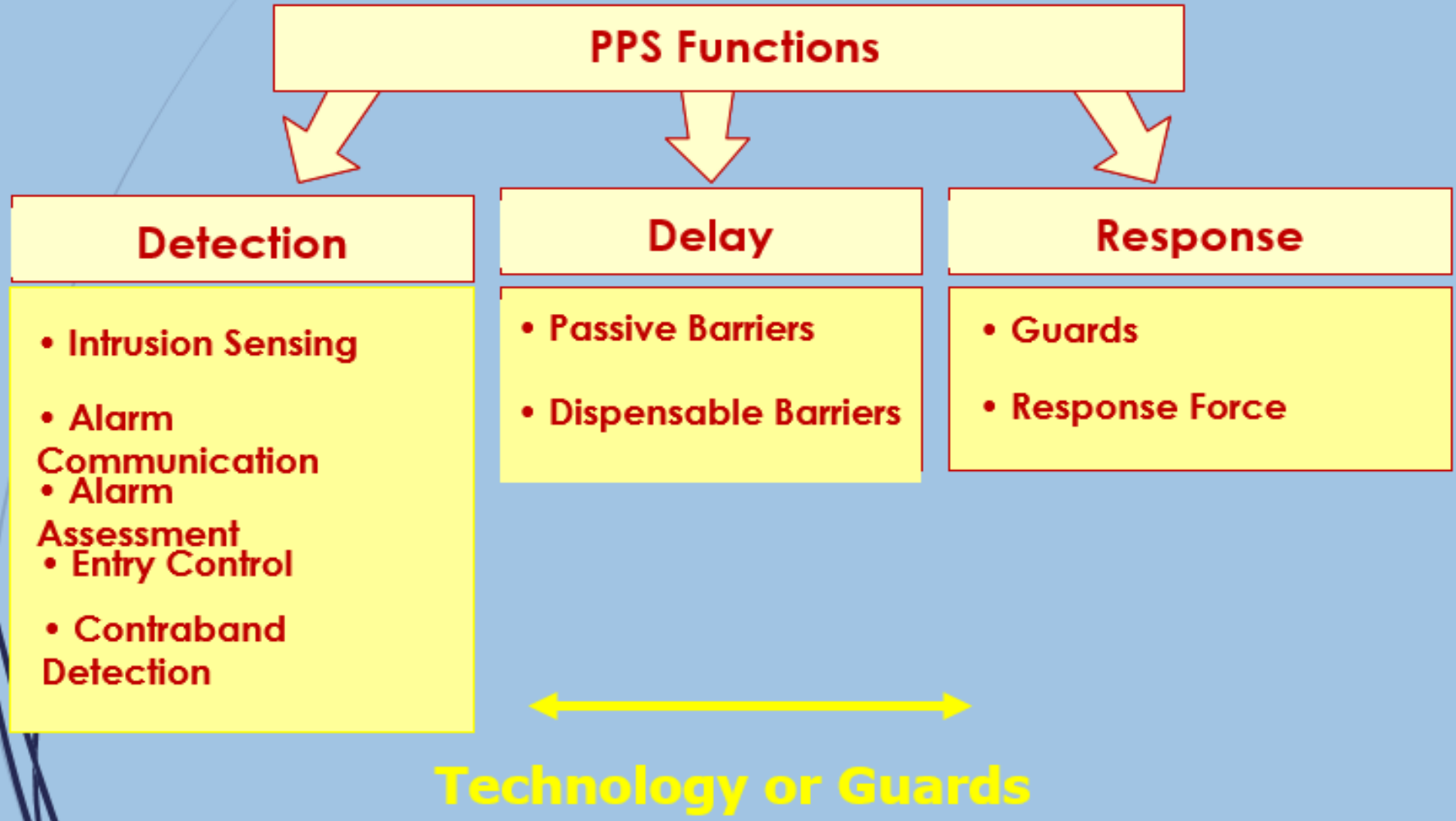
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PPS FUNCTIONS



PPS FUNCTIONS

Detection Process



→ Technologies → Guards

Performance measures:

- Probability of sensor alarm (P_S)
- Communication and Assessment Time (T_C)
- Probability of Assessment (P_A)
- Nuisance Alarm Rate (NAR)
- Assessed detection $P_D = F(P_S, T_C, P_A, NAR)$



