

IRSN

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COMPLEMENTARITIES BETWEEN SECURITY, SAFEGUARDS AND FRENCH NATIONAL SYSTEM OF ACCOUNTING FOR AND CONTROL

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DEFINITIONS

- *Safeguards: A set of activities by which it is possible to verify that a State is living up to its international undertakings not to use nuclear programmes for nuclear weapons purposes*
- *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*
- *National Control: A system to protect NM in facilities and during transport against theft and diversion. Protective measures to meet this goal consist of a set of measures of monitoring and accounting of NM and measures of physical protection of facilities and transport of NM*

RESPECTIVE APPROACHES (1/2)

- Security is based on provisions of physical protection of nuclear materials and facilities complemented by:
 - Provisions for accounting for and control to prevent and detect loss, theft or diversion of NM
 - Safety provisions to protect nuclear materials and facilities against sabotage
- Safeguards are mainly based on accounting data provided by States and on controls in the facilities
 - IAEA control is to check the final use of NM. The aim is to ensure that NM are not used for purposes other than peaceful
 - EURATOM control is a check of compliance to ensure that nuclear materials are not diverted from their intended uses as declared by the users

RESPECTIVE APPROACHES (2/2)

- The national control, implemented in France, is positioned upstream to the international controls. It aims to prevent, deter and detect the loss, theft or diversion of NM in installations or during transport
- International controls do not check the physical protection of NM, which is under the sole responsibility of the States
- Security and safeguards, supplemented by the provisions of the national control system, have a common purpose which is to protect against theft and diversion of NM

NATIONAL SYSTEM OF PHYSICAL PROTECTION

- The physical protection system has to protect NM against theft or diversion, but also against acts of sabotage
- Protection of NM against theft has to be adapted to:
 - The nature and quantity of NM, its physical and chemical form and packaging
 - Operations related to these materials and the local operating conditions
- Protection against sabotage has to take into account:
 - The sensitivity of each area of the facility characterized by the level of radiological consequences
 - The vulnerability of different areas for each type of aggression
- The physical protection system will be designed to protect nuclear materials and nuclear facilities against the predominant risk

PHYSICAL MONITORING AND ACCOUNTING

- The physical follow-up and the accountancy of NM constitute tools for prevention, detection and control
 - The national system for physical follow-up and accountancy acts to prevent theft and diversion of NM and if necessary to detect NM disappearance
 - The safeguards intervene in the verification of the countable declarations in order to control a posteriori the compliance with the declared use of the materials

NATIONAL ACCOUNTING FOR

- Accountancy is held separately for each category of NM, a separate account, by category, being held for irradiated materials
- The accountancy of the materials includes the chronological recording of each variation quantitatively affecting the NM stock or its distribution in the categories:
 - External movements, receipt and shipping
 - Internal operations: use, movement and transformation
 - Corrections and adjustments, results of measurements, calculations and estimates
 - Differences identified during physical inventories or any other occasion
- Inventory changes must be recorded the same day they occurred or were determined

PHYSICAL FOLLOW-UP

- **The French regulation requires operators to ensure the follow-up of NM to know at any moment, their location, use, movement and transformation**
 - **Periodic inventory:** The holder of NM must carry out at least once a year a physical inventory of all NM in his establishment or facility
 - **Inventory in case of emergency:** In case of suspected theft, the authority may require a crisis inventory to deny or confirm any information or suspicion in all facilities holding NM
 - **Transfer of materials:** implementation of a mechanism to exchange information between shippers and recipients, with contradictory checks as well as recognition of materials upon receipt by the recipients

INTERNATIONAL ACCOUNTING STATEMENTS

➤ Controls of IAEA

- Accounting and record of measurements
- Physical inventory and comparison with the accounting
- Declarations of imports and exports of nuclear materials

➤ Controls of the European Commission

- Verification of the declarations sent by the nuclear operators
- Physical check on the spot by Commission inspectors and on site inspectors on some French installations
- Commission inspectors are also interested in quality assurance practices through a type of audit approach

INTERNAL THREAT

- A physical segregation of the facility in space and time enhances protection against the internal threat
- The monitoring and accounting of NM can usefully complement the physical protection against insiders
 - monitoring of nuclear materials (choice of measurement points, precision of controls, inventory methodology...)
 - accounting of these materials (procedures...)
 - consistency between reality and its representation in physical follow-up and accounting
 - independence of the systems and the tasks of follow-up and accounting
 - organization of work of employees in all phases of life of the facility
 - periodic inventories

LOSS OF NUCLEAR MATERIAL

- The physical protection system generally presents limited effectiveness to detect a loss of NM
- The monitoring system complement the PPS to detect a loss by means of:
 - physical inventories
 - internal controls made by the operator
 - checks at the shipping and reception stages

NATIONAL CONTROL

➤ Inspections

- First level of control: the operator has to ensure the monitoring, accounting and protection of NM
- Second level of control: the authority has to verify
 - the stocks and movements of NM
 - that the physical protection measures required by the regulation are properly implemented
- Inspections cover the area of physical protection as well as that of accounting for and control and complement each other on these two areas

➤ Cross data

- Accounting information for changes in the stocks of NM
- Information provided by carriers on the quantities of transferred NM

OTHER LINE OF DEFENCE (1/2)

➤ Confidentiality

- In the security field, confidentiality rules, trustworthiness checks, screening of people could be considered as a specific line of defence

➤ Radiation protection

- Radiation detectors used to detect the unauthorized movement of materials emitting ionizing radiation could help to detect theft of NM
- Access restriction to protected areas in the sense of radiation protection can help to discourage or even prevent the theft of NM or sabotage by an insider

OTHER LINE OF DEFENCE (2/2)

- **Search of non declared activities**
 - The broaden scope of the Additional Protocol (information related to a nuclear program, broaden access to facilities) constitutes an additional line of defence likely to ensure a better control of NM and associated activities
- **Control of criticality**
 - Provisions implemented to limit the risk of criticality accidents (limitation of the concentration of fissile materials' solutions, division of the quantity of NM involved) could help to the protection of NM

CONCLUSION

- **Protection of nuclear materials in France is based on multiple layers of different natures which complement each other:**
 - **Nuclear security:** based on physical protection provisions
 - **Safeguards:** based on accounting data and controls in facilities
 - **National System of Accounting for and control:** based on specific rules for physical protection, physical follow-up and accounting for
 - **Other lines of defence** such as:
 - Confidentiality rules
 - Safety and radiation protection provisions
 - Search of non declared activities
 - Control of criticality