NUCLEAR SAFETY AND SECURITY INTERFACE: EXPERIENCE OF THE RUSSIAN FEDERATION

TAISIYA AFANASYEVA
The State Atomic Energy Corporation Rosatom
Moscow, Russia
Email: TaAleAfanasyeva@rosatom.ru

Nuclear security aims at protection of persons, property and society, as well as the environment [1] against the radiological consequences of malicious acts involving nuclear material, other radioactive substances or their associated facilities. Nuclear safety aims at protection of people (individually and collectively) and the environment [2] from undue radiation hazards by means of ensuring proper operating conditions, prevention of accidents or mitigation of accident consequences.

While there are many apparent similarities in the areas of nuclear safety and nuclear security, it is important to take into consideration core differences which are obvious in the process of documents development, as well as in the process of practical solutions implementation. Simple merge of nuclear safety and nuclear security into one system is impossible because nature and principles of structure and functioning of the two systems are different, they are based on distinct legal framework, the level of responsibility of a state is not the same, as well as the terminology is diverse.

Nuclear security, as well as nuclear safety, has its main purpose - the protection of people, society and the environment. However, the sources of the threats in these two systems are completely different what dictates the principles and approaches to protection against these risks. For safety assurance, it is necessary to neutralize the risks arising from *unintended events* (natural occurrences, hardware failures, other internal events or interruptions) or human mistakes; whereas, for nuclear security it is necessary to minimize, or ideally eliminate, the risks arising from *malicious acts* (unauthorized removal and sabotage).

It is important to notice that nuclear security is an area which is based on sensitive information, often classified information (state secret). Approach to achievement of nuclear security objectives significantly differ from approach to achievement of nuclear safety objectives, inter alia because of obligations of information protection. Nuclear security does not allow for the same level of transparency and international obligations, as it is present in the field of nuclear safety. In the area of nuclear security, the IAEA acts only upon a request from the Member States what confirms the specific nature of the area as well.

It is necessary to highlight that interaction of nuclear safety and nuclear security is present constantly. Some elements (such as safety and security culture), actions (e.g. response actions in emergency situations) and documents (e.g. response plans at the nuclear facility or stipulations of the national regulations on reciprocal consideration of requirements on nuclear safety and nuclear security) serve the common purpose of overall protection. Such joint aspects require evaluation and coordination before they are applied.

In the Russian Federation on the level of competent authorities and nuclear facilities, approach to interconnection of nuclear safety and nuclear security is implemented within the requirements of the regulatory authority. Within the Russian approach to physical system development, nuclear safety requirements are taken into account already on the pre-design stage.

In the course of vulnerability assessment for a nuclear facility, working groups are created where nuclear safety specialists must be invited. Such working groups assist in identifying nuclear facility vulnerabilities, which nuclear security specialists protect then. In order to develop effective physical protection system preventing sabotage, in-depth understanding of technological processes at radioactive nuclear is required.

Nuclear safety specialists are essential for classification of radiological consequences of nuclear security events. For ensuring appropriate physical protection of radioactive materials and nuclear facilities, it is mandatory to establish if a nuclear security event could cause unacceptable radiological consequences or high radiological consequences (e.g. personnel radiation exposure, population radiation exposure outside of nuclear facility, environment radiation contamination).

Cooperation of specialists of the both areas in necessary also at the design stage in order to archive optimal design concept. Design of buildings and premises where radioactive materials are stored and used is of special importance. Physical protection requirements must not complicate performance of safety functions (e.g. access of fire-fighting crew), as vice versa – safety requirements must not compromise or complicate physical protection measures (e.g. redundancy of doors and windows).

Within the framework of emergency planning, it is vital to ensure coordination of development of integrated evacuation plan that incorporates both nuclear safety requirements and nuclear security requirements. Moreover, the integrated evacuation plan should ensure cooperation between officials responsible for nuclear safety and officials responsible for nuclear security. At the stage of emergency plan development, it is necessary to consider objectives of both areas: protection of people and the environment and protection against unauthorized acts directed at radioactive materials and nuclear facility vulnerabilities. Furthermore, it is important to take into account emergency exit requirements on the design stage.

Nuclear safety culture and nuclear security culture is part of the overall organizational culture. Nuclear safety culture and nuclear security culture interfere and influence each other inevitably. Both cultures are based on the same principles. However, there are some characteristics which are unique for each culture. The most significant difference between nuclear safety culture and nuclear security culture is approach to the handling of information. Whereas, nuclear safety strives to open and wide spread of information (in order to prevent repetition of accidents and emergencies), nuclear security tend to restrict information dissemination (in order to protect sensitive information which could compromise physical protection). Taking into account differences, establishing and maintaining integrated culture is vital.

Considering all abovementioned, the following conclusion is reasonable: nuclear safety and nuclear security are independent, connected and mutually reinforcing areas. Concurrently, merging the two systems is unacceptable due to their different nature and characteristics. Interconnection and interface of the systems shall be taken into account in order to reach the common goal. Simultaneously, each of the two systems is equal and autonomous; none shall be subordinating or prevailing to the prejudice of the other.

One of the tasks of the IAEA and countries with significant experience of reliable, safe and secure operation of nuclear facilities and use of nuclear and other radioactive materials is to provide assistance and support upon request to newcomer countries interested in the development of nuclear infrastructure for launching nuclear power or nuclear research programmes. Such assistance and support involve exchange of the relevant experience which at the moment confirms that the approach of independent and coordinated systems - nuclear safety and nuclear security – is effective.

REFERENCES

[1] - IAEA Nuclear Security Series No. 20 “Objective and Essential Elements of a State’s Nuclear Security Regime”

[2] – IAEA Safety Standards No. SF-1 “Fundamental Safety Principles”