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PPS FUNCTIONS

Delay Process

Delay provides obstacles to increase the adversary task time

Passive Barriers

Dispensable Barriers

Performance measures

- **Time to penetrate or bypass obstacles**
- **Time to travel across areas**



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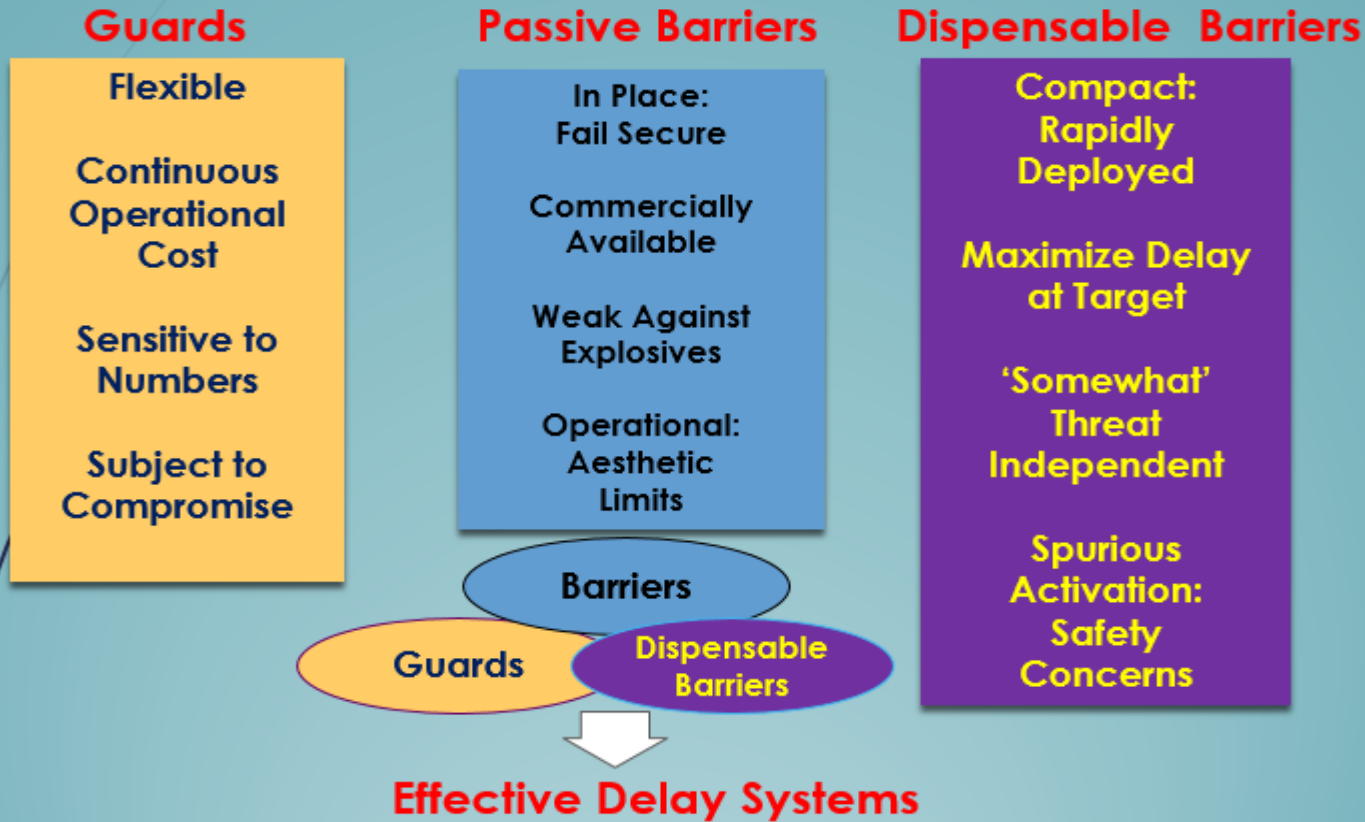
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PPS FUNCTIONS

Elements of Delay



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Nuclear Security

Over the last 20 years, there have been 1000s of nuclear smuggling incidents, of which ~ 20 involved highly enriched uranium or plutonium.

- It's likely that many more cases were undetected .
- There have been numerous lapses in security that, under different circumstances, could have been catastrophic:
- Y-12 (U.S.) security breach (2012) protestor intrusion in the HEU facility
- Pelindaba (South Africa) (2007)
- Kurchatov Institute (Russia) accounting problem (2001)

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Nuclear Security Definition

*As defined by the IAEA, nuclear security is:
[T]he 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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Nuclear Security

Global Nuclear Security System

- Nuclear security is historically viewed as the sovereign responsibility of individual states.
- Each country's regulatory systems were often developed independently.
 - Often variable
- There is no comprehensive global system for tracking, protecting, and managing nuclear materials in a way that builds confidence.
 - The existing international system is a patchwork of agreements, guidelines, and multilateral engagement mechanisms.
 - It encompasses only civilian materials (15% of total weapons-useable nuclear materials).

