

# STRENGTHENING NUCLEAR SECURITY BY INSTALLING THE NUCLEAR SECURITY CULTURE

Abdelouahed Chetaine, O. Kabbache, T. Bouassa & A. Saidi  
Faculty of sciences university mohammed V Rabat Morocco  
email : [a.chetaine@um5r.ac.ma](mailto:a.chetaine@um5r.ac.ma)

**Abstract.** Nuclear security culture is defined as the assembly of characteristics, attitudes and behavior of individuals, organizations and institutions, which serves as a means to support and enhance nuclear security culture.

As Defined by the IAEA, Nuclear security is: The Prevention and Detection of, and Response to, theft sabotage unauthorized access illegal transfer theft , Sabotage , Unauthorized access, Illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated other radioactive substances or their associated facilities. These objectives can be achieved with equipment, methods and human behavior that we can trust.

The objectives of the nuclear security and physical protection system is to protect nuclear facility or nuclear material against threats and terrorist. The equipment is not sufficient it must be completed with nuclear security and nuclear security culture to achieve these objectives.

The foundation of nuclear security culture should be the recognition that a credible threat exists, that preserving nuclear security is important, and that the role of the individual is important.

**Key Words:** nuclear security, nuclear security culture.

## What is nuclear security

the use of nuclear material continues to increase (whether in the production of energy or peaceful use in hospitals, industry or research) in parallel, the interest of terrorists to acquire nuclear matter to produce dirty bombs or the real nuclear bomb. we know that every country has a nuclear security system.

Nuclear security deals with the prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities. (IAEA reference)

- Nuclear security is based on the:
- Prevention
- Detection
- Response



- The Nuclear Security Series was launched in 2006 and is continuously updated by the IAEA in cooperation with experts from Member States.
- The series comprises four sets of publications:
  - **Nuclear Security Fundamentals**, which establish the fundamental objective and essential elements of a State's national nuclear security regime.
  - **Recommendations**, which set out measures that States should take in order to achieve and maintain an effective regime.
  - **Implementing Guides**, which provide guidance on how States can implement the Recommendations.
  - **Technical Guidance**, which provide more detailed guidance on specific methodologies and techniques for implementing security measures.
- The IAEA Nuclear Security Training and Demonstration Center will help strengthen countries' abilities to tackle nuclear terrorism. It will be located at the IAEA laboratories facility in Seibersdorf, 30 km south of Vienna, Austria, and is scheduled to be operational in 2023.
- NSSC cooperates with international community in maintaining an effective physical protection system and preventing crimes during the interstate transport of nuclear materials. We exchange information to develop advanced technologies with the international organizations.

The consequences of a serious nuclear accident would not be contained within national borders, but would certainly have an impact on other states. As a result, member states have recognized their obligations to

one another for many years. The same kind of logic is beginning to be applied in the field of nuclear security.

Without avoiding their national responsibility, member states have recognized that they can sometimes act more efficiently through common legislation, by developing common guidelines under the IAEA.

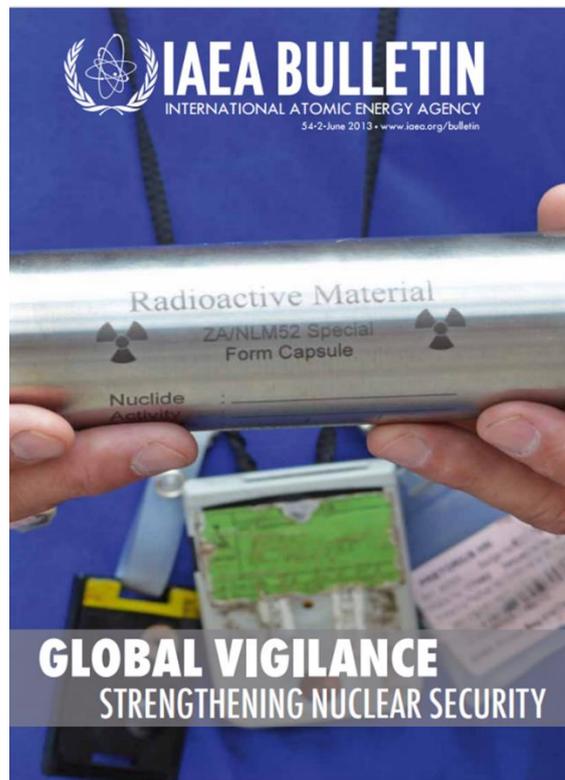
The Nuclear Security Summit, held in Seoul in Mar 2012, boosts our roles in leading the efforts to strengthen the global nuclear security regime. NSSC will further contribute to consolidating nuclear non-proliferation and nurturing experts by opening the International Nuclear Security Academy to the international community in 2014.

