国際フォーラム パネル討論2

Panel Discussion 2

4 December, 9:30-12:00

テーマ:
「核燃料サイクルのオプションに係る核不拡散確保のための保障措置や技術的措置の役割」

Theme:
Roles of Safeguards and technical measures for ensuring nuclear non-proliferation for nuclear fuel cycle options

座長：Chairperson：

- **田中　知　東京大学大学院工学系研究科原子力国際専攻教授**

  Prof. Satoru Tanaka, Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo

パネリスト：Panelists：

- **ディヴィス・ハート　IAEA東京事務所長**

  Mr. Davis Hurt, Head of the IAEA Tokyo Regional Office
- **クリストフ・グゼリ　在日フランス大使館　原子力参事官**

  Mr. Christophe Xerri, Nuclear Counselor at the Embassy of France in Japan
- **イル ソン ファン　ソウル国立大学教授**

  Prof. Il Soon HWANG, The Seoul National University, the Republic of Korea
- **安　俊弘　カリフォルニアバークレイ校原子力工学科教授**

  Prof. Joonhong Ahn, Professor and Vice Chair, Department of Nuclear Engineering, University of California, Berkeley
- **久野　祐輔 日本原子力研究開発機構　核物質管理科学技術推進部次長**

  Dr. Yusuke Kuno, Deputy Director, Department of Science and Technology for Nuclear Material Management (STNM), Japan Atomic Energy Agency (JAEA)

論点１:クローズドサイクルとオープンサイクルにおける保障措置技術の役割
Discussion Point 1:Roles of Safeguards technologies for closed and open fuel cycle facilities

イントロダクション（Introduction)

クローズドサイクルとオープンサイクルにおける保障措置の役割と技術に関するIAEAと日仏の取組みと課題について、以下の内容についてパネリストから紹介

IAEA's efforts to develop Safeguards approach for closed and open fuel cycle facilities. Japan's and France's efforts for IAEA safeguards and challenges, and possible measures to overcome such challenges. Following topics will be presented by the panelists.

- **クローズドサイクルとオープンサイクル両者に関連する原子力施設への保障措置適用に関するIAEAの取組**
- IAEA's effort for Safeguards applied to closed and open fuel cycle facilities
- **クローズドサイクルに適用される保障措置に対する我が国の対応**
- Japan's efforts for Safeguards measures and technologies for closed fuel cycle facilities
- **使用済燃料の直接処分(オープンサイクルでの使用済ウラン燃料、クローズドサイクルでの使用済MOX燃料等)に関する保障措置アプローチ検討と技術開発**
- Safeguards approaches for direct disposal of spent uranium and MOX fuels and necessary technology developments

論点１:クローズドサイクルとオープンサイクルにおける保障措置技術の役割

Discussion Point 1: Roles of Safeguards technologies for closed and open fuel cycle facilities

議論（Discussions）

- 保障措置は重要、特に機微技術をあつかう核燃料サイクル（短期）には有効
- From non-proliferation perspective, Safeguards is important and effective especially for nuclear fuel cycle facilities with sensitive technologies.
- 今後どのような保障措置技術開発を進めるべきかについても議論
- In this respect, we should now discuss what Safeguards technologies we should develop in the future.
- しかし長期的に核拡散リスクを残す直接処分においては、保障措置に限界はないか（長期にわたって有効という保証はない）？直接処分では保障措置を短中期に有効な対策と考え、長期的には、より抵抗性（物質・技術的困難性）に重点を置いた対応が必要ではないか 。
- However, the direct disposal of spent fuel has proliferation risks on a long-term basis because there is limitation of Safeguards (no guarantee that effectiveness of safeguards can be maintained over a long period of time). Considering these aspects of the long-term nuclear activities such as direct disposal of spent fuel, we should consider that safeguards is effective measures in short/medium term, but need to focus on proliferation resistant including reducing material attractiveness and technical difficulties in long-term.

