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Nuclear And Radiological Security:

Introduction

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Outline

- **Concept and Importance**
- **Threats**
  - Insider threat
  - Sabotage
  - Diversion of materials
- **South Africa Case Study**
- **Nuclear security vs. security of radiological and portable sources**
- **International Legal Framework**

What is Nuclear Security?

- **What we really mean is NUCLEAR SECURITY CULUTRE!**
  - The IAEA defines nuclear security culture as:
    - *"The assembly of characteristics, attitudes and behavior of individuals, organizations and institutions which serves as a means to support and enhance nuclear security"*
      - Source: http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1347_web.pdf
- **This includes:**
  - The prevention and detection of, and response to theft, sabotage, unauthorized access, illegal transfer
  - Or other malicious acts involving nuclear or other radioactive substances or their associated facilities
- **This is MULTIFACETED!**
- **This can include:**
  - Nuclear Safeguards, Physical Protection, and Human Reliability

Influential Policy Makers on Nuclear Threat

- **“Nuclear terrorism is the gravest danger we face”**
  - President Barack Obama (July 2009)

- **“The gravest threat the world faces today is that extremists could get hold of nuclear or radioactive materials”**
  - Mohamed El Baradei (Nov 2009)

- **“The biggest threat facing the country is weapons of mass destruction in in the hands of a terrorist network”**
  - President George W. Bush (Sept 2004)

Dr. Siegfried Hecker on Nuclear Security

- **“Nuclear Security is not a destination!” – S. Hecker**
- **Los Alamos National Laboratory Director (1985-1997)**
- **Professor at Stanford**

Threats

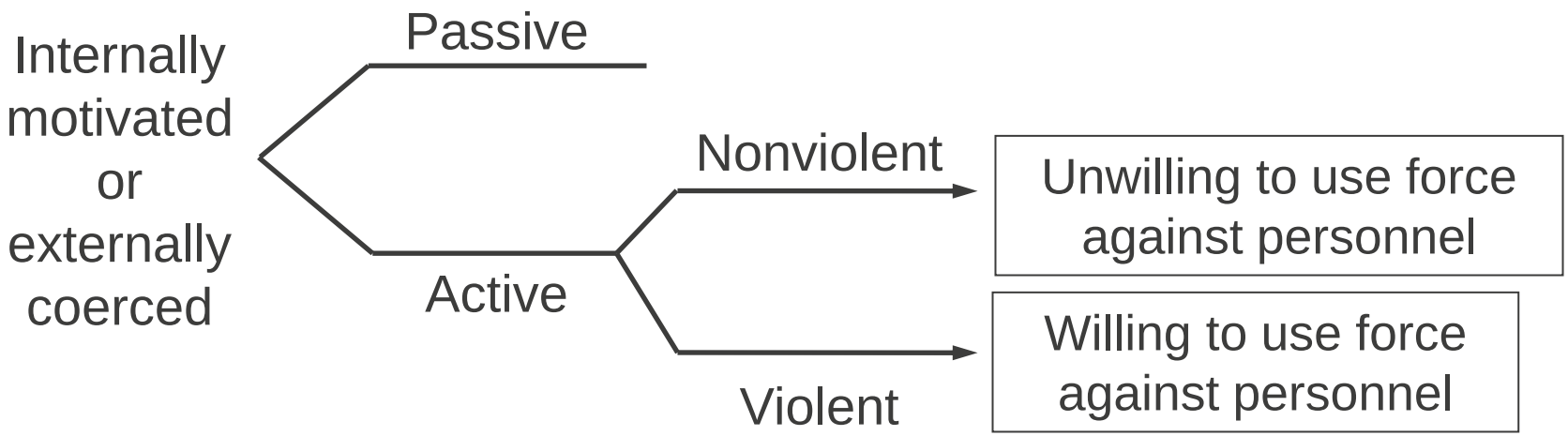
- **Insider Threat**
  - Trusted employees acting against a facility or government
  - Not always intentional!
- **Sabotage**
  - Damage or disablement in place to either prevent activities or cause catastrophe
- **Diversion of Material**
  - Removal of nuclear material for non-declared purposes (nefarious)