#### ► **Role of the IAEA**

- Global attention focused on nuclear power and one of the key ingredients for its growth, nuclear security, during the *Nuclear Security Summit*, convened in Washington, D.C. on 12 and 13 April 2010 by US President Barack Obama. **The IAEA** defines nuclear security as "the means and ways of preventing, detecting, and responding to sabotage, theft, and unauthorized access to or illegal transfer of nuclear material and other radioactive substances, as well as their associated facilities".

#### ► **The Challenge**

It's a phrase as weighty as the challenge States face to prevent anyone from acquiring radioactive materials to make a crude, yet devastating weapon. The **IAEA** works closely with its Member States to establish and enhance the measures needed to control and protect nuclear and radioactive materials, as well as prevent illicit nuclear materials trafficking.



  
**IAEA**

The International Atomic Energy Agency's mission is to prevent the spread of nuclear weapons and to help all countries — especially in the developing world — benefit from the peaceful, safe and secure use of nuclear science and technology.

Established as an autonomous organization under the United Nations in 1957, the IAEA is the only organization within the UN system with expertise in nuclear technologies. The IAEA's unique specialist laboratories help transfer knowledge and expertise to IAEA Member States in areas such as human health, food, water and the environment.

The IAEA also serves as the global platform for strengthening nuclear security. The IAEA has established the Nuclear Security Series of international consensus guidance publications on nuclear security. The IAEA's work also focuses on helping to minimize the risk of nuclear and other radioactive material falling into the hands of terrorists, or of nuclear facilities being subjected to malicious acts.

The IAEA safety standards provide a system of fundamental safety principles and reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from the harmful effects of ionizing radiation. The IAEA safety standards have been developed for all types of nuclear facilities and activities that serve peaceful purposes, as well as for protective actions to reduce existing radiation risks.

The IAEA also verifies through its inspection system that Member States comply with their commitments under the Nuclear Non-Proliferation Treaty and other non-proliferation agreements to use nuclear material and facilities only for peaceful purposes.

The IAEA's work is multi-faceted and engages a wide variety of partners at the national, regional and international levels. IAEA programmes and budgets are set through decisions of its policymaking bodies — the 35-member Board of Governors and the General Conference of all Member States.

The IAEA is headquartered at the Vienna International Centre. Field and liaison offices are located in Geneva, New York, Tokyo and Toronto. The IAEA operates scientific laboratories in Monaco, Seibersdorf and Vienna. In addition, the IAEA supports and provides funding to the Abdus Salam International Centre for Theoretical Physics, in Trieste, Italy.

- Many organizations and institutions help to implement nuclear security in different states members of the IAEA
- INSEN (education, workshops, )
- NSSC (practice)
- And others like INMM, WINS and... (workshops, webinars, meeting)
- All this effort is good for the implementation of NS
- But to complete the protection of NM we need **nuclear security culture**

## NUCLEAR SECURITY CULTURE

- Radioactive materials play an important role in medical, research and energy facilities. Many of these facilities implement security systems to protect the radioactive materials; however, a facility's *security culture* can make the security system more efficient.
- **What is nuclear security culture**  
 Security culture is a term used to describe the beliefs and behaviors people exhibit in relation to security. It is one of the most challenging aspects—and underlying vulnerabilities—in the practical implementation of security. This presentation will discuss the role of security culture in a facility's security system and why a strong security culture is so important for protecting radioactive materials. The presentation will also explore how disposing of radioactive materials or using alternative non-radioisotopes technologies will impact a facility's security culture out of order.

the protection of NM must be a priority, whatever the category and radioactivity level

The use of NM must remain safe and secure during its life

When NM escape regulatory control and in route for malicious use, we must have the capacity to detect and return it to regulatory control.

STAFF knowledge of radioactivity and nuclear security is VERY POOR!!!

Nuclear security is not yet included in the work instructions for many facilities.

