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**Background Information
on a Current Topic**

North Korea's¹ disclosure of October 2002. Does North Korea have the atomic bomb *now* ?

In August 1994 SPIEZ LABORATORY published a "Background Information on a Current Topic" dealing with the question "Does North Korea have the atomic bomb?"² The answer then was: "We suspect it, there is circumstantial evidence, but we do not know with certainty."

In the light of North Korea's latest disclosures a couple of weeks ago admitting the existence of a secret uranium-enrichment program, i.e. about the continuation of its efforts to obtain nuclear weapons, we are again confronted with this question.

Does North Korea *now* have the atomic bomb?

Today's answer is: "Probably Yes", but still we do not know for sure.

The paper at hand analyzes the most important developments concerning the country's nuclear weapons program, ranging from August 1994 till the end of October 2002.

Back to the second half of 1994: In August "Geneva talks" were announced between the US and North Korea. These negotiations then actually took place and led to an **"agreed framework" on October 21, 1994**. This agreement is considered controversial by many non-proliferation experts, who come to the conclusion that North Korea had been rewarded for its illegal nuclear weapons program. The US of course see it differently. The agreement was praised as a big success, a milestone in the struggle against nuclear proliferation and a very important contribution to the nuclear security in Northeast Asia.

Let's have a look at the principal features of the four main articles of this

Agreed Framework Between the United States of America and the Democratic People's Republic of Korea

Article 1:

Both sides cooperate to replace North Korea's graphite-moderated nuclear reactors with more proliferation-resistant Light Water Reactors (LWR's).

¹ strictly speaking: The Democratic People's Republic of Korea (DPRK)

² cf. "Hintergrundinformationen des LABOR SPIEZ", August 1994 "Hat Nordkorea die Atombombe?"

To be found at: http://www.vbs.admin.ch/ls/d/h_info/korea/index.htm

(For the moment available in German only. An English version will be published in 2003.)

- This means that North Korea accepts the obligation to "freeze" its two nuclear reactors, one of them operational, the other one then under construction, together with related facilities like reprocessing plants, spent-fuel storage sites, etc.
- In return for this, a consortium led by the US but co-financed by South Korea and Japan will – for about five billion dollars – supply North Korea with LWR's generating a total electric power of 2'000 Megawatt. This at no cost to North Korea!
- To compensate for the loss of electric energy due to the freeze of the reactors, alternative energy will be provided by the consortium in the form of 500'000 metric tons of heavy oil annually for heating and electricity production, pending completion of the first LWR unit. The costs for this ran up to 100 Million Dollars in 2001.
- The freeze of North Korea's nuclear facilities is to be monitored by the International Atomic Energy Agency (IAEA), and North Korea is to provide full cooperation to the IAEA for this purpose.

Some background remarks to Article 1

- Nowhere, neither in Article 1 nor elsewhere in the document the expression "nuclear weapons program" can be found. The US wanted by all means to avoid giving the impression that they were trading the abandoning of a weapons program against political acceptance and economical assistance.
- Graphite-moderated nuclear reactors work with natural uranium, a material abundant in North Korea. This reactor-type is very well suited for the production of plutonium in the so-called "weapon-grade" quality. A verified freeze of these reactors actually blocks the plutonium path to the atomic bomb. This led the media to believe that the freeze of the reactors was equivalent to the freeze of the weapons program, maybe too hasty a conclusion!
- In our view the **biggest weakness** of the agreed framework lies in the fact that the official text does not mention North Korea's weapons related activities before 1994, i.e. before the agreement was signed. These activities are highly questionable and their outcome alarming: Evidence suggests that before the freeze North Korea separated some of the plutonium contained in the reactor's spent-fuel elements. The amount is not exactly known, but reliable estimates by international experts indicate that there is enough plutonium to **build three to five atomic bombs** with the destructive power of the Hiroshima bomb.

Article 2:

The two sides will move toward full normalization of political and economical relations.

Article 3:

Both sides will work together for peace and security on a nuclear weapon-free Korean peninsula.

