Necessity of Target Set Identification Regulation in Physical Protection Perspective

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1. Introduction

In nuclear security, target set identification refers to the process of identifying and prioritizing potential targets for terrorist attacks or other security threats to nuclear facilities.

Target sets identification is important for nuclear facilities to ensure that the facility and its personnel are adequately protected from potential security threats. By identifying target sets, which are the specific areas and assets that adversaries might seek to attack, security measures can be tailored to address these vulnerabilities and minimize the risk of harm. This is particularly important for nuclear facilities due to the potentially catastrophic consequences of a successful attack on such a facility.

In the United States, target sets for nuclear facilities are identified through a comprehensive and ongoing security assessment process. This process involves analyzing a wide range of factors, such as the facility's physical layout, operational characteristics, and potential vulnerabilities. It also includes considering various threat scenarios and the likelihood and consequences of each scenario [1]. The Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC) are responsible for overseeing the security of nuclear facilities in the United States and work with facility operators to identify and mitigate security risks. Additionally, the DOE and NRC regularly review and update their security regulations and guidance to ensure that they reflect current threats and best practices

In the design and evaluation of physical protection systems, identification of the target set is necessary to establish the physical protection goals for nuclear facilities. However, there are insufficient requirements for the identification of the target set, and therefore regulatory measures based on Act on Physical Protection and Radiological Emergency(NSSC) are needed.

In this paper, in particular, necessity of target set identification regulation was analyzed by physical protection perspective.

2.Target Set Identification Procedure

Target set identification is a complex process that involves assessing the potential vulnerabilities of a nuclear facility and its critical infrastructure to various security threats.

The methodology for identifying target sets can vary depending on the specific facility and context, but in general, the process involves the following steps and Shown in Fig.1.

Asset characterization: This step involves identifying and characterizing the assets and infrastructure that need to be protected, such as nuclear reactors, fuel storage facilities, and critical support systems.

Threat assessment: This step involves analyzing potential threats to the facility, including physical, cyber, and insider threats. The threat assessment considers factors such as the facility's location, design, and historical threat information.

Vulnerability assessment: This step involves identifying vulnerabilities that could be exploited by an adversary to carry out a successful attack. Vulnerability assessments consider factors such as the facility's physical security measures, access controls, and operational security procedures.

Consequence assessment: This step involves analyzing the potential consequences of a successful attack, such as the release of radioactive material, damage to critical systems, or loss of life.

Risk analysis: This step involves integrating the results of the asset characterization, threat assessment, vulnerability assessment, and consequence assessment to develop a comprehensive understanding of the facility's security risks.

Mitigation strategy development: This step involves developing a security plan to mitigate identified risks, which may include physical security measures, personnel security measures, and emergency response plans.

Monitoring and review: This step involves ongoing monitoring and review of the security plan to ensure that it remains effective and up to date with the latest threat information and security best practices.

Overall, target set identification is a crucial part of nuclear security planning, helping to ensure that appropriate measures are in place to protect critical infrastructure and prevent potential security threats. It requires a thorough understanding of the facility's

critical infrastructure, potential threats, and available mitigation measures.

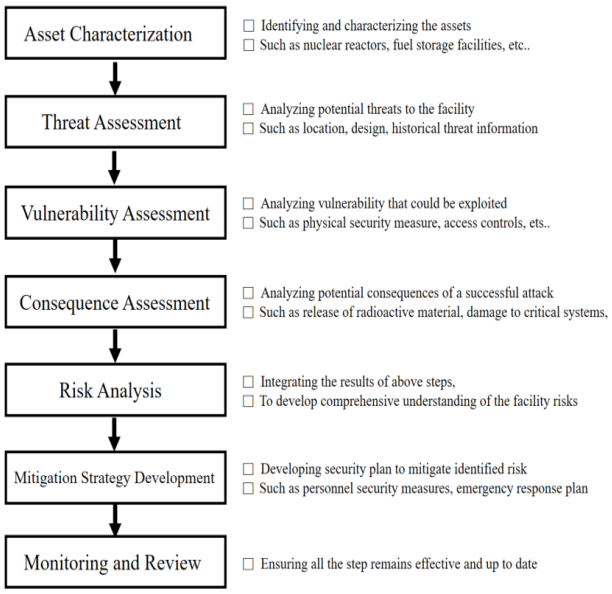

Fig.1. Flow Chart of Target set Identification

3. Necessity of Target Set Identification Regulation

In the nuclear security, the terms "vital area" and "target set" refer to different aspects of the security of a nuclear facility.

A vital area is a designated area within a nuclear facility that contains critical assets or infrastructure. This may include areas where nuclear material is processed, stored, or transported, as well as areas where safety systems are located. Vital areas are typically subject to enhanced security measures to protect against theft, sabotage, or other security threats.

On the other hand, a target set is a group of assets or infrastructure components that are considered vulnerable to attack. This may include vital areas, but it can also include other components of the facility that may be vulnerable to attack, such as perimeter fencing, communication systems, or other critical infrastructure.

While a vital area is a specific location within a facility that requires enhanced security measures, a target set is a broader category of assets or infrastructure components that require protection. Target sets may be used to identify vulnerabilities and prioritize security measures based on the importance and vulnerability of each component.

In summary, a vital area is a specific location within a nuclear facility that contains critical assets or infrastructure, while a target set is a broader category of assets or infrastructure components that are considered vulnerable to attack. Both concepts are important in nuclear security planning and are used to develop appropriate security measures to protect against potential security threats.

However, the target set identification was regulated by the U.S. Nuclear Regulatory Commission (NRC), there are no separate regulations or recommendation for it in the IAEA document. The NRC defines a target set as "a group of assets or infrastructure components that are considered vulnerable to an intentional act of radiological sabotage and require protection."[2]

The identification and protection of target sets is a critical component of the nuclear security regulations and is used to ensure that nuclear facilities are adequately protected against potential security threats.

4. Conclusion

In this paper, necessity of target set identification regulation was analyzed by physical protection perspective.

Firstly, the target set identification procedure was described in section 2 by 7 steps category. Each steps include detail information which is used to set up target set identification.

Secondly, the necessity of target set identification regulation was explained by citing regulatory cases from U.S. NRC and IAEA document.

Consequently, there are insufficient requirements for the identification of the target set in Republic of Korea, and therefore regulatory measures based on Act on Physical Protection and Radiological Emergency(NSSC) are needed.

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REFERENCES

[1] Title 10 of the Code of Federal Regulations (10 CFR) 73.55, “Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors against Radiological Sabotage

[2] Physical Protection of Plants and Materials, 10 CFR Part 73, Revised as of January 1, 2021, FR Vol. 85, No. 50, Pages 15225-15276.