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Abstract
Despite dynamic nuclear security threats to the Eastern and Central African regions, and decisions made by the government of Uganda to embark on a nuclear power program, there have not been policies put in place to encourage coordination and cooperation among the stakeholders in nuclear security activities. Uganda needs to establish policies that streamline roles and mandates for nuclear security agencies, including regulators, security and intelligence agencies, police, border control, transport control, customs agencies, and others. The policies will allow stakeholder agencies to work together, as necessary, on different nuclear security operations to strengthen the national nuclear security regime. This paper considers findings from the review of the UK Nuclear Design Basis Approach, and a review of the current situation at the state level in Uganda regarding the collaboration of stakeholders in nuclear security.

I. Introduction: Nuclear Security in Uganda
Nuclear security is a relatively new concept in need of governance and regulatory systems in Uganda, as well as many other African countries. Nuclear security is a resource-intensive undertaking and thus its infrastructure and capabilities have not advanced in most developing countries: because these governments have prioritized their available resources to address challenges seen as more life-threatening, including poverty, hunger, health, energy, democracy, and social infrastructure development. With growing nuclear technology applications and the increase in threats, Uganda must establish an effective and efficient national nuclear security plan [1].

Nuclear facility threats have increased as a result of increased applications in nuclear and radiological technology, making nuclear security a priority. There is widespread use of radioactive sources in medicine, industry, mining, road construction, and other fields in Uganda. In 2015, the government announced their intentions to embark on a nuclear power program. Their intention is problematic due to the increased threats of nuclear terrorism from the Al-Shabaab terrorist group, who have previously conducted severe terrorist attacks in Uganda. Al-Shabaab increases the nuclear security threat by taking advantage of the porous borders around Uganda for smuggling nuclear or radioactive materials for sale or blackmail.
Roles and responsibilities are, by default, distributed among a number of stakeholders who are charged with lead roles in different aspects of nuclear security within a state. In most cases, the major stakeholders are government institutions that are established by national legal instruments. In many cases, the various agencies coordinate and collaborate to assign responsibilities for advancement in nuclear security. Collaborations between government agencies in Uganda are implemented through memoranda of understanding between agencies in line with the legal instruments that establish specific agencies. There is no established mechanism for coordination of joint operations, and this presents a challenge for nuclear security.

Many different institutions work towards enhanced nuclear security—including regulation of nuclear and radiological practices, border control, transport control, import and export control, and radioactive waste management. Together, the institutions attempt to ensure nuclear security and safety, but they are currently without an official, comprehensive, and collaborative program, which leads to gaps in communication. Gaps can cause doubt and conflict among institutions and inhibits an efficient execution of nuclear security work, hindering the effectiveness of the national nuclear security program at large.

A clear concept of collaborative communication, lobbying, sourcing, allocation, and management of resources for nuclear security facilitates transparency and increases the effectiveness of nuclear security. With all stakeholders having a round table where priorities, strategies, and decisions can be negotiated and adopted, communication and consultation with external stakeholders and management in both bi-lateral and multi-lateral relationships will be more efficient.

A. Collaboration among Nuclear Security Stakeholder Agencies in Uganda

Uganda has protocols in place for the legal framework of nuclear security as it relates to the use of nuclear material and radioactive sources. However, there are no protocols in place ensuring efficient and effective coordination in the execution of inter-agency nuclear security activities. An absence of permanent and inclusive institutional collaboration among key stakeholders for nuclear security policy has led to identifiable gaps in inter-agency action.

The lack of a collaborative program hinders the optimization of the available resources, such as radiation detection equipment and trained human resources. Agencies are only aware of what they themselves have and are often unable to access assistance when needed, despite the fact that it may be available within the country.

B. Objective

The objective of this paper is to propose a plan for coordination and cooperation among major Ugandan nuclear security stakeholder agencies in congruence with the nuclear security responsibilities and operations. It identifies stakeholders’ nuclear security responsibilities and provides proposals for establishing and maintaining an effective plan for inter-agency action.

