North Korean Nuclear Program in Transition

Olli Heinonen
Belfer Center for Science and International Affairs
John F. Kennedy School of Government
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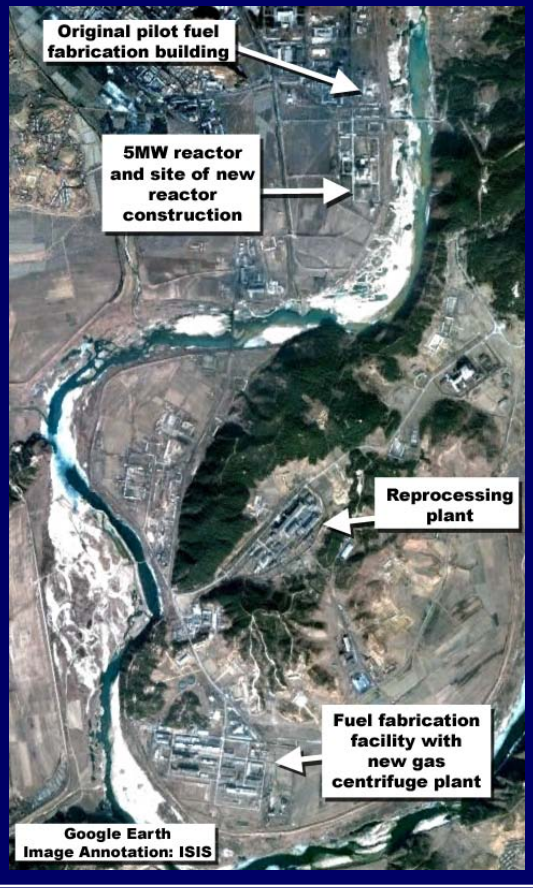
Major Milestones

- Program started in 1953
- Infrastructure built with the support of the Soviet Union
- NPT Safeguards agreement,1992
- Agreed Framework, 1994
- Joint statement, 2007
- Statement on 27 February 2012

Plutonium Cycle Facilities



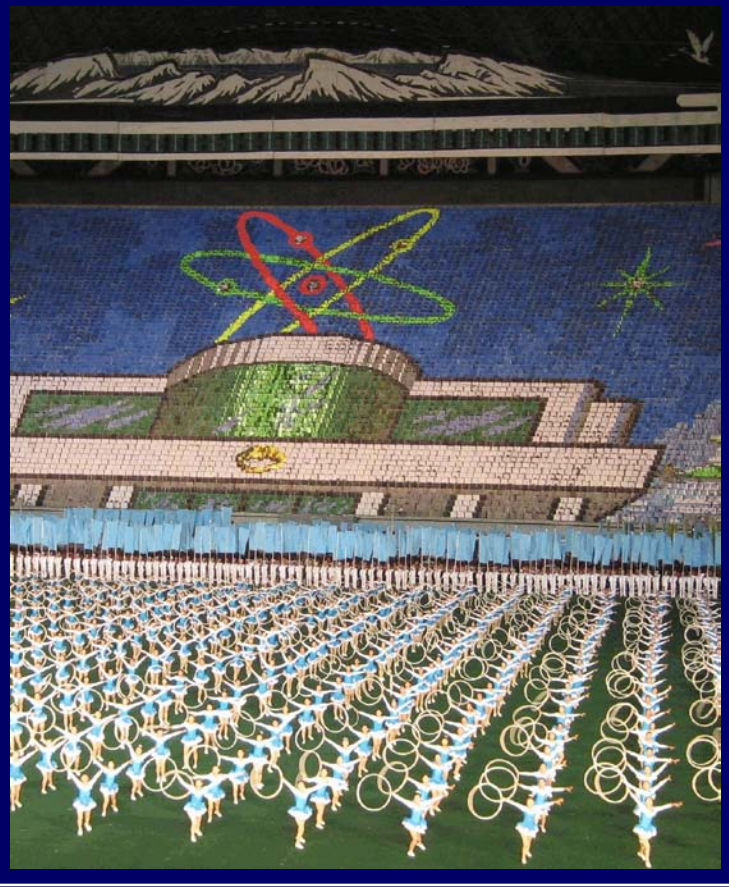
Why Concerns about Uranium Enrichment or Plutonium Reprocessing?

