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## **Nuclear Materials and International Security**

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# Nuclear Materials and International Security

## INTRODUCTION

*During the Cold War, Argument on Arms Control Issues Have Been Focused on Those Topics:*

- Nuclear Weapons and International Security
- Test Ban and International Security
- Preventing Nuclear Proliferation

The last topic was also a important topic, but more emphasis was put on proliferation of nuclear weapons and its technique. The uranium concentration and plutonium reprocessing technologies also have been noted, but it met difficulty for its dual-use characteristic.

*After End of Cold War, A Part of Above-Mentioned Topics Have Reached Common Understanding, But in Some Important Issues, The Argument Will Still Go On.*

### Common Recognize:

- The huge nuclear stockpiles like U.S. and Russia's nuclear stockpiles are not contribute to world stability and to international security, nuclear superpowers accelerate their nuclear disarmament process necessary absolutely.
- Test ban could prevent to develop new nuclear weapon and could curb nuclear arms race . No any reason to reject it.
- Non-Proliferation regime benefits international security, it should be supported and consolidated.

### Different Opinion Still Exist in Following Issues

- What is the roles of nuclear weapons in the world of today?
- What is final target of comprehensive nuclear disarmament? What steps should be accepted?
- How to enhance and how to consolidate the global non-proliferation regime?

*Nuclear Materials and International Security Has Been Turned into A Hot Topic in Today's Arms Control Research.*

How to safeguard, to protect and to control the fissile materials used for weapons, How to prevent smuggling, it is urgent task for global security.

## NUCLEAR MATERIALS AND NUCLEAR WEAPONS

*Along with nuclear technology developing, the secret of nuclear weapon is no longer a mystery for more and more countries.*

- India, Pakistan, Israel and South Africa are de facto nuclear weapon states, and Iraq had gone to the edge of possessing the nuke.
- Some countries like, Japan, Brazil, North Korea and South Korea, they have a capability to make a nuclear bomb during a short period, if a political decision

were made.

- It might not need nuclear test to make a first-generation nuclear weapon.

***Now, the Crux of Possessing of Nuclear Weapon is Possessing of the Fissile Materials or Developing The Capability to Produce The Fissile Materials. That Means The High Enriched Uranium (HEU) and Weapon Grade Plutonium are Key Materials for Nuclear Weapon.***

***A State Who Wants to Develop A Real Nuclear Force Have to Possess The Weapon Grade Plutonium and/or Weapon Grade Uranium (The Concentration of U-235 >90% ).***

- Reactor grade plutonium also can be used to fabricate a nuclear explosion device. It will meet great difficulty to establish a actual combat nuclear attack force only depending on civilian plutonium. Those plutonium have a high heat and high level radioactivity, and the yield of the explosive device made by civilian plutonium is instability in large range . But it could use to take a nuclear threat or nuclear terror, so civilian plutonium also relate to international security.
- The low enriched uranium (the concentration of U-235>20%, <90%) can be used to make nuclear weapons. The more low enrichment, the more large and heavy, the more difficulty for weaponization. Now, the advanced isotope separating technique facilitate to obtain the high enriched uranium from low enriched uranium.

All HEU and Civilian Plutonium are Dangerous For International Security.

**TO ENHANCE THE RESEARCH ON HOW TO PROTECT, TO CONTROL AND TO DISPOSE THE FISSILE MATERIALS IS FIRST PRIORITY IN ARMS CONTROL RESEARCH FIELD, NOW.**

***Success of Nuclear Disarmament Depends Upon Closely The “Surplus” Fissile Materials From Dismantled Weapons, Especially WPU, Could be Safer Disposed.***

- A comprehensive and irreversible nuclear disarmament have to refer feasible version on disposition of fissile materials. These materials come from the deployed warheads which have been reduction, it also come from the retired or reserved warheads, pits and secondaries.
- We should enhance the research work introduced from deep cut on nuclear arsenals. We have met and will meet a large amount of technical problems to be solved. Technical support will pay more important roles on nuclear disarmament process. For example:

#### Verification Technology

to monitor the dismantlement, to monitor the warhead's transportation, to monitor the storage of the pits and other nuclear materials components and to monitor the disposition process.

#### Materials Accounting Measurements

to develop a precise accounting technique which uncertainty would be met big reduction.

### Fissile Materials (WPU) Immobilization Technologies

All immobilization option should consider future feasible disposal that can keep the environment permanent safety.

### Technologies on Fabricating Mixed-Oxide Fuel From Surplus WPU

The Gallium (Ga) removal technique, Ga is a important component of WPU, but it is very harmful in the reactor. varied of experiments on reactors used MOX fuel are needed.

Of Course, All Technique Should Be Less Intrusive and Acceptable.

### ***Safeguards on Civilian Plutonium***

- After year 2000, the civilian plutonium will exceed military plutonium in the world. According to the data from NCI (Nuclear Control Institute), global civilian plutonium would have 55% in year 2000 and it would have 68% in 2010. We should never ignore these data.
- To safeguard the civilian plutonium would meet more difficulty than military plutonium for it distribution on more states and more facilities. At present, the IAEA's safeguards system would be unequal to this task.
- Controversy has been raised for the agreement between Clinton and Yeltsin that put 100 tons weapons plutonium to be turned into fuel for civilian power reactors. It needs a technical demonstration to proof that the MOX fuel option is a safer option and a verifiable option.

### ***There is Close Relationship Between Non-Proliferation and Nuclear Energy and Nuclear Fuel Cycle Policy***

- There is great debate on developing fast breed reactor which needs a nuclear fuel cycle to breed plutonium. For 20 years, the U.S. was not allowing plutonium to be used as fuel in nuclear power plants, and of discouraging its use in other countries. But the U.K., Japan, France and Russia strong opposed this police. The debate could not conclude in a foreseeable future.
- Some new ideas on developing new type reactor using transmutation technology or to design a new resistant proliferation reactor which could burn all plutonium in the fuel elements have developed widely. We should support those research work.

We should support all long-term research work on preventing nuclear proliferation. Both non-proliferation and economic development are first priority for international security.