The industrial area is used for processing and packaging the main export products for the country. There are several residences and apartment buildings located within approximately 300 m to the southwest of the RSCL. There is a significant amount of criminal activity in the general area at night as reported by the security forces, due to its location and proximity to various commercial properties. On average, there are five cars stolen per year or vandalized in the immediate vicinity. To tackle this concern, state actors conduct comprehensive and credible threat assessments followed by appropriate actions to improve radiological security.

Threat assessment is the practice of determining the credibility and validity of a potential threat, and to acknowledge the probability that the estimated threat can be activated into reality. This study analyzes a hypothetical radiological research organization using modeling tools. The research evaluates three (3) facilities at the radiological organization and their Physical Protection System (PPS) to assess possible entrances and diversion. The three (3) major facilities being considered for this research at the RSCL are the Calibration Laboratory (F1), the National Repository (F2), and the Interim Storage facility (F3). The buildings allocated for these facilities are strategically spaced from each other to allow effective transfer of materials and also to support routine security response concerns.

The site security plan prepared by the stakeholders has considered the need for periodic threat assessment to be conducted to support the response team and maintain effective security onsite. This condition with initial probabilities of adversary attack as 0.26, 0.15 and 0.42 leads the scenario into a state of varying probabilities of threat at the three (3) facilities being considered; F1, F2 and F3 respectively. The research conducts several repetitive runs of the threat assessment process using the modeling tools, by considering different response elements that could potentially be added to the design to reach the desired response margin and overall system effectiveness. After thirteen (13) simulation event trials, a steady state is reached with final probability of adversary attack values as 0.60, 0.09 and 0.14 for facilities F1, F2 and F3 respectively. The several trials conducted and the steady state reached serves as a guide for facility managers to acknowledge and determine the resources required to control adversary attacks at the various facilities considered at the nuclear organization.

EHANCEMENT OF SECURITY CULTURE USING A PREDICTIVE MODEL TO PREVENT SABOTAGE AND THEFT AT RADIOLOGICAL FACILITIES

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With the increase in the application of nuclear technology around the globe, there is a need to institute predictive and prudent measures at nuclear and radiological facilities and activities to adequately and effectively protect their materials from incidents and adversaries.

This implies that the human factor and security culture as defined by the International Atomic Energy Agency (IAEA) in the Nuclear Security Series No. 7, plays a crucial role in the entire nuclear security architecture of any organisation or state. Physical Protection Systems for nuclear facilities and radiological sources are designed to protect and/or prevent possible malicious acts.

The dynamic significant threat environment has evolved such that, relying on the perception that certain nuclear materials are self-protecting, can lead to the sabotage and unauthorized removal of facility assets by insiders. These assets are manned by management members and employees who are trained and trusted to maintain procedures and practices required for the routine operation and development of the associated facilities and activities.

The methodological approach utilized in this research as a predictive potential insider model adapts initial data from the threat group table of the hypothetical facility, Anshar Radiation Source Calibration Laboratory and National Repository (RSCL).

The initial state vector values adapted from the threat group table with a high, medium and low potential insider attribute analysis are; 0.42% 0.33% and 0.25% respectively of the employee population at RSCL.

This methodology is designed to quantify the likely outcome of an implemented internationally recommended security culture model to guide management of nuclear and radiological facilities in preventing sabotage and theft at nuclear and radiological facilities.

Over a 20 year period (ie. trials), involving an annual International Atomic Energy Agency (IAEA) recommended self-assessment of the facility security culture, a steady state of 0.38%, 0.35% and 0.27% of the employee population indicating a fairly balanced security system.

The obtained steady state will aid the managers of RSCL to acknowledge and make the necessary changes to the knowledge training development of personnel, the controlled authorized access granted to the employees at various divisions of the facility and control the level of authority granted to the employees.

ENSURING SECURITY WHEN USING RADIOACTIVE MATERIALS IN A RADIOLOGICAL FACILITY

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The number of radioactive materials used in the radiological facilities around the world demands for an effective security to be put in place. Ensuring the safe operation of facilities that uses radioactive materials has always been priority of States, personnel and the general public. The main idea is to keep these operating