A New Regulation Policy for Accounting and Control of Nuclear Material

K. H. Kim*, M. S. Kim, S. H. Ahn
Korea Institute of Nuclear nonproliferation and Control, 1534 Yuseong-daero, Yuseong-gu, Daejeon, Korea
**Corresponding author: khkim@kinac.re.kr*

1. Introduction

Nuclear Safety and Security Commission(NSSC) has amended two public notices about the regulation of nuclear material accounting and control(NMAC). Those notices were declared in November 2014 and entry into force since 2015. According to this legislation, a new type of NMAC inspection system was introduced and facility rules for NMAC approved by the government should be revised subsequently. These changes were one of the preemptive actions to cope with the emergence of new international safeguards policy and increasing demand on advanced nuclear technology.

Generally, the regulation policy affects the nuclear business including research and development. Therefore, understanding of the new policy and its making process may help stakeholders to minimize unnecessary financial and operational burden. This study describes background, features, and institutionalization of the new regulation policy for NMAC.

2. Methods and Results

2.1 Background of Policy Making

NSSC established a new NMAC regulation policy to proactively deal with two major upcoming changes. One is the application of new IAEA policy to the ROK with regard to the strengthened safeguards implementation and the other is the industrialization of advanced nuclear technologies.

IAEA developed a new safeguards implementation policy so called State Level Concept [1]. This new policy pursues optimal combinations between the effectiveness and efficiency so that safeguards measures such as unannounced or short notice inspections become more prevalent. In order to cope with IAEA's strengthened inspections under this new policy, a state needs to establish and maintain a capable state system of accounting and control of nuclear material. In the light of that IAEA was finalizing legislation process to apply their new policy to all member state, the government which extended its support to IAEA's new policy needed to take preemptive and practical actions.

On the other hand, the governmental mid-long term plan clearly identifies the development of advanced nuclear technologies such as a pyroprocessing. Research and development of nuclear fuel cycle technologies has been jointly studied with US through the official cooperation program. This joint R&D program covers not only technical and economic feasibility but also safeguards measures. It may reflect that nuclear safeguards is one of the fundamentals that nuclear programs on advanced technologies to keep their momentum. A strategic approach, therefore, to maintain and accelerate momentum was required in the context of not only promotion but also regulation.

Based on the understanding on these issues, awareness of limitations of the current regulation system triggered the establishment of a new NMAC regulation policy. Under the current regulation system, regulators were not able to assure that the facility's NMAC system not only has a substantial quality but also functions systematically. Regulation activities had been focused on the verification of nuclear material rather than evaluation of NMAC system. In addition, the scope of regulation did not cover some part of NMAC system such as organizations and management procedures. In order to make a breakthrough, existing policy and regulation system needed to be changed. Fig 1. shows the structure of NMAC system.

Fig. 1. Structure of the accounting and control system of nuclear material.

2.3 Features of the New Policy

The new NMAC regulation policy differs from the existing policy in terms of objective, goal and measure. The regulation objective is to assure the compliance of requirements and implementation of legal obligations rather than to prevent the diversion of nuclear material. The regulation goal was changed from timely detection of diversion of nuclear material to making the NMAC system of nuclear business operators competent to the extent that operators are able to prepare taking an IAEA inspection at any time. In terms of regulation method, the national inspection and examination of facility rules

for NMAC maintained. Table I. shows the outline of policy changes.

Table I: Outline of policy change

Regulation	New policy	Existing policy
Objective	To assure implementation of obligations	To prevent diversion of NM and facility
Goal	To make NMAC system competent	To detect NM diversion timely
Measure	Examination Inspection	Examination Inspection

2.3 Involving Stakeholders in Decision Making

The new NMAC regulation policy requires follow-up actions in terms of not only regulation system and practice but also NMAC system of nuclear business operators. For that reason, NSSC needed to take a participatory decision making process into consideration to increase the acceptability of the new policy and to have a full cooperation from stakeholders.

Not only regulators, NSSC and KINAC, but also representatives of nuclear business operators, Korea Hydro and Nuclear Power(KHNP), Korea Atomic Energy Research Institute(KAERI), and KEPCO Nuclear Fuel(KNF) involved a decision making process to choose the most feasible option to implement the new regulation policy. NSSC led a task force team consists of stakeholders for a year since December 2013. NSSC explained their new regulation policy and opened it to stakeholders for comments. Task force team went through the draft regulation policy and examined feasible options through 5 meetings and workshops for a year.

Finally, task force team concluded that the new regulation policy is acceptable to all parties. They admitted feasibilities of the new type of national inspection system. As a visible outcome of the operation of task force team, two draft revisions of NSSC's public notices about the NMAC regulation were prepared.

2.4 Institutionalization of the New Policy

Through the legislation process, NSSC's two revised public notices about NMAC regulation were entry into force since January 2015. One was the regulation about the examination of facility rules for NMAC and the other was the NMAC inspection system.

The former regulation includes the elimination of sensitive facility information and supplement of safeguards obligations according to the international agreements and national law [2]. According to this regulation, all licensees should revise their facility rules for NMAC and obtain the NSSC's approval.

The latter regulation restructures NMAC inspection system in terms of type, scope and activity of the inspection [3]. Firstly, with regard to the inspection type, nuclear safety and physical protection type of inspection such as pre-service and regular inspection were newly applied. This change does not mean re-naming of the previous inspection which copied IAEA inspection type such as physical inventory and design information verification. The top priority of inspection is to check the compliance of approved facility rules for NMAC. In addition, as other nuclear regulations do, administrative penalties such as an order of corrective actions can be applied to licensees depending on the inspection result. Secondly, the expanded scope of inspection covers not only existing ones but also operations of NMAC system. It means that organization, responsibility, record and report, measurement system, control procedure and inspection readiness are listed on the inspection check list. Thirdly, comprehensive examination and evaluation of the NMAC system accounts for the primary method. Material verification is still applicable but it is optional as necessary. Table II. shows features of the improved NMAC inspection system.

Table II: Features of improved NMAC inspection system

Inspection	Existing	Improved
Type	IAEA safeguards	ROK safety/security
Scope	Nuclear material Facility information	Nuclear material Facility information NMAC system
Activity	Verification of Nuclear material	Evaluation of NMAC system

3. Conclusions

The new regulation policy for NMAC was established and institutionalized to preemptively cope with the internal and external demand on 'better' national system of accounting and control of nuclear material. This new policy and regulation system may call not only the regulator but also nuclear business operators for new works to make their system more effective and efficient. We are looking forward to that this study is useful for stakeholders to operate their business, to design or plan their future business and to optimize their resource management.

REFERENCES

[1] IAEA, "The Conceptualization and Development of Safeguards Implementation at the State Level", *GOV/2013/38*, 2013.

[2] NSSC, "Regulations on Preparation of Regulation on Measurement Control of Special Nuclear Materials", *NSSC Notice 2014-5*, 2014.

[3] NSSC, "Regulations on Inspection of Measurement Control of Special Nuclear Materials", *NSSC Notice 2014-6*, 2014.