High enriched uranium and plutonium have currently very few civilian applications, but they are suitable for nuclear weapons

Uranium enrichment cascades can be fairly easily modified to produce high enriched uranium

Nature of the Efforts

- It pursues its program vigorously regardless of the hardships relying heavily on indigenous resources – Juche philosophy
- It continues to buy equipment and material from black markets
- It withdrew in 1993 (2003) from the NPT and 1994 from the IAEA
- It has been in breach with its obligations under the safeguards agreement from 1992
- It has not heeded to the UNSC resolutions
- It has been proliferating sensitive nuclear technologies and nuclear materials



No Uranium Enrichment

1991 North-South Joint Declaration on Denuclearization	• Agreed not to possess facilities for reprocessing and enrichment
1993 DPRK-US Joint Statement	• Support for the North-South Joint Declaration on the Denuclearization
1994 Agreed Framework	• Upholding the principles of the DPRK-US Joint Statement

Change of Statements

DPRK Spokesman 29 April 2009

- Will quarantee fuel on our own (uranium enrichment) for the nuclear program

DPRK Foreign Ministry 13 June 2009

- Uranium enrichment will begin
- Decision to build LWRs of its own
- Uranium enrichment has entered to test phase

Enrichment – What We Know

Before 1992

- Stated in 1992 that enrichment beyond technical capabilities
- Therefore developed Gas cooled graphite moderated reactors

Procurement and technology acquisition after 1992

- Procurement of materials and equipment
- Co-operation with Pakistan
- Provided in 2000 ca 1.7 tonnes UF6 to Libya

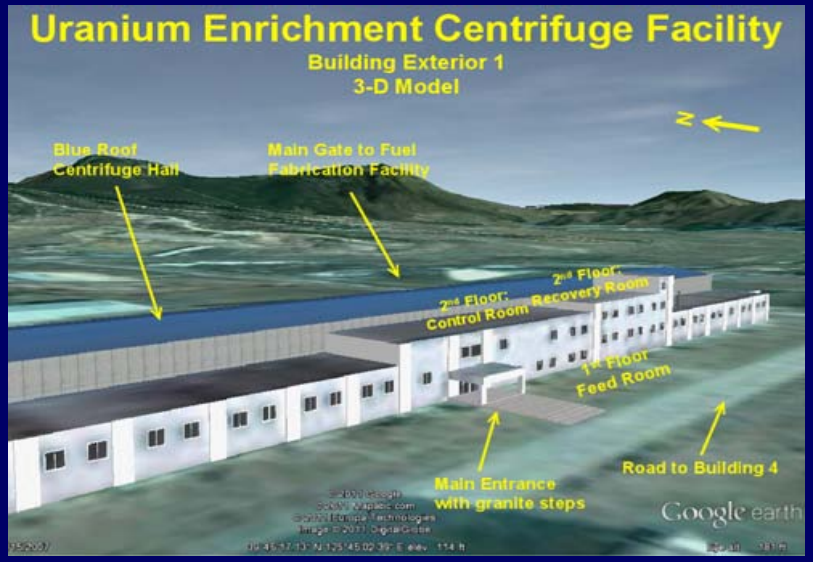
Uranium Enrichment Workshop

- Located at the Fuel Fabrication Plant
- Enrichment R&D installation likely exists
- UF6 production likely exists

Statement on 27 February 2012

- The DPRK, upon request by the U.S. and with a view to maintaining positive atmosphere for the DPRK-U.S. high-level talks, agreed to a moratorium on nuclear tests, long-range missile launches, and uranium enrichment activity at Nyongbyon and allow the IAEA to monitor the moratorium on uranium enrichment while productive dialogues continue.

