

A Study on Physical Protection Records of Nuclear Facilities

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1. Introduction

Records keeping for differed physical protection in nuclear facilities is very important in terms of preventing security incidents and to investigate security incidents when they occur. There are often cases in which regulatory authorities discover problems while inspecting records of nuclear facilities, prevent and supplement problems, or recognize that problems have occurred in the past and take action.

Nuclear facilities in the Republic of Korea (ROK) keep records in accordance with the Enforcement Regulation of the Act on Physical Protection and Radiological Emergency (APPRE), which was enacted in 2013. Since 2013, new systems and new technologies have been introduced and several records have been replaced by electronic records. So record keeping may have changed.

However, there have not been reviewed and improved records keeping regulations since its initial enactment. Record keeping need to be reviewed and improved for physical protection regulation.

In this paper, the US and IAEA physical protection record standards are summarized, and improvements to the standards of ROK are suggested.

2. Physical Protection Record Regulation of ROK

In accordance with Article 9 of the Enforcement Regulation of the APPRE, ROK stipulates matters to be recorded in Attached Table 2 of the Enforcement Regulation. The stipulated items are the contents of records, the time of recording, and the retention period of records, the details are as follows.

- 1) Records on security check of people and vehicles accessing a protected area as well as commodities carried therein [10years]
- 2) Records on alarm and patrol of a protected area [10years]
- 3) Records on implementation of training and exercise [5 years]
- 4) Records on installation, examination, and maintenance of physical protection facilities and equipment [5 years]
- 5) Design records regarding the installation of physical protection facilities and equipment [5 years]
- 6) Response measures against unauthorized removal of nuclear materials and threats [20 years]

The retention period differed for each record, and the retention period was indicated next to the record.

3. International Physical Protection Record Regulation

In order to find out the international physical protection record regulation, the contents of 10 CFR of the US NRC and the IAEA Nuclear Security Series (NSS) were investigated.

3.1 US NRC

The US NRC stipulates physical protection of nuclear facilities in 'Part 73. Physical Protection of Plants and Materials'. Among them, '73.70 Records' stipulates requirements related to records.

According to this regulation, the record form can be original, reproduced copy, or microform, and the items to be recorded are as follows.

- 1) The name and address of the person who has been given certain designated authorities, such as handling special nuclear material
- 2) The name, address, and badge number of the individual granted access to vital equipment, special nuclear material and vital area, etc.
- 3) Registration records of individuals, such as vendors and visitors
- 4) Name, badge number, time of entry/exit of individuals entering the vital area
- 5) Records related to testing, inspection, and maintenance of physical protection system (physical barriers, intrusion alarms, communications equipment, etc.) and security patrols
- 6) In the event of an alarm, a record of the type, location, date and time of the alarm, false and nuisance alarms, and the response of facility guard when an alarm occurs
- 7) Procedures for the use of locks and keys used in the protection of nuclear material

The retention period for all records required by the NRC is 3 years.

3.2 IAEA

The IAEA recommends physical protection requirements to member states through NSS No.13. The document presented as the implementation guideline of NSS No.13 is NSS No.27-G, and the document describing it in the technical guideline is NSS No.40-T.

This paper summarizes the contents of NSS No.40-T, which is the most detailed technical guideline. Chapter 4. physical protection equipment of NSS No.40-T describes the technical requirements related to all physical protection equipment. Among them, the requirements related to record keeping are presented in the ‘Alarm Stations’ Chapter, and the contents are as follows.

- 1) All notable incidents relating to access control, alarms, and video assessments
- 2) Records of entry and exit from the facility
- 3) Automated alarm logs

Although not directly mentioned in the ‘Record Keeping’ chapter, each chapter has items recommended for recording, which are as follows.

- 1) Personal tracking data
- 2) Locks, keys, and authorized personnel
- 3) Acceptance testing, prescriptive verification, and performance testing data
- 4) Video records
- 5) Personnel training records
- 6) Meaningful data from force-on-force exercise

The retention period for records was not in the IAEA recommendation.

4. Comparative analysis

4.1 Record content aspect

Compared to the US, ROK needs to record in detail the entry and exit records for vital areas and individual information accessing special nuclear material. It is also considered necessary to add records relating to locks and keys.

As a result of comparison with the IAEA, it is thought that ROK needs to supplement the regulations to keep records of facility access and tracking data if possible. Similar to the results of comparison with the US, it is judged that records related to locks and keys should be added. In particular, the IAEA considers it important to leave data of automated devices such as automatic alarm records and video recording records.

When compared with the US and IAEA, the parts that differ from ROK are marked in gray in Table.1.

Table 1 : Comparison of records regulations

ROK	US	IAEA
Security check	Registration information of vendors	Records of entry and exit from the facility
	Record of access to SNM and vital area	Personal tracking data
Alarm & patrol		
Training & exercise		Training & exercise data
Examination &	Testing,	Acceptance,

maintenance of PPS equipment	inspection of PPS	prescriptive and performance testing
Design of PPS equipment		
Response measures	Event of an alarm	All notable incidents, automated alarm logs
	Procedures for the use of locks and keys	Locks, keys

4.2 Retention period aspect

The U.S has been keeping all records for three years. In ROK, records are required to be kept for as long as 5 years or as long as 20 years. The IAEA does not present any regulations regarding the retention period of records.

It is true that the record retention period in ROK is stipulated for too long. Automated alarm recording and video recording are on the rise. ROK needs to clearly define the purpose of keeping records and adjust retention period to a reasonable period.

Table 2. Comparison of retention period for records

ROK	US	IAEA
5~10 years	3 years	No mention

5. Conclusions

Physical protection records are vital in terms of prevention and response to physical protection incidents. Periodic review and supplementation are required because the targets and methods to be recorded change depending on the changing threats and developing technologies.

In this paper, we compared the cases of developed countries and confirmed that there are points to be supplemented in terms of retention period and contents to be recorded.

In the future, research should be conducted periodically by cross-checking the cases of advanced countries and analyzing the changing threats and environments.

REFERENCES

- [1] 10 Code of Federal Regulation 73.70, US NRC
- [2] Handbook on the Design of Physical Protection Systems for Nuclear Material and Nuclear Facilities, IAEA NSS No.40-T, Vienna, 2021