II. Why Inter-Agency Coordination?

A permanent framework for stakeholder inter-agency coordination and cooperation in nuclear security would achieve the following goals:

a) Make the most efficient use of each organization’s resources in the context of existing mandates, legal framework, and the objectives of the state’s nuclear security regime.
b) Facilitate a common understanding of security situations, their consequences, and the way they are expected to develop through an exchange of information (which may include monitoring and technical data).

c) Foster a common and respectful approach to developing mandates for emergency-related activities and procedures that would serve as communication to stakeholders, reports for the government, and statements to the media and public.

d) Exchange information regarding an agency’s specific capabilities, actions planned, actions taken, information received, and information released.

e) Promote efficient and coordinated provision of assistance to other parties in accordance with their mandates, since several organizations may be approached with the same information or request.

f) Facilitate ad-hoc agreements on dividing work among national organizations, which may be needed in emergency situations, nuclear security events, incidents, and other relevant situations, as well as to solve any other practical problems.

III. Current Status: The Challenge

Due to the increase in radiological applications, the initiation of Uganda’s nuclear power program, and the increase of nuclear security threats as discussed in section one, the following have been identified as key issues affecting the coordination of inter-agency action for nuclear security in Uganda:

(1) The major stakeholder agencies and their roles in nuclear security have not clearly been identified or utilized for the advancement of national nuclear security activities. The border and aviation police departments are currently left out of the national nuclear security arrangements.

(2) The legal mandates of several stakeholder agencies do not clearly state roles, responsibilities, or accountabilities for nuclear security. They also do not provide for methods enabling several agencies to cooperate with each other.

(3) There are no state-level methods or programs that allow coordination and collaboration among stakeholders that identify communication, commands, and reporting structures in nuclear security initiatives.

With the lack of established nuclear security methods, the country faces inescapable realities related to its nuclear security regime, and coordination of inter-agency action for nuclear security:

(1) Rising trends in the use of nuclear technologies in Uganda for health, agriculture, industry, education, research, and power generation.

(2) Increased need for cooperation in nuclear security, with respect to the dynamic local and regional nuclear security threat environment.

In light of these realities, inter-agency action for nuclear security should focus on eliminating duplicate roles and optimizing resources for nuclear security. It should also identify key nuclear security stakeholders. It should focus on eliminating gaps and overlaps in the nuclear security regime through streamlining accountabilities for various aspects of nuclear security in the country.
IV. Reviewing the UK Nuclear Design Basis Threat Approach

This section presents the findings from a study of the United Kingdom’s (UK’s) national system for prevention of acts of nuclear terrorism and protection of nuclear material, radioactive sources, associated equipment, and facilities in the civil nuclear industry. This information was obtained from publicly accessible documents and other open and unclassified sources of information, mainly the internet.¹

The International Atomic Energy Agency (IAEA) and the World Institute of Nuclear Security (WINS) have commended the UK for having implemented a solid, efficient, and effective nuclear security regime as regards both physical protection of materials and facilities, and preparedness for detection and response to nuclear security events [2].

A. The UK Design Basis Threat

In the United Kingdom the Design Basis Threat (DBT) document is referred to as the Nuclear Industries Malicious Capabilities (Planning) Assumptions (NIMCA) and its preparation is coordinated via the Joint Terrorism Analysis Centre (JTAC), which is the UK centre for all source analysis and assessment of international terrorism. JTAC sets threat levels and issues analytical reporting to government departments and agencies [3].

NIMCA is prepared for systematic national threat assessments that take into account the inventory of civil nuclear material, radioactive sources, and associated equipment and facilities. The country acquires input from all relevant security and intelligence organizations and agencies, both at home and abroad, including those from other states. JTAC performs the coordinating role for the preparation of NIMCA.

The UK’s DBT is a dynamic document that has a formal annual review process. JTAC examines all current intelligence relating to the UK’s nuclear industry and can demand a review and update as needed per new threat information provided by JTAC. Conclusions are used to establish the type of threat the civil nuclear industry should protect against as stipulated in the nuclear security regulatory requirements, the Nuclear Industries Security Regulations of 2003 (NISR 2003). The Conclusions are recorded in a document which was issued by the Office for Nuclear Regulation (ONR), known as the ‘NIMCA’, (UK’s DBT). This provides the basis for the design, implementation, and management of security measures and systems undertaken by regulated civil nuclear industries in the United Kingdom.