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Prevention



Detection



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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Nuclear Security

The objective of the Nuclear Security Plan 2014–2017 is to contribute to global efforts to achieve effective security wherever nuclear and other radioactive material is in use, storage and/or transport, and of associated facilities by supporting States, upon request, in their efforts to meet their national responsibilities and international obligations, to reduce risks and to respond appropriately to threats. ... To provide a coordinated education, awareness raising and training programme in nuclear security that meets the requirements and needs identified by Member States.



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NUCLEAR SECURITY

The *Nuclear Security Fundamentals* document provides the **objective** and **essential elements** of an appropriate and effective **national nuclear security regime**.

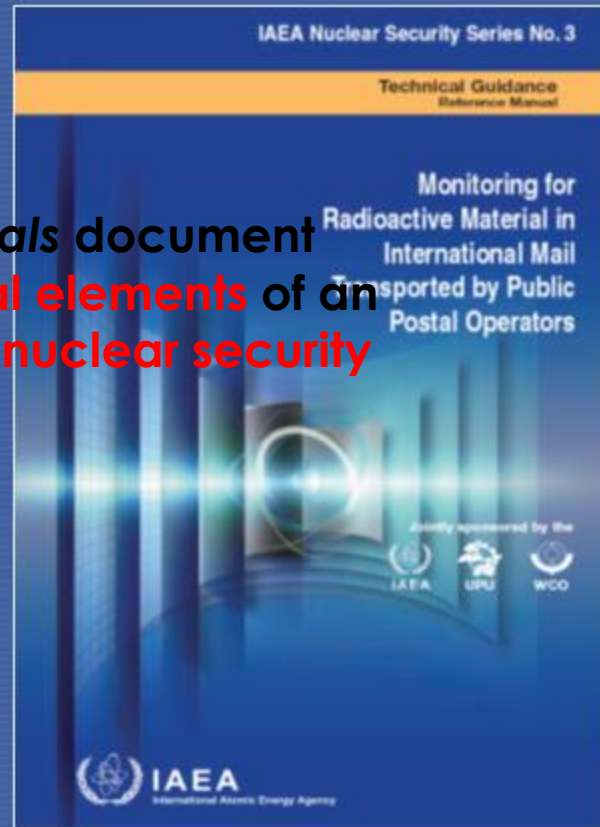
Guidance Development IAEA Nuclear Security Series

Based on the International legal framework for nuclear security

Nuclear Security Fundamentals

Recommendations:
What measures?

Implementing guides*: *How?*



* Technical guidance, reference manuals, training material

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Nuclear Security

What Type of Global System Is Needed?

- The system should be comprehensive; it should cover all weapons-usable nuclear materials and facilities in which they might be present, at all times.
- The system should employ international standards and best practices, consistently and globally..
- At a national level, each state's system should have internal assurance and accountability mechanisms.
- Globally, the system should facilitate a state's ability to provide international assurances that all nuclear materials and facilities are secure. secure.
- The system should work to reduce risk through minimizing or, where feasible, eliminating weapons-usable material stocks and the number of locations where they are found.

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NAVIGATION

Nuclear Security

- > Security is the responsibility of every person in the organization
- > Principle and resulting behavior:

Leadership behaviors:

setting standards expectations
good decision making
Involvement of staff
communication

Individual behavior

Personal accountability
Following procedures
Communication
Reporting

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NAVIGATION

Nuclear Security

Nuclear security is a cornerstone of preventing nuclear terrorism.

- An attack anywhere would be an attack everywhere.
- Currently, nuclear materials security largely depends on actions by individual states.
- A comprehensive global system is needed to provide confidence in each state's materials security.