Insider Definition

Insider: **One or more individuals with authorized access to nuclear facilities or nuclear material in transport who could attempt unauthorized removal or sabotage, or who could aid an external adversary to do so. (From INFCIRC/225/Rev.5)**

- **Insiders might include, but are not limited to:**
  - Management
  - Regular employees
  - Security personnel
  - Service providers
  - Visitors
  - Inspectors
  - Past employees

Insider Categories



- **All insiders can use stealth and deceit**
- **Violent insiders may be rational or irrational**

Insider Attributes

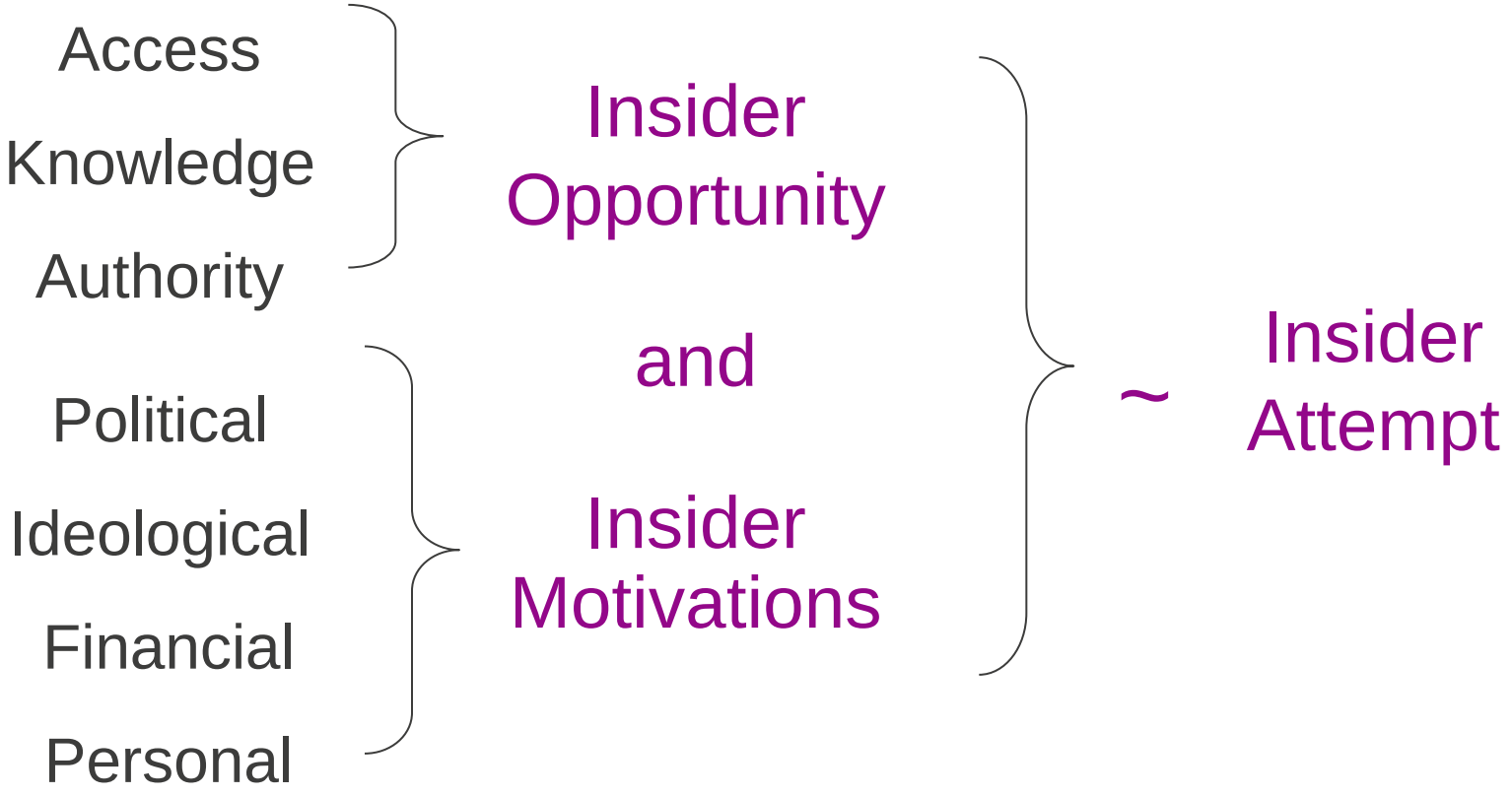
- **Authorized access to *nuclear facilities* or *transport* (from definition)**
  - Special/temporary/emergency access
  - Escorted vs. unescorted
  - Access to special tools and/or knowledge
- **Authority**
  - Over people, tasks, and/or equipment (coercion)
  - Temporary/falsified authority
  - Exemption from procedures
- **Knowledge**
  - Targets (location, characteristics, facility layout details, etc)
  - Security systems (response force details, operations, bypass info, etc)
  - Special tools/equipment (storage, access controls, etc)

