A Consideration of the Nonproliferation Acceptability: A Case of the U.S.-Japan NCA

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1. Introduction

The Republic of Korea (ROK) is developing pyroprocessing technology as a part of a long-term option of spent fuel management. An agreement between the ROK and the United States (US) is needed to conduct back-end fuel cycle activities that include alteration of form or content of U.S.-obligated spent fuel pursuant to the ROK-U.S. nuclear cooperation agreement (NCA) that entered into force in Nov. 2015 [1].

The U.S. Atomic Energy Act as amended in 1954 (AEA) specifies that a recipient country should get an approval of the U.S. government prior to the handling of U.S.-origin nuclear material such as reprocessing and alteration in form or content of irradiated nuclear fuel [2]. In this regard, the ROK-U.S. NCA defines a mechanism of bilateral consultation for programmatic or advance long-term consent to the relevant activities. The mechanism includes procedures and several evaluation criteria such as nonproliferation acceptability, which need to be elaborated further in the consultation.

The U.S. government had some experience of evaluating nonproliferation acceptability such as with Japan when they concluded the revision of the existing U.S.-Japan NCA in the 1980's. The U.S. evaluation of nonproliferation acceptability on the Japanese nuclear programs at that time can be seen in the unclassified Nuclear Proliferation Assessment Statement (NPAS) submitted to the U.S. congress by the U.S. President [3].

This paper aims to examine factors of nonproliferation acceptability related to nuclear technology to handle the U.S.-origin spent fuel through analyzing the NPAS on the U.S.-Japan nuclear cooperation agreement.

2. Overview of Consent Rights and Nonproliferation Acceptability

2.1 An Overview of Consent rights

After India conducted a nuclear test by using the U.S.-origin heavy water in 1974, the US decided to strengthen the control on nuclear items that the US supplied [4]. Carter administration enacted Nuclear Non-Proliferation Act of 1978 (NNPA) as a part of strengthening nuclear nonproliferation [5].

One of key elements in the NNPA is to amend the section 123 of the U.S. AEA which contains consent rights on nuclear activities that can relate to directly or indirectly manufacture nuclear weapons in the bilateral NCA. It means that prior consent of the US is needed, whenever a recipient country tries to do enrichment, reprocessing/alteration in form or content or retransfer by using the U.S.-obligated nuclear material or equipment.

Therefore, consent rights are a legal tool for the US to engage fuel cycle activities or nuclear exports in the recipient country in addition to IAEA safeguards and physical security measures under the existing nuclear nonproliferation regimes. As a result, the tool to prevent a significant increase of risk of proliferation in the bilateral nuclear cooperation is provided for the US.

2.2 Subsequent Arrangements and nonproliferation acceptability in the U.S. Atomic Energy Act (AEA)

The section 131.a of the AEA says that Secretary of Energy could allow a recipient an activity related to the U.S.-origin nuclear material or irradiated fuel under a prior approval including reprocessing or alteration form or content under a NCA, through his or her written determination, that the activity will not be inimical to the common defense and security.

According to the section 131.b of the AEA, Secretary of Energy with an agreement of Secretary of State could also allow a recipient the activity through his or her judgement that the approval on such reprocessing or retransfer will not result in a significant increase of the risk of proliferation. Among all the factors in making this judgement, the most important consideration is to ensure timely warning to the US of any diversion in advance of the time at which the recipient as a non-nuclear-weapon state could convert diverted material to a nuclear explosive device.

With regard to determination and judgement, the AEA does not say in detail any element or criteria on such terms as *significant increase of proliferation risk*, *timely warning*, etc. On one hand, it enables the U.S. government to maintain flexibility in applying nuclear nonproliferation policies, but on the other hand, it may make cooperating countries face increasing uncertainty of getting the U.S. approval.

The US has however exercised its consent rights in different ways to recipient countries depending on the status of their civil nuclear programs, the political and security relationship with them, their nonproliferation credentials, and the proliferation concerns in the regions where they are located [6].

2.3 Description in the ROK-U.S. NCA

The paragraph 6 in the Agreed Minute of the ROK-U.S. NCA defines some criteria for granting consent such as technical feasibility, economic viability and nonproliferation acceptability.

Evaluation of nonproliferation acceptability would include 1) application of effective safeguards, 2) assurance of timely detection and early warning of diversion of nuclear material recovered through the facilities which handle the U.S.-origin spent fuel, and 3) ability of deterring or impeding nuclear proliferation.

Considering 2.1 and 2.2 above, the criteria and evaluation in the ROK-U.S. NCA are based on the section 131 of the U.S. AEA.

3. Lessons Learned from the U.S.-Japan Case

3.1 U.S.-Japan Arrangements for Required Consents

The U.S. granted so-called programmatic or advance long-term consent to Japan on reprocessing, enrichment and alteration of form or content of U.S. origin nuclear material in specified facilities in Japan in the U.S.-Japan NCA that entered into force in 1988. Programmatic consents were designed to meet the needs of Japanese full fuel-cycle programs including the reprocessing of U.S.-obligated spent fuel and the storage of the recovered plutonium in facilities designated by Japan as constituting its civil nuclear program [6]. This enabled Japan to have a long-term and predictable implementation of its back-end fuel cycle policies.