- To understand the threat to radioactive materials, including the potential motivations of adversary groups and individuals;
- To appreciate the particular threat posed by insiders and how to mitigate the threat;
- To develop a common understanding of what an effective security culture looks like and how it can mitigate threats;
- To identify the respective roles and responsibilities of licensees and regulators in establishing an effective and sustainable security culture;
- To review methodologies for measuring the level of security awareness and good culture in an organization, assessing the results and implementing change;
- To identify possible incentives to encourage staff to adopt security best practices as a normal part of their daily work lives;
- To identify training opportunities to improve the competency of staff;
- To explore the use of peer review as a method for an independent assessment of security culture and identifying areas for improvements; and
- To explore permanent threat reduction approaches through the adoption of alternative technologies.

Indeed, an effective security culture for NM depends not only on proper planning, training, operations, and maintenance, but also on the thoughts and actions of people who plan, operate, and maintain security systems.

## STRENGTHENING NUCLEAR SECURITY REGIME BY THE IMPLEMENTATION OF NUCLEAR SECURITY CULTUR

The foundation of security culture is recognition by those that have a role in regulating, managing, or operating facilities or activities involving radioactive sources, or even those that could be affected by such activities in which a credible threat exists and that security is important.

There is a clear recognition of the human factor plays in maintaining control of radioactive sources at the lowest possible risk level.

NS is not only guidance and rules

As an assembly of characteristics, attitudes, and behavior, security culture is a supporting and enhancing tool of

the security regime of radioactive sources. As defined by the IAEA, the objectives of the regime are to:

Protect against unauthorized removal of radioactive material;

Protect against sabotage of material, facilities and activities, i.e. production, processing, use, storage, disposal, transport, etc.;

Ensure the implementation of rapid and comprehensive measures to locate and recover radioactive

material that is lost, missing or stolen and to re-establish regulatory control

securing civilian and military nuclear infrastructure is critical in preventing a radiological release or, in a worst-case scenario, an accidental or deliberate nuclear explosion. Traditionally the focus of nuclear security specialists has been on physical threats, such as theft of nuclear materials or sabotage of facilities. However, a newer threat has emerged—a ‘cyber’-attack on a system that could be conducted in conjunction with a physical attack. This new and growing threat presents significant challenges to facility operators as well as national authorities. The chapter examines the nature and range of ‘cyber’ threats posed to civilian and military nuclear systems. In doing so, the chapter builds on a growing literature that seeks to understand the intersection of the innovative field of information technology with the much more established literature on nuclear security (both civilian and military). The chapter provides an overview of the cyber nuclear vulnerability/risk landscape, surveys the nature and contours of the existing academic and policy debate, and hopefully provides a way of thinking about how to meet these challenges going forward

People are the main players in the design, testing, maintenance, and operation of any security system, and their performance depends on each person’s capabilities, limitations, motives, and attitudes, as well as the quality of instruction and training provided them. This is explored in the chapter through the concept of ‘culture’, as a tool to support, enhance, and sustain nuclear security. The chapter reviews the genesis and application of nuclear security culture as developed and practiced by the International Atomic Energy Agency (IAEA). The IAEA’s program is designed to enable trained individuals to identify security risks, stay motivated, empirically evaluate the ambient culture, and adjust it to current and emerging needs. Because security culture constitutes a subset of organizational culture, it strives to improve the performance of the human component and make its interface with security technology and regulations more effective and user-friendly.

To protect people, property, society and the environment from harmful effects of ionizing radiation. Work to deal with the risks from sources of radiation during their normal use and from possible accidents is considered work to promote nuclear safety. Nuclear security work aims to prevent, or detect and respond, to intentional malicious acts involving radioactive substances or directed against facilities or activities where such substances are used.

Nuclear or radioactive material of all types, whether in use, storage or transport, must be secured as it could be used to cause harm and disruption to society. The emergence of cyber-threats and other new technologies that might be used in attacks, or to protect against attacks, has further broadened the understanding of the need for nuclear security.

Nuclear materials and technologies find various peaceful applications like power generation, radiation therapy, food processing, and industrial applications. However nuclear materials and other radioactive substances can harm the people and the environment if used by non-authorized persons, in special if those material are acquired by terrorists this would be a serious threat for the World security.

Nuclear security deals with the prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities. (IAEA reference)

Nuclear security is so far a national responsibility, what makes more difficult the implementation and assessment of standard international practices.

In recent years, with the increasing terrorism threat, nuclear security is getting more and more importance but not sufficient. This led the international community to apply greater efforts to minimize this threat. nuclear security culture must reduce gaps and strengthen the nuclear security regime.