

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

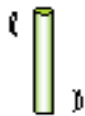
Technical cooperation by JAEA

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



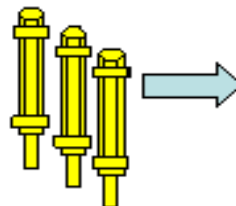
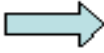
MOX granule



Vibro-packing



Vi-pac fuel pin



Vi-pac fuel assemblies



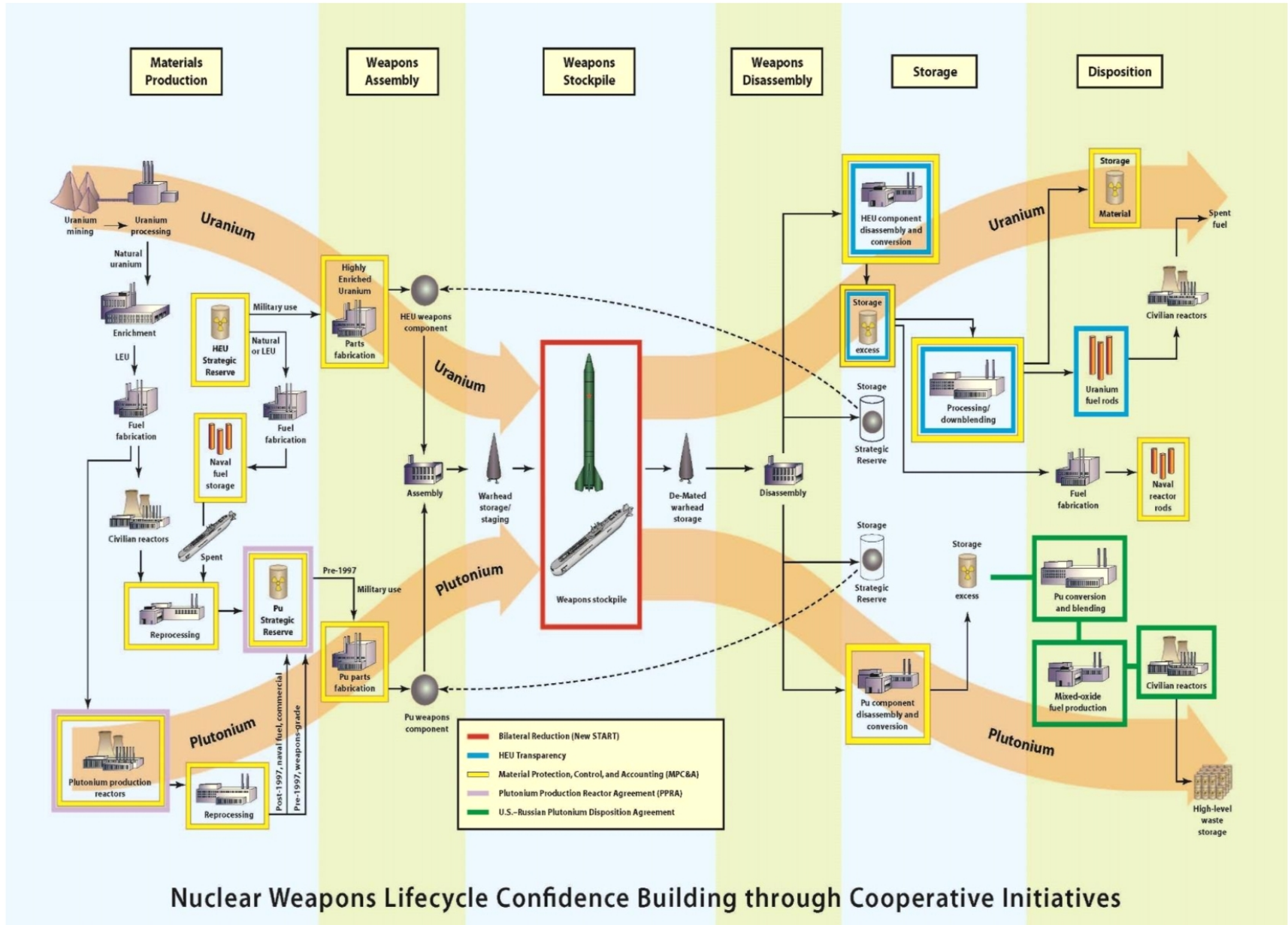
Irradiation in the Fast reactor (BN-600)