The most important point in this article is that North Korea will benefit from a so-called "negative security assurance" from the US. Thereby a nuclear weapon state, in this case the US, guarantees not to use or threaten to use nuclear weapons against a country abiding to the stipulations of the Non-Proliferation Treaty (NPT), in this case North Korea.

Article 4:

Both sides will work together to strengthen the international non-proliferation regime.³

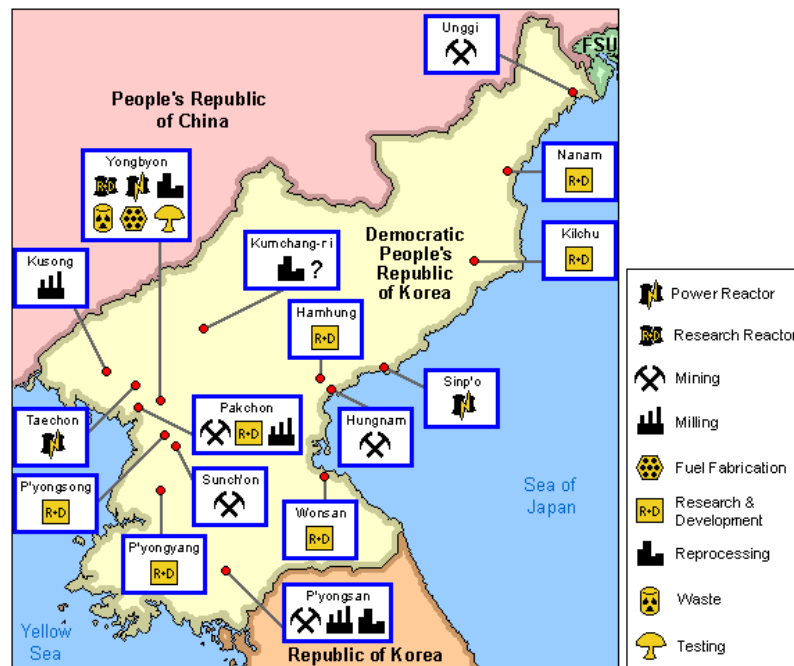
Under this article North Korea, having joined the Non-Proliferation Treaty in 1985 accepts the obligation to remain a party to the NPT, which prohibits all activities in the field of nuclear weapons and allows inspections by the IAEA.

So much to the 1994 agreed framework. What followed in the next eight years was a strenuous and embarrassing attempt to come to terms with the implementation of the agreement. Each party accused the other not to comply with the stipulations of the agreement. As a matter of fact, the IAEA was allowed to monitor the freeze of the reactors, but was **never allowed by the government of North Korea to perform full-scale inspections, i.e. extended inspections of suspicious facilities**. As a consequence, the deliveries of heavy oil were delayed, together with the start of the LWR-project, which began only as late as 2001. Originally planned to be operational in 2003, the first of these LWR's will be finished not earlier than 2007.

³ In the nuclear field the expression **Non-Proliferation Regime** wraps up all the treaties concluded and measures taken to get the dissemination of nuclear weapons under control. In the foreground are the Non-Proliferation Treaty and its associated technical control measures, the IAEA's so-called "safeguards".

Summing up:

- There is no doubt that North Korea has an amount of plutonium sufficient for the construction of three to five nuclear warheads.
- There are rumors that in the eighties North Korea conducted a large number of experiments with conventional explosives, aiming at the development of the implosive configuration needed to ignite a nuclear device with a plutonium core.
- Taking into account North Korea's undisputed technical abilities and its considerable nuclear infrastructure (cf. figure) it has to be assumed – or again "evidence suggests" – that North Korea actually **built between three and five nuclear warheads**. With its various short- and medium-range ballistic missiles it possibly could transport these warheads over distances of up to 2'000 km, which gives military relevance even to a tiny arsenal.
- Here also North Korea's missile test of August 31, 1998 has to be mentioned. In this test the trajectory of a three-stage missile led over Japan, provoking headlines at that time.



