A Suggestion for Safeguards System under Nuclear Supply Assurance Environment

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1. Introduction

Various ideas about nuclear fuel supply assurance have been proposed with the expectation of a new era of 'Nuclear Renaissance.' The possibility is ever than high now as the environmental impact due to the fossil fuel burning is worsening. But there are several obstacles to realize the resurrection of nuclear power as promising energy source in the future. The disposal of high radioactive wastes like nuclear spent fuel could be the first one that everyone can imagine, because those wastes are regarded as one of the direct threat to human health. But the most dangerous threat can be materialized through the diversion of nuclear material, if some malicious actors like some rogue states or terrorist groups take chance of the nuclear industry booming.

Most supply assurance ideas based on multilateral approach provide the way to provide nuclear fuel while limiting dissipation of sensitive technologies. But regarding the safeguards implementation under the supply assurance environment, it seems that any appropriate approach has not been prepared. It is prerequisite to establish safeguards implementation system for multilateral facilities prior to their actual operation.

2. Concept of the MASC

2.1 Summary of Multilateral Approaches to Nuclear Fuel Supply

Nuclear fuel supply assurance is an inevitable choice for expansion of nuclear energy and strengthening international non-proliferation regime further. For the actual implementation of any MNA idea, it is required to prepare multilateral framework. Various ideas have been presented like US GNEP, IAEA MNA, Russia's INFCE, Germany's MESP, and so forth. All of them have common features as follows;

- Limitation of sensitive technologies like U enrichment and Pu reprocessing
- Providing future energy need
- Possible Frameworks (LEU)
  - ✓ Level 1. Reliance on the int'l market
  - ✓ Level 2. Back-up Assuracne
  - ✓ Level 3. Low enriched U last resort reserves

The key point of supply assurance idea is how to eliminate the possibility of making nuclear arsenals while maintaining peaceful nuclear activities.

2.2 Safeguards Implementation Under the MNA Environment

The IAEA performs its safeguards based on the safeguards agreement between the IAEA and the member state. But some limitations were revealed through the Iraq's and North Korea's clandestine nuclear activities. To overcome these limitations of the comprehensive safeguards agreement, the Additional Protocol was introduced in 1997 with endowing extended rights like environment sampling and complementary access to the Agency. However, there is a question about how to extend the IAEA mandate to fuel supply framework. It is expected that the actual implementation of supply assurance ideas should be based on the multilateral facilities which are capable of processing sensitive materials like U or Pu. The potential supply nations want to circumscribe the locations of the facilities, but allow other nations to have the share. Though the IAEA safeguards can be applied as it is, which is a common assumption of most supply assurance ideas, some problems can emerge like how to extend the IAEA mandate, how to protect proprietary problems, and how to prepare additional safeguards resources, and so on.

To maintain safeguards system in the multilateral facilities effectively, it is necessary to call the SSACs to participate. If any country have share of the multilateral facility and hold their SSAC, there is a possibility to organize an independent safeguards implementation body to support the IAEA safeguards. Actually, the SSAC performs in its territory as a nuclear material accounting and control authority, so it can do the same roles in the multilateral facilities, if agreed between participants.

2.3 A New Accounting Model for Multilateral Facility

There is still a reluctant atmosphere against the Fuel Supply Assurance ideas because some developing countries interpret the hidden intention must be for monopolizing nuclear fuel market which leads finally to limiting peaceful nuclear activities. If we are not able to propose some appropriate alternative to encourage their participation, any of Fuel Supply Assurance ideas can not be implemented. So it is necessary to allow them to have share of and profit from the facilities, while not banning the access to the sensitive technology itself. To accomplish all about this, 'multilateral facilities' would be a sole solution, which should be based on participation of as many as possible nations. Although

agreed by the participating countries about the construction of multinational facilities, there is a hurdle to overcome to provide fuel services like U enrichment or Pu reprocessing. It is prerequisite to prepare a systematic accounting system for those facilities, because the facility characteristics related with the possession and management have very complex aspects.

In this context, a new model for safeguards implementation in the multilateral facilities under the supply assurance framework can be proposed, MSAC, Multilateral System of Accounting for and Control of nuclear material. The MSAC is organized by the SSACs of participating countries in multilateral facilities, and does its verification work only for the multilateral facilities. It could increase mutual credibility between participants and transparency of the operation of the facilities as well.

It should follow the IAEA SSAC Guideline, and carry out the inspection works according to the AP. Following preconditions are presented for participation in the MSAC.

- CSA/SP signing and entering into force
- No outstanding issues about verification with the IAEA
- To hold well organized SSAC
- To maintain well trained human resources for inspection
- To hold physical protection and export control functions

3. Conclusions

Fuel supply assurance is needed to be implemented based on the multilateral approaches and multilateral facilities. In this case, a new safeguards system should be prepared which can stand for the IAEA safeguards inspection. In this context, a new concept of safeguards implementation system just for the multilateral facilities is proposed, MSAC. The safeguards implementation should be discussed among the stake holder countries with the supply assurance implementation plans.

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