

Abstract for the INMM

UNATTENDED SYSTEM VERSUS UNANNOUNCED INSPECTIONS CONSIDERATIONS REGARDING COST-EFFECTIVENESS

**M. A. Marzo; H. E. Vicens; A. L. Biaggio
ABACC**

Some diversion and misuse scenarios may be addressed using a Containment and Surveillance Unattended System (CSUS), or performing unannounced inspections (UIs). Although the objective is the same, the conceptual approaches are different. A CSUS is aimed at detecting a diversion of nuclear material by keeping the continuity of knowledge (e.g. on a given inventory or flow of nuclear material) coupled with activities intended to detect an eventual tamper of the system. UIs are aimed at deter a diversion of nuclear material because of the risk of early detection. Each UI is planned to identify and detect potential indicators of a diversion of nuclear material.

This difference is clearly identified throughout the inspections activities carried out in each case, for instance in case of safeguarding a pond spent fuel inventory:

- a) In the case of a CSUS working properly, the inspectors examine the records and confirm that the system has not been tampered with. To cover the tamper scenario a low-level inventory re-verification during PIVs took place.
- b) When performing effective UIs, the inspectors look for indicators of diversion of spent fuel, such as spent fuel casks, special tools or any other potential indicator that a removal of spent fuels have already took place or is under preparation.

Eventual re-verification of the pond's inventory would be the consequence of a CSUS failure in the first case and the detection of a suspicious matter, personage or piece of information on the second case.

Based on the concepts indicated above, the cost-effectiveness of these two approaches is evaluated, considering inter alia the following elements: Reliability and deterrence effect, operational costs and costs associated with re-verification.

Each element is analyzed based both in ABACC experience and in the information available. The results of a simplified theoretical exercise for the case of an existing NPS are presented.

Finally, the deterrence effect of the measures foreseen on the Additional Protocol is examined and its significant effect on the effectiveness of UI is analyzed.