North Korea's nuclear infrastructure
(Source: Center for Non-Proliferation Studies, Monterey, USA)

Now to the disclosures of October 2002

When J. Kelley, US Assistant Secretary of State, confronted the North Korean delegation with irrefutable proof about the existence of a uranium-enrichment program, the North Korean delegation surprisingly confirmed this fact and added that for them the agreed framework was nullified.

What is – technically – behind these disclosures?

- North Korea came to realize that the agreed framework had effectively blocked or at least seriously jeopardized the plutonium option for its nuclear weapons program.
- The only option left then is the uranium path, where **enriched** uranium is needed. For a nuclear explosive device with a uranium core highly enriched uranium (HEU) is needed, uranium where the content of the isotope U^{235} is increased from 0.7% in natural uranium to more than 80% for weapon purposes.
- Uranium enrichment is a costly and technically utmost demanding procedure. On the one hand, North Korea has large deposits of uranium, and on the other hand without doubt the technical prerequisites and expertise to realize an enrichment program. The main obstacles are certainly the industrial infrastructure of an economy close to collapsing and the huge amount of energy needed by a full-scale enrichment plant. For many years now North Korea has clandestinely tried to obtain centrifuge technology abroad. Presumably, North Korea follows this path towards enrichment, not least because this method needs considerably less energy than e.g. the gas-diffusion method or the electromagnetic method.

- In the media as well as in the Bush Administration acknowledging an enrichment program is considered equivalent to admitting the continuation of the nuclear weapons program. This interpretation is probably correct; what else would North Korea need enriched uranium for? Hardly for its future LWR's, whose fuel-elements will be supplied by the US.
- For the moment extent and state of the enrichment program are unclear. The most reliable estimates point to a "pilot-plant", much more than a laboratory experiment, but only a first step towards an industrial facility. The question whether North Korea already possesses "weapon-grade" uranium or not remains open.

Implications and consequences

- One thing is for certain, by secretly enriching uranium North Korea seriously violated its commitments as a party to the **Non-Proliferation Treaty**.
- It is more difficult to assess whether or not these enrichment activities also violate the **agreed framework** with the US, which only deals with the freezing of all the activities in context with the production of **plutonium** and does nowhere mention uranium enrichment.
- At least North Korea's course of action is not consistent with Article 3, which demands a nuclear-weapon-free Korean peninsula. In this context also the **North-South-Korean declarations** of 1991 and 1997 ought to be mentioned, which literally ask, that neither of the two states operates nuclear reprocessing plants or **uranium enrichment facilities**.

Reactions of the US

- To put it mildly, the US reactions to North Korea's disclosures were very moderate. The US tend towards a diplomatic solution of the dispute. At the same time they seemingly want to ignore North Korea's statement that for them the agreed framework is null and void.
- At the end of October 2002 the presidents of the United States, South Korea and Japan agreed to put diplomatic pressure on North Korea, with the goal of a quick and verified termination of the enrichment program and at the same time to make the country respect its international obligations in the nuclear sector.
- Experts and analysts speculate about the reasons for this low key reaction of the US, which is in sharp contrast to the rather aggressive rhetoric of the Bush Administration in the case of Iraq.
- If one starts from the assumption that North Korea actually has a couple of operational nuclear weapons it could use to destroy large parts of Seoul and/or Tokyo in the case of a military action of the US and its allies, this understandably leaves only little leeway for negotiations and actions. This represents a conceivable, but admittedly highly speculative explanation for the guarded behavior of the US and North Korea's neighbor states.
- A peaceful diplomatic solution of the conflict and a continuation of the reconciliation process between North- and South Korea, the so-called "sunshine politics", are for the moment the most promising alternative for all the countries involved. The fact that North Korea has signaled to be open for talks can be judged positive.

(state of the affair at the end of October 2002)

To interested readers we also recommend the website of the "Center for Non-Proliferation Studies" Monterey USA:

<http://cns.miis.edu/research/korea/index.htm>

More information about the secret nuclear weapons program of North Korea can be found in

"Exposing North Korea's secret nuclear infrastructure", Part I and II, Jane's Intelligence Review, July and August 1999.

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