NIMCA sets the “threat” bar for physical protection systems and the provision of security resources by the operators which are expected to be sufficient enough to sustain an effective and proportionate security posture on a daily basis. It also allows for a re-posturing of security activity if a national change in threat demands it [3, 4].

(Figure 1) illustrates the UK’s approach to DBTs, and how its outcomes are conceptually put to use by the UK’s nuclear industry. It includes three sections: Section 1 involves national agencies that conduct an overall national threat assessment and, from it, extract conclusions for the NIMCA; Section 2 involves two independent state agencies that are charged with overseeing the implementation of protective measures to counter the NIMCA; and Section 3 involves the nuclear industry or the licensed nuclear operators who have the responsibility to put in place industry-level protection measures against the NIMCA threats.

¹ No interviews were conducted and no single individual from either within or outside the United Kingdom was consulted or interviewed in the preparation of this work for purposes of studying the UK nuclear security system.
V. Way Forward: Proposals

A nuclear security–focused research case study for coordination of inter-agency action for Uganda was compared to a good practice model used in the United Kingdom. This section describes the need for effective collaboration and the need to further generate recommendations towards improving coordination. This paper makes a number of general and specific stakeholder recommendations, based on which a model for coordination and cooperation of nuclear security in Uganda can be developed.

A. General Recommendations

Below are suggestions for coordination of inter-agency action for strengthening Uganda’s nuclear security regime.

1) The border police and aviation police departments are currently left out of the arrangements for inter-agency nuclear security operations. These departments must be brought on board to close the gaps in combatting illicit trafficking of radioactive sources and nuclear material. This will strengthen the nuclear security detection methods in airports and border entry points, thus minimizing the risk of illicit trafficking of nuclear and radioactive materials across Uganda’s borders [5].

2) National-level policies should be developed for coordination among the stakeholder agencies that specify the means and mechanisms for how several agencies will cooperate in executing their mandates related to nuclear security [6].

3) Under the auspices of the nuclear and radiological regulatory body, inter-agency nuclear security working groups should be established and required to participate in regular meetings. There should be formally appointed representatives from the relevant stakeholder agencies, as per its periodic work plan, to prepare the DBT, to organize nuclear security measures for major public
events, to monitor shipments of nuclear or radioactive materials, and to perform any other tasks as assigned by the national nuclear security committee.

4) With the introduction of the nuclear power program, a special unit of the police should be established, trained, and equipped with the skills and abilities to protect nuclear installations, defend/respond to attacks to them, and pursue and recover lost nuclear or radioactive materials. This measure has been effective in the United Kingdom and is implemented through the Civil Nuclear Constabulary [7].

5) The national security and intelligence agencies should intensify their efforts in assessing nuclear threat information and putting measures and expertise in place to manage threats to the nuclear industry [8]. As the potential targets for theft and sabotage of nuclear and radioactive materials and facilities increase, so should the national intelligence service to effectively counter it.

6) The National Security Organizations Act of 1987 should be reviewed to establish the duties of the National Security Council secretariat, adding roles for receiving, reviewing, and disseminating the nuclear threat information to the head of the national nuclear and radiological regulatory body for preparation, review, and update of the DBT [9, 10].

7) There should be open communication among agencies before and during nuclear security operations. A clear chain of command and distribution of key responsibilities should be assigned, especially during joint operations and incidents, as well as a designated top office from which incident or operations management instructions are taken [11].

8) Communication officers for media and the public should be established for nuclear security events to inform the public about the inter-agency action for nuclear security in the country [12].

9) Defined procedures on how to activate interagency in a joint operation or in response to an incident is essential; they should be clear about to whom, when, and how the incident or operation is declared complete and closed. It should further be specified how recovered/seized nuclear or radioactive material should be stored and managed [8].

