



Do Sang-rok

The “Father” of North Korea’s Nuclear Weapons Program?

Accounts suggest that regime acquired scientists for developing nuclear program decades before publicly acknowledging it

by Bill Streifer

“If North Korea’s claim of having conducted a nuclear test on October 9 is proven true, two questions stand out: What level of nuclear technology does the North possess, and how did North Korea, with only a per-capita gross domestic product of less than US\$2,000, nurture the human capital necessary to go nuclear?”

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Like much of Kim Jong-un’s regime, the genesis of Pyongyang’s nuclear program is shrouded in secrecy. Although nuclear activities in North Korea are widely assumed to have begun in the 1950s, the hunt for nuclear materials in Korea by Japan during World War II, and later by the Soviet Union during their occupation of northern Korea, began at least a decade earlier.

“The first known reference to nuclear related activity within North Korea dates to 1947 when the Soviet Union, with assistance from a Chao Yang surveyed North Korea’s monazite mines,” said Joseph S. Bermudez, Jr., the editor of *The Journal of North Korean Defense and Intelligence Affairs*. Monazite, the principal ore of thorium, also contains some uranium, the radioactive material necessary to construct the atomic bomb.

It is now clear, however, that North Korea’s nuclear program can be traced back to Seoul National University shortly after Korea’s liberation. For example, Do Sang-rok, a student of theoretical quantum physics and a graduate of Kyoto Imperial University, fled to Pyongyang in May 1946 after a falling out with the caretaker U.S. government between national liberation and the foundation of the

South Korean state. By year's end, he helped establish Kim Il-sung University, where he built his own particle accelerator and conducted North Korea's first experiments in nuclear physics. For this reason, Do appears the most likely candidate for "father of North Korea's nuclear weapons program."

Although Do may have experimented with the weaponization of atomic power as early as the late-1960's, it was not until October 2002, after being confronted with new American intelligence, that Kim Jong-il publically admitted for the first time what Japan, Seoul and the United States had feared for nearly a decade: Pyongyang had a secret nuclear weapons program. During his meeting with Kim Jong-il a month earlier, Japanese Prime Minister Junichiro Koizumi said he was willing to offer reparations — \$1 billion per year for a decade — for the damage inflicted by Japan during its 1910-1945 colonization of Korea in the hopes that the North would abandon its dream of becoming a nuclear power. It is now clear that before the Japan–North Korea Pyongyang Declaration of September 2002, U.S. President George W. Bush closely coordinated with Koizumi regarding the steps needed to be taken before Japan would consider normalizing relations with North Korea. Bush also updated Koizumi as to what the U.S. knew about Pyongyang's nuclear weapons program, a closely-held secret from a regime about which little was known.

According to Japanese sources, South Korea had passed information concerning North Korea's Highly Enriched Uranium (HEU) program on to the U.S. earlier in the year. According to South Korea's *Yonhap News* agency, however, the report by Japan's *Yomiuri Shimbun* newspaper of a defector who "had worked on North Korea's uranium enrichment program" was untrue. Citing a South Korean official who handled defectors, *Yonhap News* reported that no such defector existed. "The claim that the defector told us that North Korea's enrichment program began in 1998, that he had pinpointed the location of the enrichment plant, that he had detailed his technical tasks, and so on is not true," *Yonhap News* reported, arguing that "all defectors from North Korea are processed through a special agency and this agency has no knowledge of this person."

Despite *Yonhap News*' denial, it is now believed that the defector was Lee Mi (a pseudonym), a female researcher at the Yongbyon Nuclear Research Center whose first-hand accounts of Pyongyang's nuclear weapons program may have been key in leading to Kim Jong-Il's October 2002 public disclosure. During her debriefing, Lee was asked 13 questions. Her responses, and her hand-drawn map pinpointing the location of the underground facilities, first appeared in the *Yomiuri Shimbun*. Question No. 4 read as follows:

Please describe the functions, owner, facilities and storage capacity of the underground structures in the Yak, Deungdae and Seokdu mountains. Also, please tell us about when these underground structures were excavated and constructed and the entry, exact locations, etc. of these underground structures as you remember them. If you could make simple drawings of the external shape and locations of these underground structures they would be very helpful. When did you go there and what were the purposes of your visit?

