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NMAC and Nuclear Security: Philosophy of Concept and Feasibility of Implementation

NMAC and Nuclear Security: Philosophy of Concept and Feasibility of Implementation
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Nuclear security is one of the three important components of the triad namely Safety, Security and Safeguards. Soon after the IAEA came into existence, appropriate mechanisms in terms of documentation (agreements, conventions, Guides. both legally binding and otherwise) and modalities of implantation have been made available for safety and safeguards. Even though necessity of addressing nuclear security issues was recognised even earlier, it is only since the beginning of this century, this matter has attracted increased global attention.

Nuclear security is the responsibility of each individual State, but international cooperation is vital to support States in establishing and maintaining effective nuclear security regimes. Since 2006, the IAEA has issued Nuclear Security Series publications to help States to establish effective national nuclear security regimes. In 2015, the IAEA published Nuclear Security Series No. 25-G Implementation Guide: "Use of Nuclear Material Accounting and Control for Nuclear Security Purposes at Facilities". The main purpose of this publication is to focus on measures to prevent and mitigate the risk posed by insider threats.

An attempt has been made in this presentation to study

• Other parameters which could be potential candidates for assessing Nuclear Security particularly from the published literature of the IAEA

• Philosophy of using NMAC for assessing nuclear security

• Feasibility of applying NMAC as a tool for assessing nuclear security at different nuclear facilities and in different member states categories: no nuclear facilities, small quantities protocol members states, limited nuclear facilities, large nuclear facilities

• Role of MUF in assessing NMAC as a tool for assessing nuclear security

• Requirement of detection goals in terms of quantities (whether absolute quantities or relative quantities: the ideal situation for nuclear security assessment)

• Timeliness of detection

• The analytical methodology available for this purpose.

Based on the above study, it is inferred that application of NMAC even by a State with enough infrastructure and technical capability and despite having enough experience in meeting the safeguards obligations is quite challenging. Increasing merely number of material balance areas (MBA) may not result in minimising the challenges. The nature of fuel cycle activities, the total quantities of nuclear material and the type of nuclear facilities (item handling or bulk handling or material processing) determine the challenge of using NMAC as a tool addressing nuclear security. Typical examples are given to demonstrate this challenge.

The considerations of using NMAC as described above led to a broader conclusion that in most of the cases "Control"of nuclear material through administrative and technical means may be the first and critical line of approach followed by "accountancy"involving physical inventory taking of items containing nuclear material in the designated MBAs. Given the stringent requirements of accounting nuclear material with greater degree of accuracy needed for nuclear security and the achievable measurement uncertainties in the analytical methodology currently available, detailed accounting of nuclear material involving analytical measurements may not be feasible and in fact quite challenging. Thus, the philosophy of using NMAC system for nuclear security may be limited to maintain and report accurate, timely, complete and reliable information on all activities and operations (including movements) involving nuclear material without involving detailed analytical measurements. The goal should be to maintain control over the nuclear material to ensure continuity of knowledge, and thereby to enhance the ability to deter and detect unauthorized removal of nuclear material. In the opinion of the author, it may be desirable to restrict the expansion of the acronym NMAC to "Nuclear MAterial Control"instead of "Nuclear Material Accountancy and Control".

State

India

Gender

Male

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