Vi-pac fuel fabrication facility (RIAR*)
Fabricate MOX granule, Fuel assemble

*Research Institute of Atomic Reactors

DPRK's Nuclear Program and Denuclearization Process

Nuclear Weapons Life Cycle



Nuclear Weapons Lifecycle Confidence Building through Cooperative Initiatives

DPRK's Nuclear Program

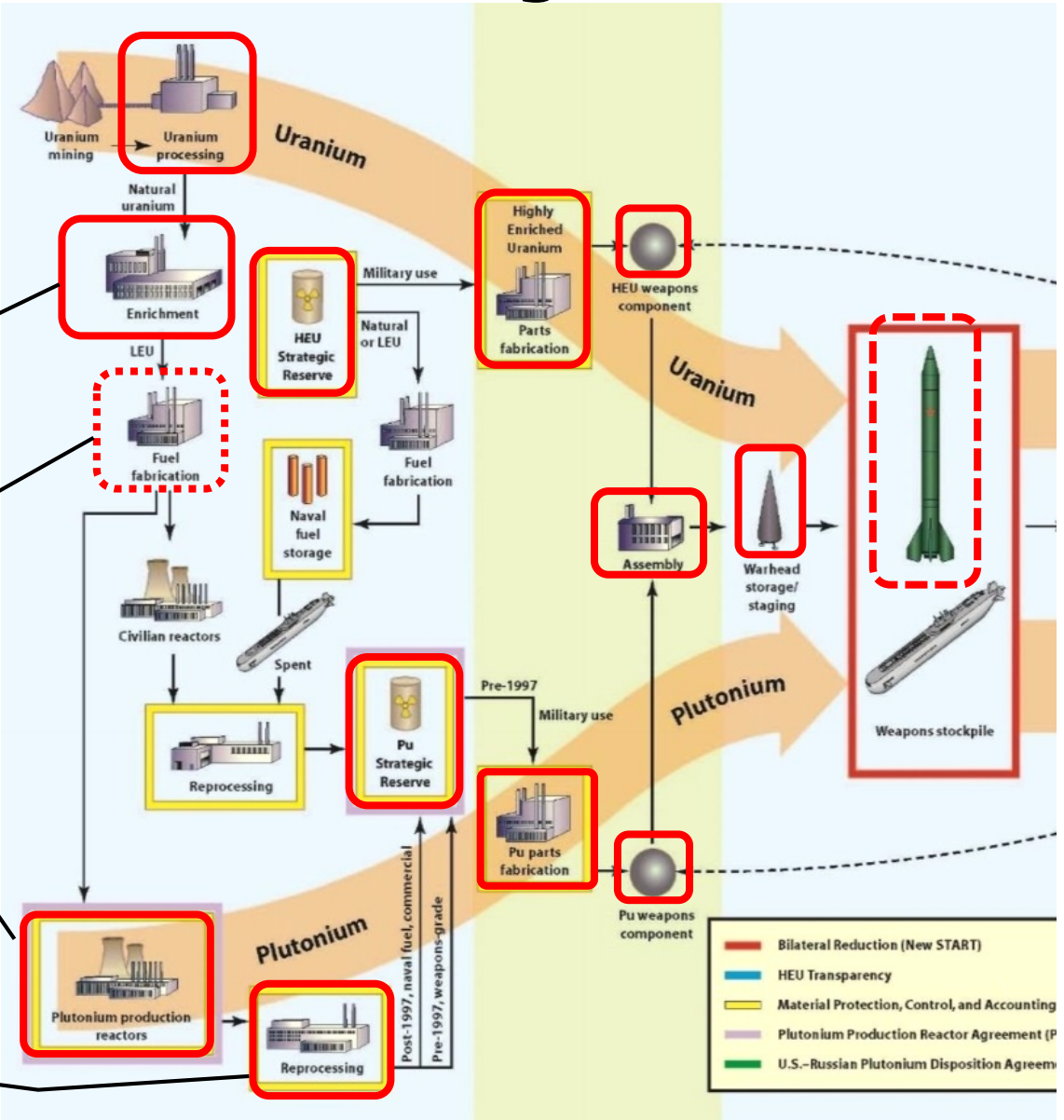
Yongbyon Nuclear Scientific Research Center