Insider Motivations

- **Political**
- **Ideological – Fanatical conviction**
  - Moscow Theater
- **Financial – Wants/needs money**
  - General Electric
- **Personal**
  - Revenge – Disgruntled employee or customer
    - Idaho 1950s nuclear incident
  - Ego – "Look what I am smart enough to do"
    - Hackers
- **Psychotic – Mentally unstable but capable**
- **Coercion – Family or self-threatened**
  - 2006 London Robbery

Note: Motivation is an important indicator for both level of malevolence and likelihood of attempt

Factors Affecting Insider Attempt



Insider Issues and Concerns

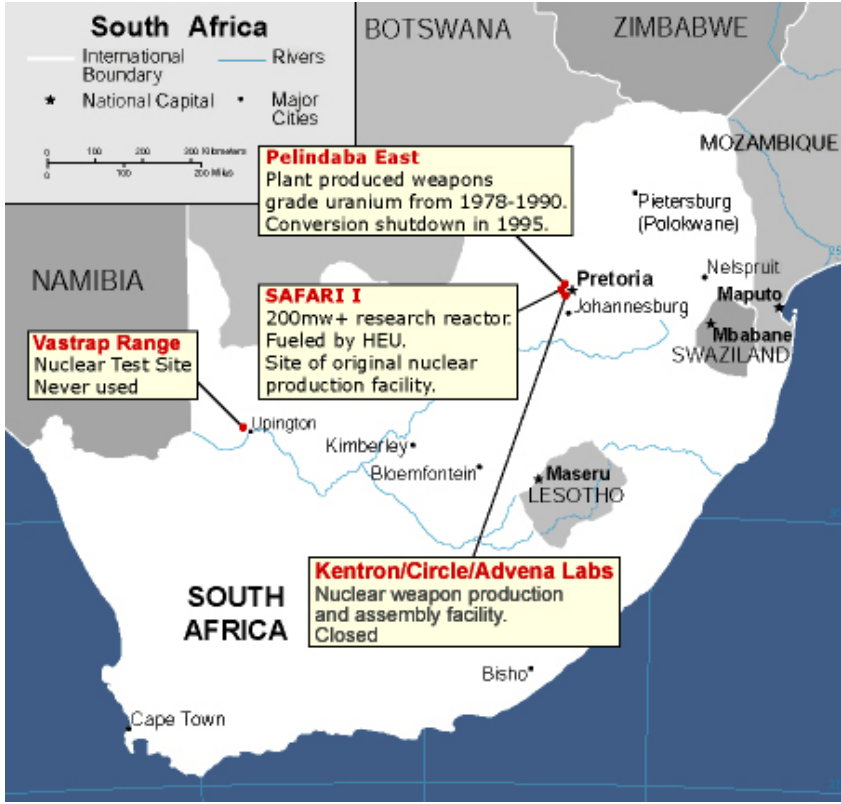
- **Time**
  - Can select optimum time to implement plan
  - Can extend actions over long periods of time
- **Tools**
  - Has knowledge of and capability to use tools already at work location
- **Tests**
  - Can test the system with normal "mistakes"
- **Teamwork (Collusion)**
  - May recruit/collude with others, either insiders or outsiders

