

Restriction of Civilian Nuclear Fuel Cycle and Effectiveness of Nuclear Nonproliferation

JaeSoo Ryu, HanMyung Lee, Hansuk Ko, MaengHo Ynag, Kunbae Oh
KAERI, 150 Deokjin-dong, Yusung-ku, Daejeon-si, lucky@kaeri.re.kr

1. Introduction

Many efforts have been made to prevent the spread of nuclear weapons since the nuclear era. Recent revelation such as Dr. A.Q. Khan Network showed that some states had acquired sensitive nuclear technologies including uranium enrichment which could be used for making nuclear weapons. In addition, with the advancement of industrial technology, it has become easier to have access to those technologies. In this context, proliferation risks are being increased more and more.

As a result, various proposals to respond to proliferation risks by sensitive technologies have been made: Multilateral Nuclear Approaches (MNAs) by IAEA Director General El Baradei, non-transfer of sensitive nuclear technologies by the U.S. President George W. Bush, international center for nuclear fuel cycle service by Russian President Vladimir V. Putin, Global Nuclear Energy Partnership (GNEP) by Bush's administration and a concept for a multilateral mechanism for reliable access to nuclear fuel by 6 member states of the IAEA.

These proposals all share the idea that the best way to reduce risk is to prevent certain states from having control over an indigenous civilian fuel cycle while still finding ways to confer the benefits of nuclear energy, and seem to imply that the current nonproliferation regime is fundamentally flawed and needs to be altered [1]. However, these proposals are a center of controversy because they can restrict the inalienable right for the peaceful purposes of nuclear energy inscribed in Article IV of the NPT.

Therefore, this paper analyzes the key challenges of these proposals and effectiveness of the goal of nuclear nonproliferation in practical term by restricting civilian nuclear fuel cycle.

2. Key Challenges of Proposals on Restriction of Civilian Fuel cycle

2.1 Controversy of Article IV of the NPT

Nuclear activities in advanced countries include uranium enrichment and plutonium reprocessing. NPT also doesn't prohibit enrichment and reprocessing for peaceful purposes of nuclear energy. Many non-nuclear weapons states party to the NPT also consider Article IV of the NPT as a key element on balance of rights and obligations.

But the recent proposals call for participating states to forgo or prohibit the indigenous development of civilian

nuclear fuel cycle. They are therefore confronted with challenges that their precondition can cancel out the benefits secured on the commitment that the non-nuclear weapons states do not have or develop nuclear weapons, and that their concepts may be more discriminatory than those of the NPT. It means that peaceful nuclear activities can be in advance restricted, even if states party to the NPT comply with their obligations under the NPT regime. Consequently, it is difficult for these proposals to achieve the goal of balanced peaceful activities guaranteed in the NPT or IAEA statute because they suggest unilateral nuclear cooperation focused on non-proliferation and safeguards obligations.

2.2 Lack of Incentives for Joining in the Mechanism of Supply Assurances

The above proposals suggest some benefits including assurances of fuel supply at the cost of voluntarily forgoing sensitive nuclear activities.

However, existing nuclear world market has provided a very high trust of security of supply in all aspects of the nuclear fuel industry. Indeed, in the history of the industry, there has never been a disruption of supply that has led to a loss of electricity generation, especially in states that had a comprehensive safeguards agreement in force [2, 3]. In addition, countries normally operating nuclear power plants may already secure reserved fuel, various suppliers and contractual flexibilities to prevent suspension of electricity generation. These options would be available in the event of a supply denial. Even though there is a possibility that it may happen, states using nuclear power plants will have enough time to find another nuclear supplier before the event of a supply denial for political reasons. Several instances of major discontinuities in recent years have all been resolved with conventional market mechanisms [2].

Consequently it will be difficult for assurances of nuclear fuel supply to become enough incentives to restrict indigenous civilian nuclear fuel cycle activities, as rare supply disruption which may happen in the future can be overcome under the existing market mechanism.

Furthermore, supply assurances will become more advantageous to countries with small-sized nuclear programs than to countries with large-sized nuclear programs. The large-sized nuclear states that will have economic feasibility in the near future won't accept the precondition as the same standard.

2.3 Right for Future Development and Technological Leadership under Supply Assurances

Supply assurances can be more advantageous to small-sized nuclear states than to large-sized nuclear states which have economics and competitiveness as time goes by. It is also likely that large-sized nuclear states pursue sensitive technologies not for the development of nuclear weapons and trust for supply assurances, but for economic reasons and energy security. Even if states join in the multilateral mechanism, they shouldn't give up the right to develop sensitive activities, especially the threshold-states which have large-sized nuclear programs in the present or near future.

