Centrifuges in North Korea Force a Recalculation of Iran's Nuclear Progress

by Simon Henderson **(/experts/simon-henderson)**

Nov 22, 2010

ABOUT THE AUTHORS

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Brief Analysis

The recent confirmation that North Korea has built a centrifuge plant for uranium enrichment has major implications for the Middle East as much as it does for East Asia. The presence of the plant, shown on November 12 to visiting Stanford University professor Siegfried Hecker and two colleagues, has sparked a need to reassess the technical nuclear competence of Iran, with which North Korea has collaborated on missile development, and raises questions about U.S. intelligence capabilities.

Background

Professor Hecker is a former director of the Los Alamos National Laboratory (where the first atomic bomb was designed) who has spent his career there developing the U.S. nuclear arsenal. Since retiring from government service, he has visited North Korea six times, acting in an unofficial capacity. Pyongyang uses Hecker as a conduit to indicate to Washington the country's nuclear progress; U.S. officials accept the arrangement because it provides insights into North Korean thinking, which is often considered impenetrable. The November visit was Hecker's fourth to the controversial Yongbyon nuclear complex, where enough plutonium has been produced to create between six and ten nuclear bombs.

The principal facility at the Yongbyon complex, located about fifty miles north of Pyongyang, is a reactor disabled in 2007 as part of an international confidence-building measure, after years of operation during which its by-product was the fissile material plutonium. In October 2006, some of this plutonium was used in a nuclear test. A further test is believed to have taken place in May 2009. The enrichment plant, which is claimed to include 2000 centrifuges, has been constructed in a building in the complex previously used for fuel rod fabrication, which Hecker had visited in February 2008.

Pakistan Link

For several years, North Korea has been suspected of working on centrifuge technology because of the country's past close relationship with Pakistan. During the 1990s, North Korean scientists and technicians helped Pakistan develop the nuclear-capable Ghauri missile -- a copy of the eight-hundred-mile-range North Korean Nodong missile -- at the Khan Research Laboratories at Kahuta outside Islamabad, which is colocated with a centrifuge enrichment plant. The missile deal was reportedly hatched during a 1993 trip to North Korea by then Pakistani prime minister Benazir Bhutto. Four years ago, former Pakistani military dictator Pervez Musharraf alleged in his autobiography that Abdul Qadir Khan, the head of the Kahuta facility, had transferred to North Korea several of Pakistan's P1 and P2 centrifuges in the late 1990s.

Known Cooperation with Iran

The existence of the new Yongbyon centrifuge plant, which theoretically could give North Korea the capacity to make highly enriched uranium (HEU), an alternative nuclear explosive, places in doubt current assessments of Iran's centrifuge capabilities. North Korea has helped Iran develop the Shahab-3 missile, which is -- like the Ghauri -- a copy of the Nodong. Iran's centrifuge plant at Natanz uses the technically unreliable P1 centrifuge but has still managed to enrich uranium from its natural level of 0.7 percent of the fissile isotope U-235 to just below 20 percent enrichment. From this level, it is comparatively easy to reach the 93 percent needed to create an atomic bomb. If Iran has access to more-advanced technology, it could produce HEU more quickly and in larger quantities than previously believed. For its part, North Korea is seen to have no scruples about transferring nuclear technology. In 2007 it was revealed to have secretly sold a plutonium-producing reactor to Syria, which Israel destroyed in an airstrike.

Previous Information about North Korea and Enrichment

Although North Korea's enrichment capabilities are now confirmed, they have been alleged for several years. Pyongyang's 2003 withdrawal from the Nuclear Nonproliferation Treaty was prompted by U.S. claims that it had started an enrichment program, a diplomatic fracas from which the United States backed away in order to encourage negotiation. A year ago, on December 28, 2009, the Washington Post reported that "Pakistani scientist Abdul Qadir Khan ... said that North Korea may have been enriching uranium on a small scale by 2002, with 'maybe 3,000 or even more' centrifuges, and that Pakistan helped the country with vital machinery, drawings and technical advice for at least six years."

In his latest report, Hecker suggests that the centrifuges he saw were about six feet in height (roughly that of a P1 centrifuge) but quotes a North Korean engineer as saying they are not P1s. The centrifuges are more likely to have been P2s. The same engineer said the 2000 centrifuge machines fit six different groups, known as cascades. Hecker was not able to count the centrifuges in each cascade but cited the average enrichment as 3.5 percent. According to inspectors from the International Atomic Energy Agency, Iran uses 164 machines in each cascade. Such arrangements are sufficient for enrichment to around 20 percent, but smaller cascades are used for enrichment to 60 percent and to the crucial 93 percent threshold needed for workable atomic bombs. Pakistan's Kahuta plant has two centrifuge halls, each with 5,500 P2 machines. The Kahuta plant's annual capacity is estimated to provide sufficient HEU for between six and ten atomic bombs.

According to Hecker, the fact that construction of the North Korean production plant began in April 2009 and was recently completed suggests the successful design of centrifuge cascades in pilot plants or other sites elsewhere. (Pakistan also built additional reserve cascades in tunnels and at Gadwal, west of Islamabad. Iran was discovered building a second enrichment plant near Qom in 2009.)

Challenging Scenarios

Apart from the possibility that North Korea could share, or perhaps already has shared, P2 centrifuge technology with Iran, the new facility at Yongbyon raises the possibility that North Korea could enrich uranium on Iran's behalf. Such a flagrant challenge to the international nonproliferation regime would not be without precedent. In the early 1980s, China gave Pakistan enough HEU for at least two atomic bombs, as well as the design details for a weapon that Beijing had successfully tested using a ballistic missile. One can only guess as to the motivation for that transfer, but China was seeking Pakistan's knowledge of centrifuge technology and might well have wanted to jump-start work on Pakistan's nuclear deterrent, aimed at their mutual rival, India.

If North Korea masters the ability to produce HEU, it could also try to develop a much more powerful hydrogen bomb, the design of which requires both plutonium and HEU. Such prowess would challenge the balance of power in East Asia. Whereas China regards North Korea as an ally, Japan and South Korea live in growing fear of Pyongyang's military capabilities and mercurial leadership. Just yesterday, Chairman of the Joint Chiefs of Staff Mike Mullen described North Korea as a "destabilizing" influence and its reported nuclear advance as a "huge concern."

In the Middle East, North Korea's motivation appears to be to earn money from its sales of long-range missiles and other conventional munitions. Nuclear technology would no doubt command an even higher price. In the past, Washington has had to tolerate transfers by North Korea of missiles to U.S. allies such as Yemen and Egypt, as well as Syria and Iran. North Korea's evident nuclear ambitions raise stakes that need to be challenged by tough diplomacy and better intelligence, as well as heightened military readiness. U.S. allies, especially in the Middle East, will be looking for a firm response by Washington.

Simon Henderson is Baker fellow and director of the Gulf and Energy Policy Program **(https://www.washingtoninstitute.org/templateI02.php?SID=23&newActiveSubNav=Gulf%20and%20Energy%20Policy%20Program&activeSubNavLink=templateI02.php%3FSID%3D23&newActiveNav=researchPrograms)** at The Washington Institute. ❖

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