Human resource development is the key to sustainability and effectiveness

Education and training to

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NUC sec and PPS complementarity

the nuclear security system:

- > prevention, detection of and response to Any nuclear security event
- > Install a nuclear security culture in the facility and ensure that all persons in the facility follow:
 - > Attitude and behavior of persons and leadership
 - > Ensure proper **coordination** and **communication**
- > protecting the confidentiality of *sensitive information* & protection of *sensitive information assets*
- > Ensuring protection of exchanged sensitive information

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PPS *objectives*

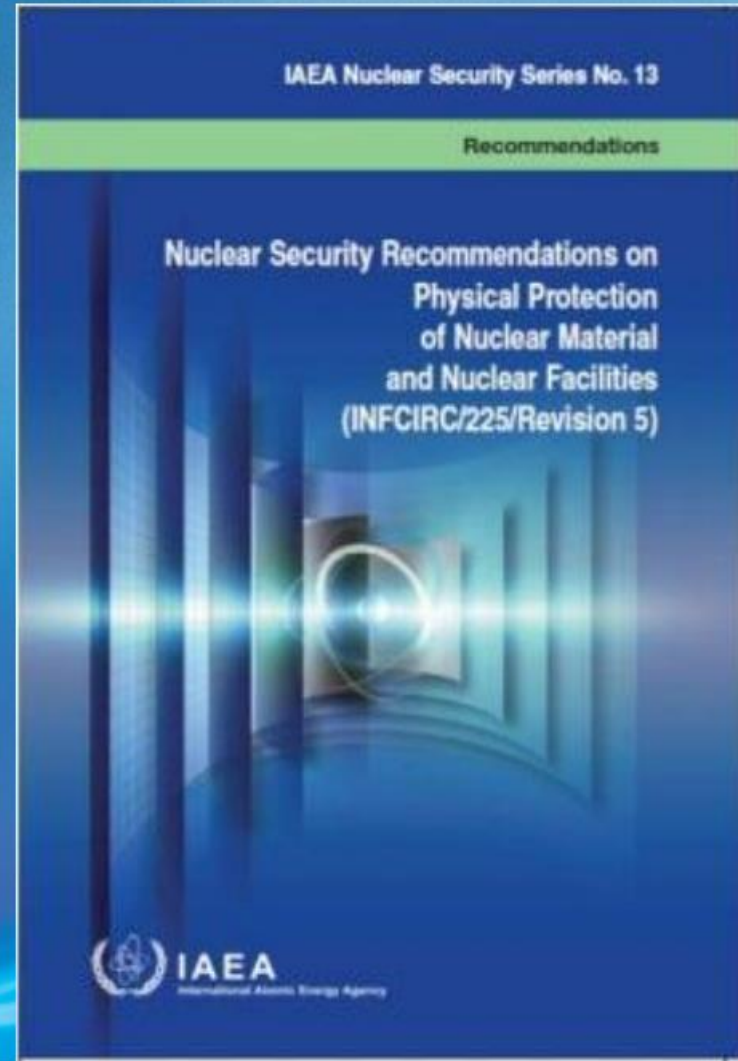
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The objectives of the State's physical protection regime, which is an essential component of the State's nuclear security regime, should be:

- To protect against *unauthorized removal*. Protecting against theft and other unlawful taking of *nuclear material*.
- To locate and recover missing *nuclear material*. Ensuring the implementation of rapid and comprehensive measures to locate and, where appropriate, recover missing or stolen *nuclear material*.
- To protect against *sabotage*. Protecting *nuclear material and nuclear facilities* against *sabotage*.
- To mitigate or minimize effects of *sabotage*. Mitigating or minimizing the radiological consequences of *sabotage*.



NUC sec and PPS complementarity

Essential Elements of a Nuclear Security Regime

1. State responsibility to establish, implement, maintain & sustain a nuclear security regime

applicable to all nuclear material, other radioactive material and their associated facilities & associated activities under the jurisdiction of the State.



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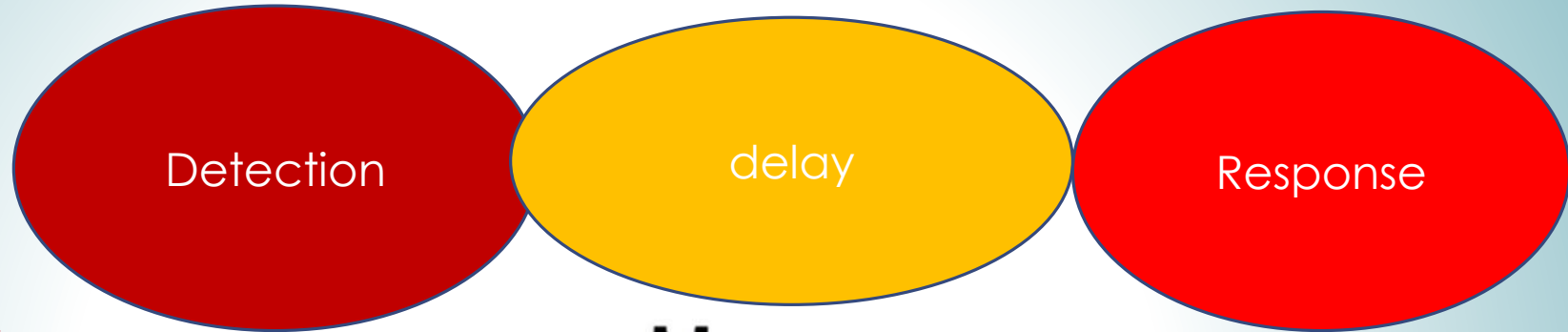
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Despite technical advancements, physical security is only as good as the people who operate and maintain the equipment

