Toward a More Coordinated Set of GIF/INPRO Proliferation Resistance and Safeguardability Assessment Tools

INPRO Collaborative Project PROSA

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PROSA – The Project

- INPRO Collaborative Project PROSA (Proliferation Resistance and Safeguardability Assessment)
- Duration: 2011–2013
- Deliverable: IAEA report drafted in 2013
- Main features
  - A follow-up to INPRO Collaborative Project PRADA (Proliferation Resistance: Acquisition/Diversion Pathway Analysis)
  - Continued cooperation with GIF
  - Evaluation of a mutually beneficial reference case
- IAEA-internal coordination: SG, NE
PROSA – Ultimate Goal

• Make assessment of Proliferation Resistance simpler, less time consuming

• **Provide recommendations to revise INPRO Manual on Proliferation Resistance (TECDOC/1575, rev. 1, Volume 5)**

• Use only the depth of analysis necessary to address the assessor’s needs (two-dimensional phased assessment):
  
  • Facility level – comparative assessment, safeguardability assessment, diversion path analysis
  
  • NES level – diversion path analysis
  
  • State level – evaluate completeness of legal and regulatory undertakings and their implications at NES and facility levels
  
  • “Self assessment” or “assessment by others” affects assessment philosophy and purpose
Example: Nuclear Material Attractiveness

- Limit the attributes/evaluation parameters to the most important ones:
  - Material type - IAEA definition (useable in nuclear explosive devices)

  **Note:** all plutonium (non-RTG) will remain under IAEA Safeguards (per IAEA Statute, INFCIRC/153 and 540). Comparably, international physical protection standards (e.g., INFCIRC/225, rev. 4) treat unirradiated plutonium as highly attractive and begin category designation at a 15g threshold. Although no international standard is in place for alternative nuclear materials (ANM: Np, Am), some Member States are currently regulating them as attractive materials (e.g., DOE O 474.2). The IAEA currently verifies reprocessing flowsheets for non-separation of ANM and requires declaration of certain waste stripping activities under Additional Protocols in force.
Material characteristics (physical/chemical forms) that make the diversion of attractive materials from, or misuse of, declared facilities more difficult from either a timely detection or processing point of view (GIF TD – technical difficulty).

This includes the difficulty to establish subsequent undeclared processes, that may remain undetected, which could produce material for use in a nuclear explosive device.

...Link to Additional Protocol (INFCIRC/540)
Effect of Additional Protocol:

• If a given State has a CSA in force without an Additional Protocol, then the IAEA is only able to conclude whether declared nuclear material inventories remained in peaceful activities.

• For such a State, an assessment is limited to the declared NES/facility level and “completeness” cannot be assessed.

• For a State with an Additional Protocol in force, assessment of “completeness” is related to whether a “broader conclusion” has been reached by the IAEA.
Assessment of Safeguardability

- Describe process of evaluating of whether *effective and efficient* IAEA Safeguards can be implemented:
  - Starting point is effective Safeguards – no significant barrier exists to prevent technical implementation at facility level
  - Theoretically, all facilities can be effectively safeguarded, but at what cost – efficiency?
  - See, e.g., “Facility Safeguardability Analysis In Support of Safeguards-by-Design”, INL/EXT-10-18751
  - Development of comparative assessment approach with ratios of essential cost and/or burden elements to evaluate efficiency and/or formal cost/benefit analysis?
INPRO PR Manual Revision

Advice on revision of INPRO PR Manual, including:

• Revision/rework of INPRO User Requirements, Criteria and Acceptance Limits with improved explanation of rationale

• Restructuring and reformatting of the evaluation tables to improve logic, clarity and utility

• Introduction of novelty evaluation and comparative assessment approaches

• Elimination (to the extent practicable) of “expert judgement” as an INPRO Acceptance Limit

• Explanation of phased approach and how to use assessment to support “gap analysis” and sustainability planning
...Thank you for your attention