Uranium enrichment facility

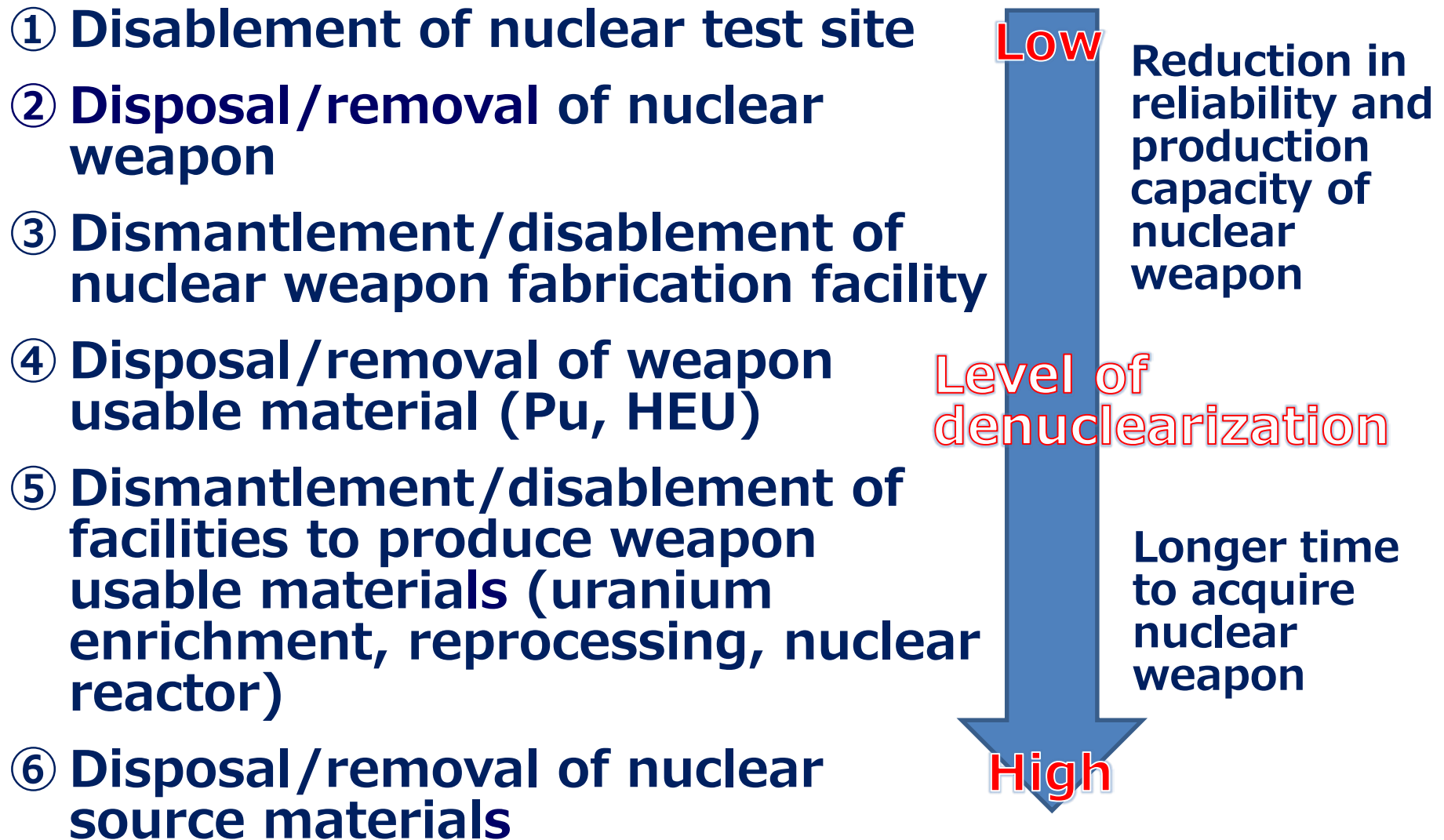
Nuclear fuel rod fabrication plant
(Installed machineries and its materials were removed in 2007.)

5 MWe graphite moderated reactor

Radiochemical research facility



Technical Process of Denuclearization



Human resources, technical know-hows, procurement routes