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Overview of INPRO methodology in the area of Physical Protection

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INPRO and Sustainability



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Overview on INPRO methodology for Physical Protection (PP)



- INPRO defined one basic principle (BP) for PP:
 - ***BP: A Physical Protection Regime shall be effectively and efficiently implemented for the full lifecycle of an INS.***
- To fulfil this BP the State, the operator, and the designer are asked to consider several (12) user requirements covering the four general areas of the PP regime:
 - Area No.1: **Legislative and regulatory framework**
 - Area No.2: **Siting, layout and design**
 - Area No.3: **Design of the PP system**
 - Area No.4: **Contingency planning and consequence mitigation**

- **PP area No.1: Legislative and regulatory framework**
- **User requirement UR1: *Prior to the deployment of the INS the legislative and regulatory framework to govern PP should be established (by the State).***
 - Competent authorities designated, empowered and responsibilities defined.
 - Legislative and regulatory framework developed
 - Responsibilities and authorities of operator defined.

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- **PP area No.2: Siting, layout and design**
- ***UR2: Physical protection should be integrated into all INPRO areas and throughout all phases.***
 - Synergies between PP, safety and PR and operations.
 - Evidence PP has been accounted for in all INPRO areas.
 - Evidence of forethought regarding PP at shutdown and decommissioning.

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- **PP area No.2: Siting, layout and design**
- **UR9: *The PP should be considered when siting INS components.***
 - Terrain, topography and geography assessed to preclude potential benefits to adversaries.
 - Feasibility, flexibility, vulnerability and efficiency of transportation and offsite response routes assessed.
 - Future development, encroachment by public considered.

- **PP area No.2: Siting, layout and design**
- **UR10: *INS component layout and design should be developed to minimize susceptibility and opportunities for malicious acts.***
 - Evidence that PP considered in design of INS components.
 - Evidence that PP considered in layout of INS components.

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- **PP area No.3: Design of the PP system**
- **UR3: *A program to determine trustworthiness should be defined and implemented.***
 - Program of trustworthiness established.
- **UR4: *Sensitive information developed for all areas of INPRO should be protected in accordance with its security significance.***
 - Program and procedures developed and implemented for identification and protection of relevant information according to security significance.

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- **PP area No.3: Design of the PP system**
- ***UR5: The physical protection systems (PPS) should be based on the State's current evaluation of the threats .***
 - Design basis threat (DBT) developed.
 - Periodic review by State of DBT.
 - DBT used as basis for establishment of PPS.
 - Flexibility in PPS design to cope with dynamic nature of threat.
- ***UR6: Physical protection requirements should be based on a graded approach.***
 - State defined limits of consequences of malicious acts.
 - Concept of graded approach used by State to define PP requirements and by operator to define PPS.

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- **PP area No.3: Design of the PP system**
- **UR7: *Quality assurance policy (QAP) and programs for all activities important to PP should be established and implemented.***
 - QAP defined and implemented.
- **UR8: *All organizations involved in implementing physical protection should give due priority to development, maintenance and effective implementation of the security culture in the entire organization.***
 - Security culture program developed and implemented.

- **PP area No.3: Design of the PP system**
- **UR11: *The physical protection system of all INS components should be developed in uniform layers of protection using a systematic approach.***
 - *Deterrence, detection, assessment, delay, and response integrated.*
 - *Insider adversaries included in PPS design .*
 - *Several uniform and complementary layers and methods include in PPS design .*

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- **PP area No.4: Contingency planning and consequence mitigation**
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- **UR12:** *Contingency plans to respond to unauthorized removal of nuclear material or sabotage of nuclear facilities/transport or of nuclear material, or attempts thereof, should be prepared and appropriately exercised by all license holders and authorities concerned .*
 - Responsibilities for execution of emergency plans identified.
 - Capabilities of PP regime established to prevent and mitigate radiological consequences of sabotage.
 - Capabilities of PP regime established to recover stolen NM or recapture facilities before adversary achieves his objective.



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Necessary input for an INPRO assessment



The following information should be available to the INPRO assessor:

- Description of the INS.
- Description of the legislative and regulatory framework related to PP and of the respective responsibilities of State authorities and license holders pertaining to PP.
- Results of an analysis of the considerations for PP during site selection and facility design.
- Results of an analysis of the effectiveness of the envisioned Physical Protection Systems (PPS) of all nuclear facilities (including transport) of the INS to be assessed.
- Draft physical protection plan.

Necessary input for an INPRO assessment



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The design and the analyses of the PPS for an INS should be performed by PP experts together with the operator and with support from the technology supplier to provide input to the INPRO assessment.

The analysis needed for an INPRO assessment should contain the information as outlined in the discussion of the criteria consisting of indicators and acceptance limits.

In an early stage of development of innovative designs, a PP plan and a PP analysis might not be available or possible. In such a case the INPRO criteria could initially serve as input to the design, to be assessed as specific PPS design information as it becomes available.



Thank you for your attention

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