B. Stakeholder-Specific Recommendations

This section provides recommendations for roles and activities specific to each individual stakeholder agency to effectively coordinate inter-agency action for nuclear security. The recommendations have been tabulated with an additional recommendation about whether a particular stakeholder should be part of the National Nuclear Security Committee (NNSC), based on the agency’s mandate and sensitivity of information accessible to this committee.

Table 1: Recommended stakeholder roles for coordinated interagency action for nuclear security in Uganda

| # | Stakeholder agency | Roles and responsibilities | NNSC Membership |
|---|-------------------|---------------------------|----------------|
| 1 | Nuclear & Radiological Regulatory body | • Issuing regulations and guidance for all nuclear and radiological activities in the country and monitoring and verifying adherence to them.  
• Inspecting and enforcing the nuclear security regulations and monitoring potential threats to facilities in collaboration with other stakeholders [13]. | Yes |

Regulator sets requirements and verifies physical protection in...
|   | National Police | National Security Council (Secretariat) |
|---|----------------|----------------------------------------|
|   | • Implementing international commitments related to nuclear security and disseminating scientific, technical, and regulatory information to stakeholders. | • Receiving the state’s security intelligence information from the internal and external security organizations and processing it to define facilities in view of the DBT. |
|   | • Maintaining communication among and coordinating with other nuclear security agencies in and outside the country. | Also provides radiological expert assistance and advice during nuclear security events. |
|   | • Obtaining nuclear threat information from the National Security Council secretariat and coordinating the preparation of the national nuclear Design Basis Threat [5]. |   |
|   | • Establishing physical protection and security requirements for facilities based on the adopted DBT statement [14]. |   |
|   | • Coordinating and organizing administrative and capacity-building inter-agency activities, including training of personnel and working group meetings. |   |
|   | • Providing nuclear and radiological expert assistance and guidance to other stakeholders in the prevention of, detection of, and response to incidents [10]. |   |
|   | • Organizing training and capacity development for other stakeholders. |   |
| 2 | Enforcing nuclear security laws, regulatory requirements, and other related laws within the state. | Yes |
|   | • Participating in nuclear threat assessment and preparation of the national nuclear Design Basis Threat [5]. | Police responds to nuclear security events and requires quick contact and understanding of the coordination system to perform well and support other agencies. |
|   | • Collecting and sharing additional intelligence information with intelligence and other security agencies on the nuclear threats. |   |
|   | • Acting as guards for some sites and acting as first responders to incidents and nuclear security events in and outside nuclear facilities. |   |
|   | • Providing security support and backup as off-site responders to nuclear and radiological facilities. |   |
|   | • Participating in nuclear security measures for major public events in collaboration with other stakeholder agencies [10]. |   |
|   | • Responding to incidents and nuclear security events, arresting culprits, managing crime scenes, collecting evidence, performing forensic analyses, and prosecuting offenders. |   |
| 4 | Security Intelligence Service [15] | • Gathering and submitting intelligence on threats to the nuclear security and any related aspects of the National Security Council and relevant security agencies.  
• Participating in threat assessment and development of the nuclear DBT.  
• May work hand-in-hand with other security agencies in analyzing criminal and military strategic intelligence relating to nuclear security. | Yes  
They are crucial in DBT development |
| 5 | Customs and Border Control Agency | • Verifying compliance with legal and regulatory requirements for transport, import, export, and trans-shipments of nuclear material and radioactive sources.  
• Detection and initial response to illicit trafficking of nuclear material and radioactive sources at borders, ports, and airports [16].  
• Notifying and communicating with fellow nuclear security competent authorities upon detection of trafficked nuclear and radioactive material.  
• Maintaining and exchanging information with the regulator on import/export and trans-shipments of nuclear material and radioactive sources [8]. | Yes  
They are crucial in implementing the nuclear security detection architecture at borders. |
| 6 | Licensed Operators | • Implementing the best physical protection systems for the nuclear material and radioactive sources and associated equipment within their facilities against a Design Basis Threat [14].  
• Designing, implementing, and maintaining technical solutions that satisfy regulatory requirements related to physical protection and security of nuclear material or radioactive sources in their facilities.  
• Ensure first-level control of radioactive sources and nuclear material in their facilities and practices.  
• Verify the skills and appropriate training of personnel employed in facilities.  
• Inform the regulatory body of any event affecting or likely to affect the security of the nuclear material and radioactive sources. | No  
They may not be cleared to access intelligence information beyond their facility specific DBT.  
They receive relevant information through the regulatory body. |
| No | Local/Municipal Authorities | • Assisting in the dissemination of information, evacuation of residents, and general management of the crisis in case of a nuclear security event.  
• Mobilizing the population near nuclear and radiological facilities to adhere to security guidance and sharing of information on possible threats. | No | Information security considerations |
| --- | --- | --- | --- | --- |
| 8 | The Military | • Detecting and neutralizing of cross-border nuclear threats, advising fellow competent authorities on security of information [8].  
• Stepping in when nuclear security events escalate out of hand for the police and for incidents and attacks that are beyond the defined DBT.  
• Providing support to on-site security at nuclear power plants and similar facilities in case of high-level events when contacted [14]. | Yes | They need to keep updated on the DBT to streamline terms and situations for their intervention in civil nuclear security. |
| 9 | Emergency Medical Service | • Developing national capacity for handling and treatment of cases of high exposure and contamination, including mechanisms for seeking external assistance in escalated cases.  
• Providing the treatment of individuals affected by contamination or exposure resulting from a nuclear security event or incident including exposed or contaminated members of the response team. | No | They respond only on call and may not cleared to access intelligence information |
| 10 | Foreign Affairs Ministry | • Continuously scrutinizing and being party to relevant international legal instruments for nuclear security.  
• Keeping the country engaged in bilateral and multilateral international nuclear security arrangements and programs.  
• Requesting for external assistance in cases of escalated nuclear security events [8]. | Yes | They need to ready measures for obtaining international assistance. |
| 11 | Justice Ministry | • Drafting or preparing and adopting state-level nuclear security legislation, including laws, regulations, and inter-agency coordination | No | --- |
procedures. Also ensuring presence of provisions for prosecution and penalties for offenders. No roles outside legal actions.