Security culture is a subset of overall organizational culture

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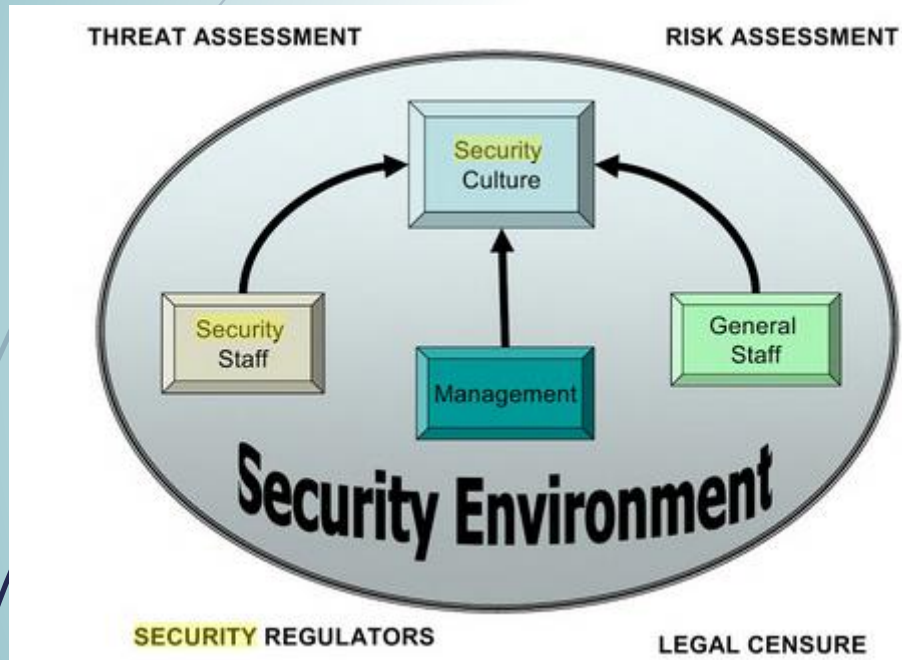
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Example: Pelindaba

- On the night of the attack, the majority of the employees were at a party, leaving a last-minute replacement to be the only person in the emergency response center.
- The response force took almost a half hour to arrive after a call confirming an attack.
- No one was ever prosecuted for anything in relation to the Pelindaba incident. The only people punished in the case were the security guards who were fired.
- The attackers displayed a detailed knowledge of Pelindaba's layout and security systems, as well as the expertise needed to overcome the site's defenses.
- The security policy of the facility allowed for a single employee to man the emergency response center.
- Despite the evidence of insider collusion, the CEO never launched a full investigation that would uncover the employees responsible.

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Pelindaba(Cont,)

- >If all of the employees at the facility were really convinced that a credible threat existed.
- >Employees at the facility also seem not to have adopted a vigilant and questioning approach. >The attackers were caught on surveillance cameras, but no one seems to have been monitoring the cameras at the time.
- >The response force was only 3 minutes away and yet took almost half an hour to respond. We could assume that these individuals either were not convinced that a serious attack was possible or that they were potentially involved as insiders. Both of these possibilities are troubling in terms of nuclear security culture.
- >The attackers also had intimate knowledge of the facility, which suggests either collusion with insiders at the facility or, at the very least, a failure to keep security information confidential.

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NUC sec and PPS complementarity

With the help and support of IAEA(Nuclear security division) :
Nuclear Security regime start from educational/training programs to meet global needs in nuclear security

- Shape the avenues of diplomacy and public policy for greater effectiveness in achieving global nuclear security objectives;

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NAVIGATION

Complementarity Nuclear Security & PPS

THANKS

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