Introduction of Physical Protection Training & Test Facility of International Nuclear Nonproliferation and Security Academy

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1. Introduction

The opening ceremony of International Nuclear Nonproliferation and Security Academy (INSA) was held at the grand auditorium of INSA, Daejeon on 19 February, 2014. INSA is KINAC's training and education center specialized in nuclear nonproliferation and security based on a presidential commitment during the 2010 Washington Nuclear Security Summit [1]. INSA aims to provide practical education and training programs, raise internationally-recognized experts, and improve awareness about nuclear nonproliferation and security [2].

Fig. 1. Main building of INSA

INSA will not only carry out wide variety of training courses but conduct various tests and develop technology in the field of nuclear nonproliferation and security by utilizing its SETT (Nuclear Security Training & Test facility). SETT will enable relevant industries and academia to come to the facility and conduct their own tests such as performance tests of newly developed products and equipments. Throughout this paper, the details of SETT such as configuration, each sector's purpose and deployed equipment will be described and explained particularly on the external physical protection training and test facility, which is called SETT/TB-I.

2. Importance of physical protection training & test

Physical protection against unauthorized removal of nuclear material and against the sabotage of nuclear facilities or transports has long been a matter of international concern. The international community had made a lot of efforts to strengthen physical protection regime. Publication of the INFCIRC/225/Revision5 is one of the achievements of the international community leaded by the IAEA. According to the INFCIRC /225/Revision5, the security plan prepared by the operator should include sections dealing with design evaluation, implementation, and maintenance of the physical protection system [3]. To be specific, the operator should develop and implement means and procedures for evaluations, including performance testing, and maintenance of the physical protection system components. Accordingly, the state's competent authority (or entrusted regulatory body) should require the use of a threat assessment or a design basis threat as a common basis for the design and implementation of the physical protection system by the operator. Furthermore, the competent authority should ensure that evaluations include the training and readiness of relevant personnel such as guards and response forces. With the purpose of meeting the strengthened international physical protection regime along with being able to carry out various training courses in nuclear security and nonproliferation, INSA was established. For most of cases in practical, the physical protection system is understood as combination of various detection sensors, CCTVs for assessment, physical structure for delay and response force at site. In order to generate solid backup data for reviewing and revising DBT (Design Basis Threat) and to assess components reliability of the conventional physical protection system and overall performance of the system, KINAC established an outdoor test facility for the physical protection system named 'KINAC Test Bed' in 2008 and now all the equipment of the test bed has been transferred to SETT/TB-I of INSA [4].

3. SETT/TB-I

SETT/TB-I is a comprehensive facility for testing, R&D, education and training. It is equipped with hands-on education/training facility and cutting-edge testing equipment of external physical protection system in an area of about 23,000 m^2. SETT/TB-I consists of 4 sectors that provide comprehensive system of detection, delay and response and infrastructure for cooperation among industries, academia and research institutes.

SETT/TB-I enables us to produce test data of physical protection equipment and conduct vulnerability assessment for design and construction of the most optimized physical protection system.

Fig. 2. Configuration of SETT/TB-I (Sector 1~4)

Fig. 3. Photo of SETT/TB-I

3.1 TB-I/SECTOR1 - Radiation Portal Monitor & Access Control system

The access control system for critical national facilities is built in SECTOR 1 to enable performance tests to develop technical standards and operational guidelines for access control. The system is utilized for education and training of physical protection personnel and international trainees on access control implementation procedure.

Table I: Sector1 Activities

Test/Research	Education/Training
Performance test on access control system	Personal access system procedure and operation
Performance test on radiation portal monitoring system	Package monitoring system procedure and operation
Performance test on vehicle monitoring system	Vehicle monitoring system procedure and operation
Performance test on package monitoring system	Vulnerability identification/improvement education

3.2 TB-I /SECTOR2 - Conventional Physical Protection systems

Conventional physical protection equipment of nuclear facilities is installed in Sector 2 for performance tests to address drawbacks and pending issues in development and implementation of technical standards and to develop technologies for operational procedure and maintenance. The system is utilized for education /training of physical protection system operators and security staff, etc.

Table II: Sector2 Activities

Test/Research	Education/Training
Performance test on conventional intrusion detection sensors	Introduction of physical protection equipment
Development of technical standards for physical protection	Performance test training on intrusion detection sensors
Performance test on assessment tools such as CCTV	Interoperability test training on detection and monitoring equipment
Development of performance evaluation procedure for detection sensors	Vulnerability identification /improvement training
Development of design standards for physical protection equipment	

3.3 TB-I /SECTOR3 - Advanced Physical Protection System

The latest and advanced physical protection equipment and technologies is installed in Sector 3 for conducting feasibility study and developing application technologies. The system, as infrastructure, can be utilized for technology cooperation among industries, academia and research institutes to nurture the Korean physical protection industry.

Table III: Sector3 Activities

Test/Research	Education/Training
Performance tests on the latest detection sensors	Introduction of the latest detection sensors
Performance tests on the latest CCTVs	Introduction

Provision of R&D infrastructure for industries, academia and research institutes	of advanced CCTVs
Development of convergence technologies for physical protection	

3.4 TB-I /SECTOR4 - Intrusion Simulation and Destructive Testing System

Physical protection simulation facility and relevant equipment are established in Sector 4 and used for destructive testing to develop standards for Design Basis Threat (DBT). MILES (Multiple Integrated Laser Engagement System) shooting system for Force-On-Force exercise is built and utilized for education and training that requires automatic exercise equipment.

Table IV: Sector4 Activities

Test/Research	Education/Training
Performance Tests on Design Basis Threat (DBT)	DBT training
Tests on response technologies against DBT	Destructive testing training
Destructive testing and database building	MILES shooting exercise
	MILES training for response forces

3. Conclusions

The final approval by the national assembly is the only procedure left for the ROK government to pass the bill on the revised nuclear security and safety law. The revised law reflects most of the strengthened contents of INFCIRC/225/Revision5. When the new law comes into force, many extra efforts should be put into nuclear security area, specifically in the field of physical protection both on education/test and systematic performance-based evaluation. As stated above, SETT/TB-I has four sectors and each sector has specified purpose which differs from each others. For now, SETT/TB-I is considered having enough features to characterize the INSA and make it unique from other CoEs. Nevertheless, there has not been enough discussion aimed at making feasible plans to maximize the use of SETT. It is time to develop long-term plan to get most out of the SETT so that practical measures can be taken through the SETT with a purpose of keeping the physical protection system of NPP robust against more challenging new threats.

REFERENCES

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