Insider Definition Summary

- **Categories**
  - Passive
  - Active Nonviolent
  - Active Violent
- **Facility insider characteristics:**
  - Access, authority, knowledge
  - Motivation
- **Insider advantages**
  - Time
  - Tools
  - Tests
  - Teamwork

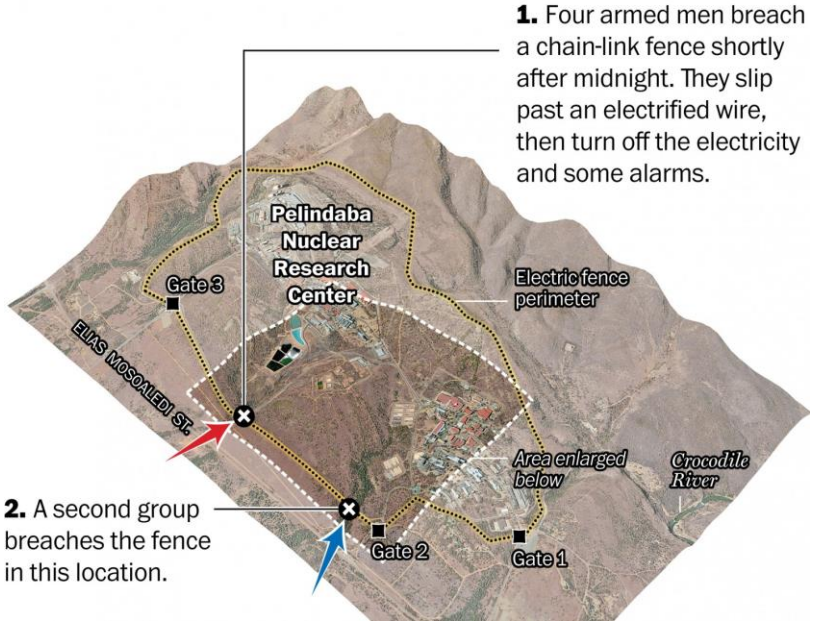
Pelindaba, South Africa

- **Site's primary functions:**
  - SAFARI-1 20MW research reactor
  - Particle accelerator for nuclear science research
  - Medical radioisotope production
  - Temporary storage for medical/civilian nuclear waste
  - Legacy enrichment facility from nuclear weapons program
  - Site of PBMR
  - Storage for legacy nuclear material (100's of kgs of HEU at the site)
- **Run by the Nuclear Energy Council of South Africa (NECSA)**
- **Operating since 1965**



Case Study: Pelindaba, South Africa (continued)

- 8 November, 2007
- Two teams of armed men attempted to break into the research center
- One team got through 10,000-volt security fence
- Disabled intrusion detectors
- Shot an employee (Anton Gerber)
- Spent 45 minutes inside “the fence”
- Never engaged by site security
- 60 Minutes News Video on the Pelindaba Security Incident
- http://www.youtube.com/watch?v=8dlvjLAxHJU