These proposals should also assure that participating states in technological development will not fall behind other nations which don't participate [4]. Unless they explain it exactly, most of countries will be unwilling to join in those systems.

3. Effectiveness of Nuclear Nonproliferation

3.1 The Origin of Recent Proliferation Risks

Recent cases or threats of proliferation have not stemmed from the diversion of civil trade or nuclear fuel cycle that was placed under IAEA safeguards [5]. Rather, the main proliferation risks have originated from sensitive technologies acquired by illicit means through nuclear black markets. In addition, the most recent examples of undeclared activities in the field of uranium enrichment in Iran and Libya have demonstrated that the illegal proliferation of sensitive technologies is difficult to inhibit, given the dissemination of knowledge and banalization of large parts of the technology [5]. Some experts argued that legitimate civilian fuel cycle programs pose a very small proliferation risk and they have never been the basis of a weapons program [1].

For this reason, the proliferation risk by the illicit or autarkic means may continue to remain despite restriction of legitimate civilian fuel cycle.

3.2 Possibility to forgo Sensitive Technologies and participate in the Mechanism of Supply Assurances

The IAEA reported to the board of governors that it was unable to provide the assurance about the absence of undeclared nuclear material and activities in Iran, and United Nations Security Council called for Iran to suspend all enrichment-related and reprocessing activities including research and development [6]. Iran also signed a 10-year contract under which Russia would supply nuclear fuel for the Buser nuclear power plant [7]. But, Iran has constructed a commercial uranium enrichment plant without competitiveness in its country and performed enrichment-related research and development. This means that sensitive activities won't be given up in accordance with intention of the states.

In particular, these proposals will not prevent states which have intention of developing nuclear weapons from acquiring indigenous sensitive activities, as they are based on a voluntary participation. Rather, problem states may accelerate efforts to secure sensitive nuclear technologies in their countries, insisting that some of the proposals may threaten certain states with denial of fuel supply under a political agreement.

On the other hand, states that adhere to the obligation of nuclear nonproliferation regime and have no intention of developing nuclear weapons will be forced to join in the multilateral mechanism by external factors including bilateral pressures. As mentioned above, however, supply assurances would be difficult to be enough an incentive to take part in the multilateral mechanism, especially to the large-sized nuclear states.

This mechanism will have difficulty in achieving the universality unless it provides solutions on these issues.

4. Conclusion

Recent cases including access to sensitive technologies under the peaceful uses of nuclear energy as well as revelation of nuclear black market are increasing proliferation risks. As a result, various proposals to respond to proliferation risks by sensitive technologies have been made. These proposals all share the idea that the best way to reduce risk is to prevent states from having control over the indigenous civilian nuclear fuel cycle. However, these proposals are confronted with challenges such as Article IV of the NPT, insufficient incentives, right of future development and technological leadership. If states that are suspected of developing nuclear weapons refuse to join in the mechanism and additional incentives aren't provided to large-sized nuclear states, it may be difficult to achieve the goal of nuclear nonproliferation by restriction of civilian nuclear fuel cycle.

Finally, these proposals should find balance of conditions and benefits to be implemented.

References

- [1] Arian Pregoner and David Saltiel, Strengthening the Nuclear Nonproliferation Regime: Focus on the Civilian Nuclear Fuel Cycle, conference report, 14th International Security Conference, May 4-6, 2005.
- [2] World Nuclear Association, Ensuring Security of Supply in the International Nuclear Fuel Cycle, WNA Report, May 2006.
- [3] Pierre Goldschmidt, Mechanisms to increase Nuclear Fuel Supply Guarantees, Carnegie International Non-proliferation Conference, Nov. 7-8, 2005.
- [4] John Deutch, Arnold Kanter, Ernest Moniz and Daniel Poneman, Making the World Safe for Nuclear Energy, 4th UN-ROK Joint Conference on Disarmament and Nonproliferation Issues, Dec. 1-3, 2005.
- [5] Marius Stein and Bernd Richter, Multi- or Internationalization of the Nuclear Fuel Cycle: Revisiting the Issue, Summer 2004, Volume XXXII, No.4, JNMM.
- [6] <http://www.un.org/News/Press/docs/2006/sc8679.doc.htm>.
- [7] <http://www.nti.org/db/nisprofs/russia/exports/rusiran/react.htm>.