

Applications of the INFCIRC225/rev5 to the national physical protection regime

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1. Introduction

The IAEA's first effort for playing a key role in physical protection of nuclear material and facilities resulted in the publication of "Recommendations for the physical protection of nuclear material" in 1972. These recommendations were revised by a group of experts in co-operation with the IAEA Secretariat and the revised version was published in 1975 in INFCIRC/225. The document was subsequently revised in 1977(rev.1), 1989(rev.2), in 1993(rev.3) and 1998(rev4).

The Physical Protection regime in ROK has been established on the basis of INFCIRC225 rev4 since 2004

IAEA recently published The INFCIRC 225 rev5 through the 2 years expert consultations. The publication recommended 12 nuclear security fundamentals and requirements of physical protection of nuclear material and nuclear facility to the member states. This paper suggests the several applications to the national physical protection system from the 12 fundamentals and the requirements.

2. Applications of 12 fundamentals in INFCIRC225/rev5

The INFCIRC225 rev5 provides 12 nuclear security fundamentals for establishing the national physical protection system together with international co-operations between the member states.

8 out of 12 fundamentals such as 1)Responsibility of the state, 2)Responsibilities during international transport, 3)Legislative and Regulatory Framework, 4)Competent authority, 5)Responsibility of the license holders, 6)Threat, 7)Contingency plan, and 8)Confidentiality are already applied to our physical protection regime and they were stipulated in the law(The Act of Physical Protection and Radiological Emergency) in 2004. Our competent authorities have been in effort for establishing and maintaining the regime.

For 9)Security culture in the fundamentals, we have first to define the term in a relevant law and all organizations involved in implementing physical protection should recognize that there could possibly be the threat and give due priority to the security culture whose elements are the roles of the state, organization and managers in organization, and the attitude of individuals.

For 10)Graded approach which defined as the application to physical protection measures proportional

to the potential consequences of a malicious act, physical protection requirements should be based on a graded approach, considering the current evaluation of the threat, the relative attractiveness, the nature of the material and potential radiological consequences.

On the basis of graded approach, we have 3 categories of protection level against the unauthorized removal of nuclear material in consistent with the law. For another threat in physical protection system, radiological sabotage and attempted sabotage, we should define the level of radiological consequence in terms of how harm neighboring public get from the results of the sabotage.

For 11)Defense in depth, protection requirements of nuclear facilities should reflect a concept of several layers and methods of protection that have to be overcome or circumvented by an invader or group of adversaries. Nuclear companies in our country have usually 3 layers of protection level based on the defense in depth concept and the guards in the facilities have been trained to respond in time to the adversaries penetrating the 3 layers.

For applying 12)Quality assurance(QA) with a view to providing confidence that specified requirements are satisfied, we need experience and time in our national physical protection system after applying 11 fundamentals above and then QA policy and programs could be established and implemented

3. Applications of the requirements in INFCIRC225/rev5

There are 3 applicable ways in the physical protection requirements for unauthorized removal of nuclear material and sabotage of nuclear facility. They are 1) application of the requirements for unauthorized removal of nuclear material, 2)for sabotage of nuclear facility and 3)for transport of nuclear material. These applications have been made for reflecting the fundamentals and for enhancing the measures of physical protection in the state.

3.1 Application of the requirements for unauthorized removal of nuclear material

The measures in the INFCIRC225/rev5 to locate and recover missing or stolen nuclear material are provided for the state and the operator and recommended for application. For the application, the operator should participate in a coordinated response with relevant organizations for the location and recovery of missing or stolen nuclear material in these requirements. These

location and recovery measures should include on-site and off-site operations.

For the operator, the requirements are organized by the process of detection, confirmation, declaration, location, securing and return of the material.

3.2. Application of the requirements for sabotage of nuclear facility

The concept of 'graded approach' is the main idea in the application. For the facility, an analysis should be performed to determine whether the nuclear material inventory has the potential to result in unacceptable radiological consequences. Based on these analyses, the state should consider the range of consequences that can be associated with all its nuclear facilities and should appropriately grade the consequences that exceed its limits for unacceptable radiological consequences for assigning appropriate levels of protection.

For the application, these requirements should be defined for facilities, including nuclear power plants, and for other facilities, the sabotage of which could result in radiological hazards to the public. Also the operator should regularly participate in a coordinated training with the relevant organizations to respond to an act of sabotage to mitigate or minimize radiological consequences.

3.3. Application of the requirements for transport of nuclear material

Application of the measures to locate and recover missing or stolen material during transport is a major part in the requirements for unauthorized removal. This application for a carrier of nuclear material should be organized by the process of the discovery, location and reporting of lost or stolen material.

In accordance with the fundamental principles of the graded approach to physical protection, the competent authority should define the requirements for the sabotage that correspond to the consequences. Based on threat assessment or design basis threat(DBT), the competent authority should determine the additional physical protection measures to be applied to prevent sabotage of nuclear material during transport.

In these applications, the carrier should include measures to mitigate and minimize the consequences of sabotage in the contingency plan. The carrier should prepare transport personnel to act in full coordination with guards, law enforcements agencies and response teams in order to achieve the objectives of the plan and implement so called associated measures to mitigate and minimize the consequences,

4. Conclusion

With a view to applying the fundamentals and the requirements of the INFCIRC225/rev5 to our physical protection regime, there are so many aspects that we should take into account. The requirements in the INFCIRC225/rev5 are mainly based on performance

rather than prescriptive manner. Then the competent authority have to prepare and organize performance testing and force on force exercise for applying performance based regulation that requires many experimental tests for physical protection related equipment.

Also, since there is no level for unacceptable radiological consequences in our physical protection regime, we should determine the level of the consequences through a process of assessing the threat including DBT. After determining the level, we can make the basis for applying the major concept of fundamentals and the performance based requirements.

Acknowledgement

This work has been carried out under the nuclear research and development program supported by MEST.

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