質問(Questions)

- 質問1：保障措置強化と効率化を同時に進めるための技術として何が必要か？
- Q 1: What kinds of Safeguards technologies are required for promoting both strengthening and efficiency of Safeguards?
- 質問2：再処理などの大規模な機微技術施設を有する国に対する保障措置（保障措置制度・技術の進化がどのように活きるか）？
- Q 2: How can IAEA Safeguards systems and technologies contribute to the Safeguards in a state that has large-scale nuclear facilities with sensitive technology, such as reprocessing plant?
- 質問3：核不拡散確保のための原子力新興国への保障措置技術協力と原子力メーカーの役割は？
- Q 3: What are roles of developed nuclear energy countries and their nuclear industries in emerging nuclear energy states for ensuring nuclear non-proliferation? What kind of assistance should they make available in the area of Safeguards?
- 質問4：使用済燃料直接処分における保障措置の限界は？
- Q 4: Does Safeguards have an unlimited effectiveness even in the direct disposal of spent fuel?
- 質問5： Puグレード別扱いの可能性の考え方の必要性・導入可能性は？
- Q 5: Is it possible to introduce a concept of the differentiated safeguards approach based on graded plutonium?

論点2：核不拡散を強化する技術的措置としての核拡散抵抗性向上の取組とプルトニウム燃焼技術等および国際協力の検討

Discussion Point 2:Technical measures for enhancing nuclear non-proliferation efforts for improving proliferation resistant technologies and technologies for plutonium-burning

イントロダクション（Introduction)

- 短中期的には、クローズドサイクルとオープンサイクルいずれにおいても保障措置の役割は重要、しかし様々な課題がある。
- In the short- and mid- term, Safeguards is important and effective for both closed and open fuel cycle, although it faces various challenges.
- 一方、長期的には、技術的対応策がより重要性を増す。
- In the long-term, however, proliferation resistance technologies play critical roles for nuclear non-proliferation.

核拡散リスクを低減するための抵抗性技術や国際協力について議論。

Based on such premise, we will discuss possible proliferation resistant technologies which enable to reduce proliferation risks.

論点2：核不拡散を強化する技術的措置としての核拡散抵抗性向上の取組とプルトニウム燃焼技術等および国際協力の検討

Discussion Point 2:Technical measures for enhancing nuclear non-proliferation efforts for improving proliferation resistant technologies and technologies for plutonium-burning

議論（Discussions）

実現性のある効果的かつ効率的な核拡散抵抗性向上策の実現に向けた取組みとは？

In order to implement feasible, effective and efficient proliferation resistant measures, following arrangements would be effective and have significance.

•クローズドサイクル：余剰Puを持たないためにPu消費技術よって補完しつつ制度(保障措置)による抵抗性が有効

•Closed fuel cycle: Application of Safeguards systems supplemented by technologies for consuming plutonium, which can avoid surplus plutonium accumulation, is effective.

•オープンサイクル：Pu消費や核分裂性プルトニウムの比率を低下させるなどの抵抗性技術が意義を持つ

•Open fuel cycle: Introduction of proliferation resistant technologies, which can consume plutonium and reduce fissile plutonium ratio etc., have significance.

•保障措置、核不拡散分野における国際協力の活用

•Promoting international cooperation in the area of nuclear non-proliferation and Safeguards

質問(Questions)

- 質問１：使用済燃料を如何に扱えばよいのか。
  クローズドサイクル（リサイクル）の不拡散課題に対する方策
  オープンサイクル（直接処分）の不拡散課題に対する方策
- Q1：How Spent Fuel should be managed?
  Measures against proliferation risk in closed cycle?
  Measures against proliferation risk in open cycle?
- 質問２：Pu（アクチニド）燃焼・消費という考え方の意義(経済性・産業的成立性を含む)は？
- Q 2What are significance of burning and consuming of plutonium and minor actinides, including their economic justification and industrial feasibility?
- 質問３：核拡散抵抗性向上策の実現に向けた課題は？
- Q 3:What are challenges for improving and implementing proliferation resistant measures and technologies?
- 質問４：核拡散抵抗性向上策を講じた場合のIAEA保障措置の軽減可能性は？
- Q 4: Is it possible to reduce IAEA Safeguards activities by introducing such proliferation resistant measures and technologies into nuclear facilities?

質問(Questions)　continued

- 質問5：Pu利用とPu消費という異なった考え方をどうバランスをとるか？
- Q 5:　How do we balance utilization and consumption of plutonium because these are different concepts?
- 質問6：再処理等の国際管理/多国籍管理や地域保障措置は有効か？
- Q 6:　Are international controls and/or multinational approaches to nuclear fuel cycle facilities (MNA), and regional safeguards such as EURATOM safeguards effective for nuclear non-proliferation?

パネル2の質疑と全体まとめ
Questions from floor and summary of the panel discussion 2

- フロアからの質疑
- Questions from floor

- 議論のまとめ
- Summary of the panel discussion 2