Lee Mi's recollections were later translated into English and republished as "A Physicist Defector's Account of North Korea's Nuke Labs" by Lee Wha-rang (aka Kim Young-sik) who received his doctorate in high-energy particle physics from Purdue University in 1962. "Some of the 'facts' are not accurate," Kim Young-sik wrote, "but the general picture described is correct as far as I know." The following is an excerpt from the *Yomiuri Shimbun* article as translated by Kim Young-sik:

The underground facilities were constructed by the 66th Industry deep beneath Yak mountain at a huge human cost. Many workers died in various accidents during their construction. Construction began in 1965 and was completed in 1970. The underground caves branch out into different interconnected tunnels. The complex is extremely large and well-illuminated. Its entrance is large enough for trucks to enter. Concrete walls block the entrance and clever camouflage hides it from outsiders. The caves are used to hide lab equipment and other evidence of a nuclear weapons program in case of inspections or other events. During the IAEA inspection, tell-tale equipment and

materials were secretly moved into the Yaksan cave. During the inspection, the lab staff members wore military uniforms.

After graduating from Pyongyang Physics College in 1974, Lee Mi was assigned to the 304th Research Lab at the Yongbyon Nuclear Physics Center in Bungang, about 50 miles north of Pyongyang, where she worked until her dismissal on February 21, 1999. Then in September 2000, she fled to China and later to a “third country,” probably South Korea or the United States. The secret laboratory she described was one of many, each with its own codename: 101st Research Lab, 206th Research Lab, 175th Industry, 66th Industry, August Industry, February Industry, and so forth. There was no “open communication” among the lab workers, Lee said, who were paid 20-30% extra to preserve security.

According to Lee Mi, the Bungang lab was created during the latter part of 1950 with the help of Soviet scientists and advisors. Special living quarters were built along Guwol-gang River and the staff members were bused to the lab. Families lived in the staff quarters. Select members of the staff were sent to China, Russia and other nations to study nuclear physics and chemistry, although staff scientists were not allowed to travel abroad or even within North Korea on their own. “If a problem cannot be resolved by the staff then special permission is given to go abroad to find the solution,” Lee said. Some, who traveled abroad and engaged in “reactionary activities,” were sent to labor camps. A reactor at Bungang was later built with Soviet assistance. There were about 200 Soviet and foreign advisors working at the lab, and most of the lab equipment was of Soviet origin or design. In the early days reactor parts came from the Soviet Union, but later they came from China. The uranium, however, was mined domestically.

Lee Mi said that North Korea’s nuclear program began in 1950 when Kim Il-sung ordered Lee Hak-mun, a two-time national hero medal winner, to develop nuclear weapons. She said that Lee Hak-mun then recruited prominent scientists from the South including Lee Sung-ki, Doh Won-sung and Do Sang-rok during North Korea’s brief occupation of South Korea in the early months of the Korean War. After the war ended, Lee Sung-ki set up a branch lab in Hamhung, and Doh Wong-sup and Kim Do-sul headed the main lab at Bungang, Lee Mi said. According to Kim Young-sik, however, Lee Mi is mistaken concerning the names of certain key scientists. Rather than Doh Won-sung, for instance, he named Han In-suk as one of the primary scientists of note involved in the project. He also named many others including Kim Gyng-wan (a chemist and president of Kim Chaik University), Yo Gyong-ku (the son of Yo Wun-hyung, who studied nuclear physics in the Soviet Union), Jung Gun, Choe Hak-soon, Keh Yong-soon and Park Kwan-oh as having taken part. Like Lee Mi, however, Kim Young-sik named Lee Sung-ki and Do Sang-rok as among the renowned scientists involved during the infancy of the North’s nuclear program. Kim Young-sik also said that several hundred of North Korea’s top scientists studied at the Dubna Nuclear Research Institute in the Soviet Union, which might help explain how an impoverished nation like North Korea was able to develop a nuclear weapon.

