Steps towards denuclearization of DPRK

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Cooperation with Russia on Disposition of Weapon Plutonium
Background of excess weapon plutonium

After the end of the Cold War, a large amount of excess weapon plutonium (Pu) occurred with the development of nuclear disarmament negotiations between United States and Russia. Its diversion and proliferation risks became a serious concern.

Reduction in the number of strategic nuclear warheads of Russia

During the Cold War ⇒ 45,000 (max, estimated)
START - I ⇒ up to 6,000* *Deployed number only
START - II ⇒ up to 3,500*
SORT ⇒ up to 2,200*

United States and Russia agreed to dispose of excess weapon Pu in a bilateral setting.

09/2000
Plutonium Management and Disposition Agreement (PMDA) :
Both sides agreed to dispose of 34 tons of Pu.

11/2007
Joint statement : Both sides agreed to dispose of Pu by irradiating MOX fuels in the fast reactor (BN-600).

As of 2018, the progress on PMDA was suspended.
JAEA’s cooperation on Vibropack MOX fuel fabrication

Technical cooperation by JAEA

JAEA provided Russia with technical assistance for realizing the Vibropack (Vi-pac) option. The option was to fabricate MOX fuels from weapon Pu by using vibro-packing technology in order to irradiate them in Russian fast reactor (BN-600). The disposition of 20 kg weapon Pu contributed to disarmament and non-proliferation of nuclear weapons.

 Weapon Pu

MOX granule

Vibro-packing

Vi-pac fuel pin

Vi-pac fuel assemblies

Vi-pac fuel fabrication facility (RIAR*)

Fabricate MOX granule, Fuel assemble

*IResearch Institute of Atomic Reactors

Irradiation in the Fast reactor (BN-600)
DPRK’s Nuclear Program and Denuclearization Process
Nuclear Weapons Life Cycle Confidence Building through Cooperative Initiatives

http://www.nti.org/media/images/IPNDV_Monitoring_Nuclear_Weapons_Lifecycle.width-800.jpg?_=1478104916
DPRK’s Nuclear Program

Yongbyon Nuclear Scientific Research Center

- Uranium enrichment facility
- Nuclear fuel rod fabrication plant (Installed machineries and its materials were removed in 2007.)
- 5 MWe graphite moderated reactor
- Radiochemical research facility
Technical Process of Denuclearization

1. Disablement of nuclear test site
2. Disposal/removal of nuclear weapon
3. Dismantlement/disablement of nuclear weapon fabrication facility
4. Disposal/removal of weapon usable material (Pu, HEU)
5. Dismantlement/disablement of facilities to produce weapon usable materials (uranium enrichment, reprocessing, nuclear reactor)
6. Disposal/removal of nuclear source materials

Human resources, technical know-hows, procurement routes