| 12 | National Nuclear Security Committee |
|----|-------------------------------------|
|    | • Overseeing the coordination of inter-agency agency action and developing general policies and strategies for the state’s nuclear security regime. |
|    | • Reviewing the national nuclear DBT and making policy decisions for implementation of suitable nuclear security measures. |
|    | • Developing and reviewing concepts of operation for inter-agency action in nuclear security in the state and appraising nuclear security performance. |
|    | • Approving and adopting strategies and measures for inter-agency action in nuclear security. |

C. The Inter-Agency Coordination Model

The recommendations above would result in the most practical model for coordinating inter-agency action for nuclear security in Uganda, as shown in Figure 2.

Figure 2: Coordination model for inter-agency nuclear security action in Uganda.
VI. Conclusion

In view of Uganda’s nuclear security situation, with lessons from the UK’s approach to collaboration of nuclear stakeholders, and also in consideration of international recommendations from the IAEA, a number of general and specific recommendations were generated and a coordination model for inter-agency action for nuclear security was suggested.

Stakeholders’ coordination on both global and state levels is critical to achieving the intended outcomes of the nuclear security efforts and enables effective use of taxpayer resources. Without coordination on all levels, communication is poor, money is wasted, equipment goes unused, gaps are unnoticed, opportunities are missed, and good will is squandered. No one wins awards or makes headlines with this thankless task of effective inter-agency coordination; however, without it there is a greater security risk, and aspiring nuclear terrorists are more likely to acquire the materials, skills, and opportunities to kill millions and inflict economic and political havoc.

This paper discussed the state of nuclear security in Uganda with a major focus on collaboration among the different nuclear security stakeholder agencies. These observations were made in response to the growing nuclear and radiological application prospects with respect to the prevailing nuclear security threats. It discussed the need for effective coordination of inter-agency action in nuclear security, outlining a number of collaboration opportunities; it also looked at possible risks arising from uncoordinated approaches of stakeholder agencies in the country. The approach adopted in the UK in the development and use of their DBT, NIMCA, was reviewed and noted as a commendable practice case.

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