

## **Consideration on Effective Methodology for Developing a Design Basis Threat as a Part of Establishing Domestic Regime of Threat Assessment**

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### **1. Introduction**

Recently the threats such as illicit trafficking, unauthorized removal of nuclear material and sabotage of nuclear facilities have had a significant effect on maintaining the international regime of as well as Member State's regime of physical protection. As a part of the countermeasures, Member States with the IAEA have finally adopted the amendment of Convention on the Physical Protection of Nuclear Material(*INFCIRC/274/Rev.1, CPPNM*) in July 2005[1-5]. Along with this, Korean government has been making effort to implement pursuant to a new 'Law for Physical Protection of Nuclear Material and Facilities and Radiological Emergency Preparedness(LPPREP)' entered into force in February 2004, but would need to imminently establish domestic regime of threat assessment including developing a design basis threat(DBT) in accordance with the LPPREP[6]. Therefore, this paper presents not only current domestic status but also the effective methodology for developing and creating a DBT suitable to Korea, which is a key issue for establishing the threat assessment regime.

### **2. Current Domestic Status**

#### *2.1 Legal and Institutional System*

As mentioned above, Korean government has legislated a strong LPPREP and enforcement regulations, which focused on substantially strengthened measures against the threat in order to cope with international strengthening trend and to establish domestic regime of physical protection. Especially, LPPREP regulates the government should not only establish its regime of threat assessment based on development of a DBT, but also periodically assess the DBT every three years[7]. Its main contents related to development of a DBT are summarized as follows :

- A. Definitions of terminology includes nuclear material, nuclear facility, physical protection, threat, sabotage, and unauthorized removal, etc(Article 2).
- B. Establishment of countermeasure of physical protection(Article 3) : reflect physical protection objectives pursuant to amendment of the CPPNM
- C. Establishment of domestic regime of physical protection(Article 4) : government should establish physical protection system, based on periodical

evaluation of the threat of domestic nuclear material and facilities

- D. Organize the Council on Physical Protection(Article 5 to 7) : determine important policy & co-ordination on physical protection including establishment of Regional Council under local government

#### *2.2 Governmental Project*

As a part of establishing the domestic regime of physical protection, the Ministry of Science and Technology has initiated a new governmental project to drive a substantial implementation system in accordance with the LPPREP and follow-on regulations since March of 2005. The MOST has entrusted the project to the NNCA, which focused on the development of design basis threat, including development of technical criteria for establishing an effective implementation system and of central monitoring system for nuclear facilities and material during transport, etc. Along with this, research team of NNCA has cooperated on physical protection field with Sandia National Lab. under agreement on technical cooperation between the DOE and the MOST since 1994, and especially has closely cooperated with Sandia experts to seek the effective methodology for developing a DBT for a several years. In near future, the MOST has a plan to cooperate with the DOE on maintenance of a developed DBT and development of response system against radiological terrorism, etc.

### **3. Consideration on Methodology for Developing a DBT**

As described above, the objective of this study is to suggest the effective methodology for developing a DBT suitable to Korea in the technical and institutional view. The main contents are summarized as follows :

#### *3.1 Technical view*

As a part of establishing the domestic regime of threat assessment, it is necessary for Member State to develop a DBT applicable to its regime of physical protection. Along with this, the IAEA has recommended so that Member State may establish a DBT pursuant to the nine step methodology for developing it, as the IAEA suggested in the international guideline on DBT[8-11]. Through carrying out physical protection duty entrusted from the MOST for about a several years, NNCA has eventually established the effective methodology for

developing a DBT as the following five steps (and another substantial procedure was here omitted due to confidentiality) :

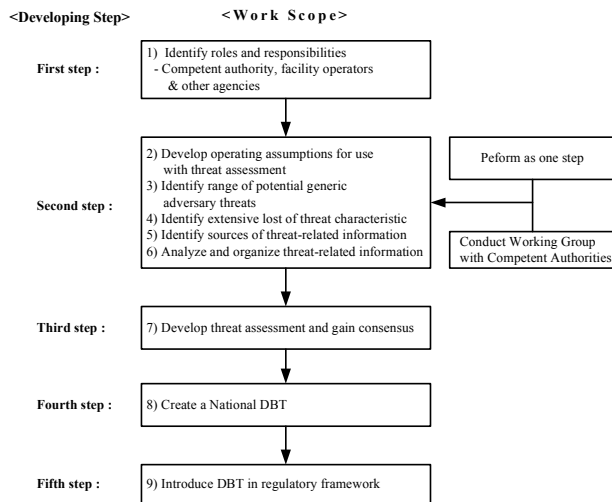


Fig. 1 The five step methodology for developing a DBT

However, the methodology would be available only if there is in advance close cooperation as well as exchange and sharing of related information among the Korean competent authorities, with simultaneous solution of following ‘institutional arrangement’ [12].

### 3.2 Institutional view

For developing a Korean DBT pursuant to the five step methodology as described above, the working group for threat assessment, first of all, should be organized for the Korean competent authorities responsible for the security, enforcement, and design of nuclear facility, etc.

Second, it would be necessary for the working group to ensure a kind of channel for collecting information of current threat as well as to consider the measure to maintain its confidentiality. For this, a desirable example would be to regulate governmental order or code of conduct to determine the organization and effectively accomplish a mission of the working group.

Third, for systematically completing the governmental tasks such as development of a DBT and its periodic assessment, it would be essential to establish governmental organization to fully engage in analysis and assessment of threat and its maintenance.

Fourth, ‘Organization of Council on Physical Protection’ has been regulated to determine the important issue on physical protection in accordance with LPPREP, but ‘Regional Council on Physical Protection(RCPP)’ has not yet activated under the local government, nevertheless the role of RCPP is very important to substantially support the local nuclear enterprisers in case of emergency situation. So, it would be desirable to identify and adjust their mission and tasks among the local competent authorities.

Fifth, the new CPPNM empathizes and regulates the importance of ‘Security Culture’ for Member State that

should give due priority to establish its regime of physical protection in any case. Moreover, ‘Security Culture’ is one of ‘twelve Fundamental Principles of Physical Protection’ that Member State shall apply in establishing its regime pursuant to the CPPNM[5]. Therefore, it would be imminently necessary for domestic competent authorities to recognize and consider importance of countermeasures against the threat and to establish its effective implementation methodology.

## 4. Conclusion

As mentioned above, the methodology for developing a DBT suitable to Korea may be suggested in technical view, however, it would be very important and sensitive for the competent authorities and nuclear enterpriser to define and establish a DBT within a State. Therefore, it would be essential, first of all, to gain a consensus by in depth consideration among them and to closely cooperate for developing and determining a DBT, because it would be directly connected with the substantial obligations and burden imposed to nuclear enterpriser through introducing a DBT in legal framework in near future.

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