3.2 The U.S.-Japan NCA and its Nuclear Proliferation Assessment Statement

The NPAS pursuant to the U.S-Japan NCA amended in 1988 states that even if programmatic consents are given to Japan on reprocessing and enrichment, the risk of nuclear proliferation will not significantly increase. The reasons for this statement included in the NPAS can be broadly divided into political and technical aspects [3].

The political aspects are that Japan is a country to lead nuclear nonproliferation in the global community and support the U.S. nonproliferation policies. Furthermore, Japan is strongly supporting the Treaty of Non-Proliferation (NPT) and is evaluated as a faithful country in the implementation of nonproliferation regimes including IAEA and Zangger Committee.

As technical aspects for verification of nuclear nonproliferation, the U.S.-Japan NCA fully incorporates the requirements which are clearly specified in the U.S. laws related to nuclear nonproliferation. The NPAS says that the U.S. and Japan NCA satisfies the important provisions in the NNPA and the AEA including guarantee of peaceful uses, application of the comprehensive safeguards agreements and physical protection, the rights of return and prior consent, and so on.

However, the elements mentioned above are understood as basic criteria in evaluating nonproliferation acceptability by the US. In this context, the NPAS further mentions the reason why Japan has obtained the programmatic consents from the US.

In a political aspect, the NPAS additionally considers that the risks of nuclear proliferation from Japan (i.e., uses of plutonium) existed before revising the U.S.-Japan NCA should be controlled and managed and the new NCA will contribute to strengthening the U.S.-Japan alliance, especially on defense and security in the Asia-Pacific region.

There was a further element in the technical aspect that the new NCA contains measures that exceed the level of the U.S. nonproliferation laws in a perspective of nuclear nonproliferation verification. These measures included in the NCA are enhanced safeguards and physical protection, timely provisions of information and warning, and unilateral termination of cooperation with granted consent. Another element to provide Japan with programmatic consents is that the US secures a right to have an access to the Japanese facilities relevant to sensitive technologies.

3.3 Evaluation Factors Considered by the U.S.

In the future, the nonproliferation acceptability evaluation on Korea's back-end fuel cycle options would be based on the criteria in the ROK-U.S. NCA as described in section 2.2. However, considering the case of the U.S-Japan NCA, it seems that evaluation of nonproliferation acceptability would involve not only technical factors but also political factors.

As shown in Figure 1, this study derived the evaluation factors - *timely warning* and *risk of proliferation* - which would be considered important in the nonproliferation acceptability evaluation by the US, through the NPAS of the U.S-Japan NCA.

Timely warning is close to a technical factor. In order to secure timely warning, along with an effective application of safeguards, the following factors can be considered; 1) the capacities of industries and R&D 2) the attractiveness of diverting nuclear materials, and 3) the system that makes any diversion difficult as can be possible.

Risk of proliferation is deemed a factor to politically evaluate the risk of nuclear proliferation from a recipient. The NPAS of the U.S.-Japan NCA indicates that the factors measuring the nonproliferation risks are 1) status of the state under the nonproliferation regimes, 2) nuclear cooperation with the US, 3) attributes of the state in response to economy, 4) military or society, and 5) incentives for developing nuclear weapons.

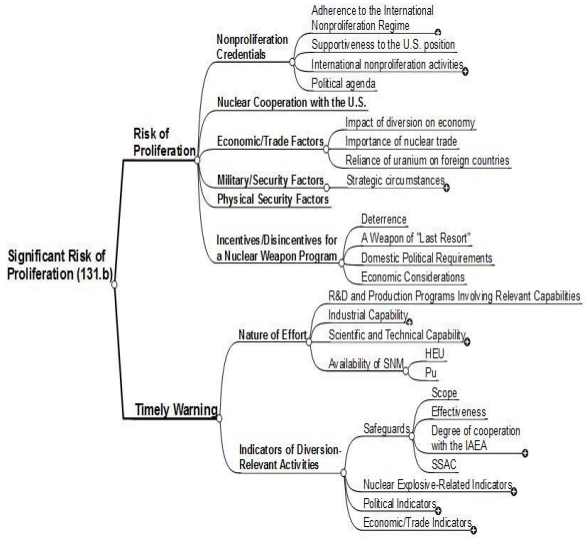

Fig.1. Evaluation factors of nonproliferation acceptability based on consideration of the U.S.-Japan NCA

4. Conclusions

It is not clear what factors will be evaluated in a perspective of nonproliferation acceptability. If political factors however are given priority, applicability in evaluating nonproliferation acceptability on technical aspects will be obviously reduced. In this regard, the visibility of the evaluation will be much improved if evaluation factors including political one are clearly identified in advance.

It means that the ROK and the US would need prior consultation to specify each evaluation factor to increase visibility of nonproliferation acceptability. Further studies on this issue should thus continue in the ROK and the US, so to improve application and visibility in their evaluation.

REFERENCES

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