According to Kim Dae-ho, who requested asylum at the South Korean embassy in Beijing in 1994, Lee Sung-ki was kidnapped at the outbreak of the Korean War. Reluctant to participate, he was eventually persuaded by Kim Il-sung, who told him, “Nuclear development is an essential project for the unification of the nation.” Born in South Korea, Han In-suk, who studied physics in Japan and Germany before Korea’s liberation from Japanese colonization, later studied at Moscow University. But Do Sang-rok is considered the closest thing to the “father” of North Korea’s nuclear program, according to a report published in 2000 by the South Korean Ministry of Unification. Born in Hamhung, North Korea in 1903 or 1904, Do began publishing research papers on quantum mechanics in Japan and the U.S. as early as 1930. According to a separate study by Lee Jae Sung, a South Korean expert on North Korea, Do was the No. 1 scientist at work on Pyongyang’s nuclear program at the time of his death in 1990, 16 years before North Korea conducted its first of three underground nuclear tests.

In May 1946, Do fell afoul of the U.S. Army Military Government in Korea (USAMGIK) when he protested their proposal to forcibly merge Seoul’s 10 colleges and technical schools, after which he voluntarily crossed into Soviet-occupied northern Korea, where he would remain for the rest of his

life. Later that summer, Kim Il-sung met with Do and other defecting scientists. In September 1946, Do became head of the physics and mathematics departments, as well as the chief of research at what would later become Kim Il-sung University in Pyongyang. He also wrote and translated Japanese textbooks into Korean. According to Kang Ho-je in "Father of North Korean Nuclear Physics Received the Appellation, 'People's Scientist'," Do presumably began research into weaponized nuclear technology in the late-1960's or early-1970's, apparently due to a confluence of factors including international developments, North Korean domestic politics, and the state of North Korean science.

Purely by coincidence, the U.S. Army began an investigation into possible nuclear research in Korea in July 1946, two months after Do's defection. Following the Soviet invasion of northern Korea at the end of WWII, U.S. intelligence in Seoul began hearing "consistent rumors" of nuclear activities from the Hamhung/Hungnam¹ area; information received, for the most part, from Japanese and Korean refugees. According to a May 1946 U.S. Army intelligence report, the actual experiments on atomic energy during WWII were conducted in Japan, but the "practical application of atomic energy to a bomb or other military use" was carried out in Hungnam, home of the largest fertilizer and chemical complex in the Far East.

U.S. Army Major Richard R. Entwistle, a member of the Economic and Science Section of SCAP, accompanied by 2nd Lt. Koyoshi "George" Yamashiro, an expert translator, interviewed Lee Tai-kyu and Ahn Dong-hyuk, reportedly the best technically-educated men in Korea. Lee, who studied under Henry Eyring and H.S. Taylor at Princeton, was a professor of chemistry at Kyoto Imperial University during WWII, and later the Dean of the College of Engineering at Seoul National University. Ahn, a professor at Seoul Technical College, was described by Entwistle as a chemical engineer and graduate of Kyushu Imperial University in Japan.

Although Lee Tai-kyu said he had no "on the spot" information on what took place in Korea, he mentioned Bunsaku Arakatsu and Seishi Kikuchi, leading Japanese nuclear physicists with whom he was associated in the Osaka-Kyoto area. "At no time," Lee Tai-kyu said, "did Arakatsu and Kikuchi indicate that research in this field was being conducted in Korea," nor is there any evidence of records or equipment which would indicate that such research had been conducted, although Entwistle and Lee Tai-kyu agreed that this was perhaps a top-secret matter, not subject to casual conversation. Nevertheless, "if atomic research had taken place in North Korea during WWII, Arakatsu and Kikuchi would have known about it," Lee Tai-kyu said.