Case Study: Pelindaba, South Africa Lessons Learned

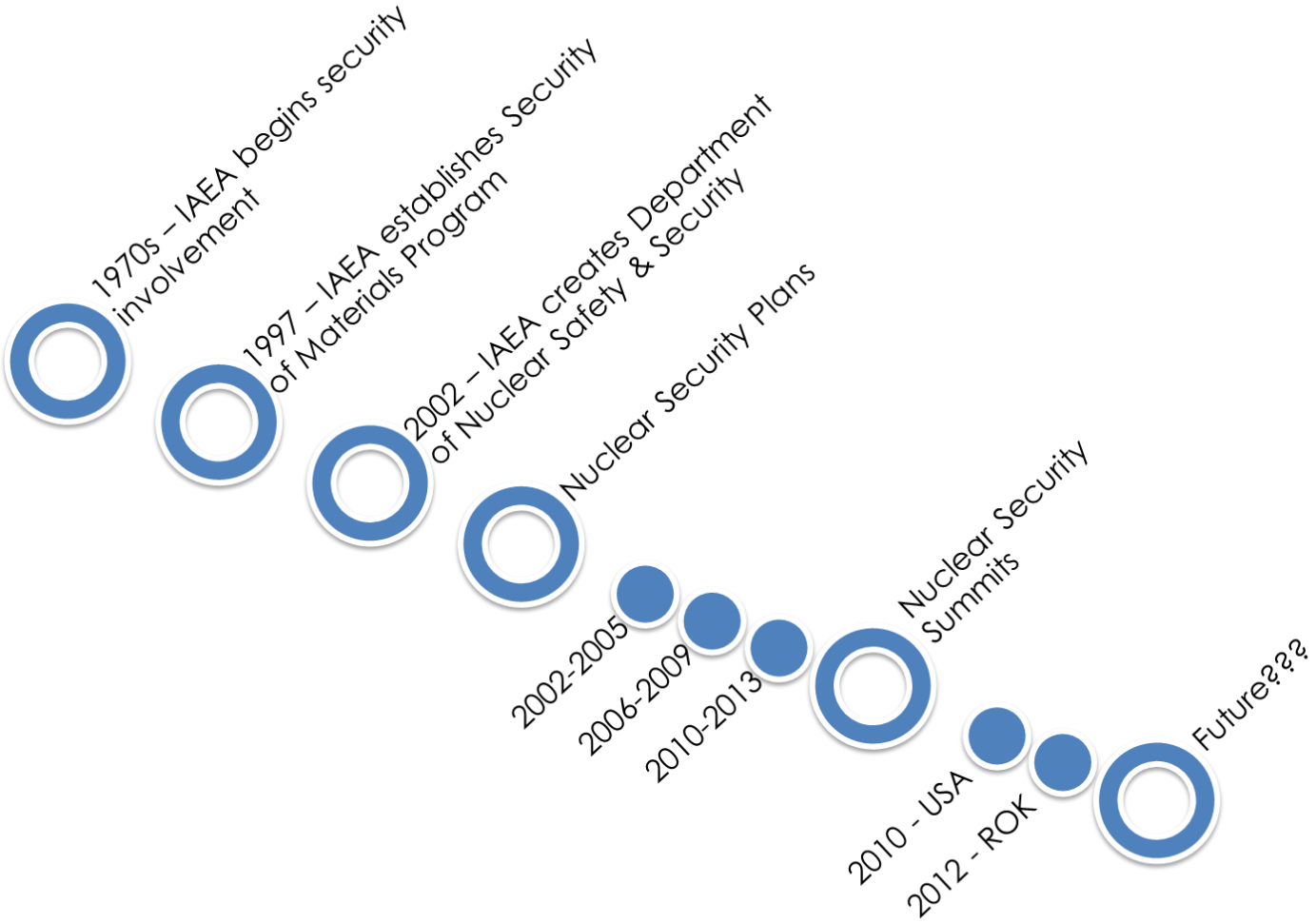
- **Familiarity of how to disable the intrusion detection and equipment at emergency control**
  - Strongly suggests help from the inside!
- **The security manager, two guards, and a shift supervisor on duty at the time resigned or were fired**
- **Intruders have never been identified or captured**