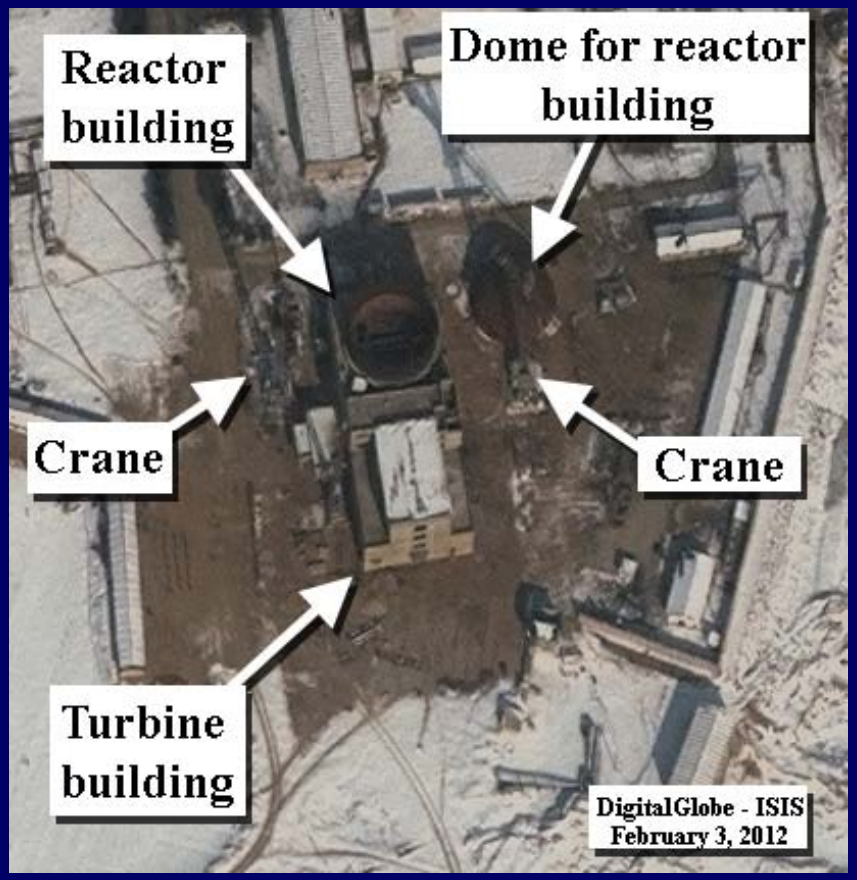
Uranium Enrichment



Centrifuges

- Likely similar to P-2, maraging steel rotor
- Ca 2000 centrifuges
- 4 SWUkg/year

LWR - Nyongbyon



Time Required to Produce Weapon Components

Scenario with of 2095 IR-2m centrifuges using low enriched uranium as feed material (roughly same capacity as the North Korean centrifuge):

Step	4-20 %	2.0 months
	20-60 %	0.9 months
	60-90 %	0.4 months
	metal component	1.0 months
Total for the 1st batch		4.3 months

The 2nd batch 2 months later

The 3rd batch 2 months from the 2nd batch

Enough for three batches in 9 months

Proliferation – Al Kibar

Proliferation

- Pakistan – enrichment technology and UF6

- Libya – UF6

- Syria – Fuel fabrication ?

Real Progress in Disablement

- No new plutonium produced 1994-2002
- 5 Mwe reactor disabled in 2008
- Fuel fabrication plant “non-existent” and no new fuel material produced since 1994

Road Ahead

- Current estimated plutonium stocks sufficient ,at least, for half a dozen nuclear explosives.
- The DPRK could have by the end of 2014 HEU stocks for another half a dozen nuclear devices, if it decides to do so.
- It is highly likely that there is, at least, an additional enrichment R&D installation, and a UF6 production facility in the DPRK. DPRK secretly proliferated by exporting technology and nuclear materials.
- Next phase should have a robust verification regime from the beginning; the US DPRK agreement on 29 February 2012 is a good albeit small step forward.