- **Clear that nuclear security systems must take into well trained adversaries and account insider knowledge!**

Nuclear Security vs. Security of Radiological and Portable Sources

- **My building is locked! Why does this matter?**
- **MORE than just Guns, Guards, and Gates!**
- **Nuclear Security encompasses**
  - Physical protection (guns!)
  - Human reliability
  - Facility access(guards and gates!)
  - Corporate attitude
  - Source/material access
  - Information security
  - Training
  - Response

International Nuclear Security Timeline



What is the International Nuclear Security Regime

- **2010-2013 IAEA Nuclear Security Plan (Current):**
  - **WHAT? –** (1) Contribute to global efforts to secure **nuclear & other radiological material** in use/storage/transport and (2) assist states in implementing full range of **international legal instruments** for nuclear security

Fundamental Nuclear Security Documents	
Convention on the Physical Protection of Nuclear Material	Only legally binding undertaking in the area of physical protection of nuclear material used for peaceful purposes
2005 Amendment to the Convention on the Physical Protection of Nuclear Material	Extends above protection measures to nuclear facilities/materials in peaceful domestic use, storage, or transport; expands cooperation among states regarding locating/recovering/mitigating missing material
International Convention for the Suppression of Acts of Nuclear Terrorism	Seeks to criminalize unlawful/intentional possession or use of nuclear materials or nuclear facility sabotage
Security Council Resolutions 1373 (2001) and 1540 (2004)	1373 – calls all states to become party all international instruments for nuclear security 1540 - calls all states to become party to the CPPNM (and amendment) and IAEA Code of Conduct
Nuclear Security Recommendations on Physical Protection of Nuclear Materials and Nuclear Facilities (INFCIRC/225/Rev.5)	See next slide
Code of Conduct on Safety and Security of Radioactive Sources	Non-binding agreement prevent unauthorized use of and minimize damage from malicious radioactive release

Nuclear Security International Legal Instruments

- **Cornerstone for physical protection:**
  - *Nuclear Security Recommendations on Physical Protection of Nuclear Materials and Nuclear Facilities* (INFCIRC/225/Rev.5)
    - Per INFCIRC/225/Rev/5: the **objective** of the **nuclear security regime** is “to protect persons, property, society, and environment from malicious acts involving nuclear material and other radioactive material”
    - …[and] the **goal** of **physical protection** is to:
      - Protect against theft or other unauthorized removal of nuclear material
      - Locate and recover missing nuclear material,
      - Protect material and facilities against sabotage,
      - Mitigate and minimize the radiological consequences of sabotage

Who Is Responsible?

- **The State**
  - It is important to note that it is the responsibility of the State to protect individuals, society, and the environment from nuclear and radioactive sources within its territory
  - This is different than the case of nuclear proliferation in which the international community (via IAEA regulation) is responsible for prevention of proliferation
- **The IAEA's role in this is to provide advice and support not to regulate**
  - This is similar to safety

Excerpts from the IAEA Code of Conduct

- **Every State should…**
  - have in place an effective national legislative and regulatory system of control over radioactive sources
  - ensure appropriate facilities and services for radiation protection, safety and security
  - ensure appropriate training
  - establish a national register of radioactive sources
  - ensure that information on incidents with potential trans-boundary effects is provided promptly to potentially affected States
  - define its domestic threat, and assess its vulnerability with respect to this threat for the variety of sources used within its territory
  - take appropriate measures consistent with its national law to protect the confidentiality of any information

Facility Operator Responsibilities

- **The facility operator will be required by the State to maintain security of the facility and materials**
  - Done through appropriate regulation
  - A facility is mandated to provide a certain level of security

- **However, sophisticated facility owners will recognize security and risk management as a means for increasing profit and efficiency, not just a required cost in which we do the minimum amount necessary**
  - Do you believe this?


QUESTIONS?