According to information received from USAMGIK's Department of Education, Ahn was reportedly the best-informed scientist in Korea. He had taught in Korea during WWII and was one of the very few Koreans taken into confidence by Japanese officials. For this reason, Ahn was not favored by certain Koreans in high governmental positions. "Ahn was not a theorist but a fundamentalist," Entwistle said, "interested in promoting basic research that will solve Korea's immediate economic problems." As Director of the Central Research Laboratory and President of Seoul Technical College, Ahn was able to obtain for his laboratory what little laboratory equipment there was in Korea. Entwistle was also impressed by the manner in which Ahn had laid out and arranged his laboratories and equipment.

During the interview, Ahn spoke freely from the outset, without going through the preliminary thawing out period like other Koreans Entwistle's group had interviewed previously. Ahn appeared technically qualified to discuss the subject because of his familiarity with the modern sciences. Entwistle concluding his report by noting that Ahn was an extremely capable and resourceful man. "One cannot predict for certain that Korea will make any noteworthy contributions to science in the near future. However, it is certain to predict that if she does, Dr. Ahn will have some part in it."

When asked specifically about nuclear physics research on the Korean Peninsula, Ahn said only that "prospecting for and research on the dressing and refining of rare element ores were conducted," although no economically important sources of pitchblende or uraninite were known to exist in Korea. He also emphasized that no atomic research, theoretical or experimental, was conducted in Korea; no equipment existed in Korea for nuclear physics research; no nuclear physicists existed in Korea; no

research work on isotope separation had been conducted; and that no plans for teaching or research in the field of nuclear physics had been contemplated because neither the equipment nor personnel existed. Nevertheless, when Entwistle asked Ahn for the names of the five most capable men of science in Korea, he mentioned Do Sang-rok, who Ahn described as a “former professor of physics at Seoul University; Electronics, Communication.”

Following the interviews of Ahn and Lee Tai-kyu, and after inspecting what was described as “important scientific institutions,” Entwistle said the equipment and personnel necessary to maintain and promote a minimum level of research did not exist in Korea. This is not difficult to believe, Entwistle said, when one considers the overall attitude and policy of Japan toward Korea during colonization. Japan had a “simple and effective policy designed to exploit Korea’s resources to the limit and reduce the Koreans to the level of serfdom.” While pursuing this policy, Entwistle said, the importance of controlling the education of Koreans was not overlooked. “Except in rare cases, middle school was the highest education obtainable.” Entwistle concluded his report by stating, “Scientific research in South Korea is today at an extremely low level; almost to the point of non-existence, so the need for exercising surveillance over the laboratories and their associated personnel does not exist except in the isolated instances of mining and mine development.” Instead, Korea needs technical direction and assistance to “guide her through these infant years”:

The situation is not one of spoon feeding or wet nursing a group of mature scientists incapable of seeing beyond their selfish ends. The research being performed now is basic, designed to solve the immediate economic problems and benefit Korean society as a whole, and not to determine “how many angels can sit on the point of a needle.” Such a policy merits active encouragement.

After Entwistle completed his investigation a few questions remain. Had Ahn misled Entwistle vis-à-vis Do Sang-rok? Was Do an expert in electronics and communications, as Ahn had stated, or was he a quantum field theorist, well-qualified to organize a nuclear weapons program? Was Do merely a “former professor of physics” as Ahn claimed, or had he defected to North Korea two months earlier, hell-bent on helping Kim Il-sung develop the atomic bomb? In his report, Entwistle noted that Ahn had reported the facts truthfully because of his willingness to talk. “Besides,” Entwistle said, “he had nothing to gain by withholding information.”

About Kim Young-sik

Born in North Korea, Kim Young-sik fled his homeland when a peasant mob killed his brother, Sung-sik. Though just 15 years old, Kim engaged in anti-communist guerilla activities during the Korean War. After the war, Kim traveled to Utah where he was “semi-officially adopted” by a wealthy Mormon family. While he worked on his uncle's farm feeding cattle and ducks, his young wife, Mary, cooked breakfast. “Mormons do not drink coffee or tea,” Kim said, “but Postum, a coffee taste-alike, is consumed in huge quantity.” He then took a janitorial job and lived in a basement room while attending Brigham Young University in Provo, Utah.

Upon graduation, Kim hitched a ride with a Korean friend to Purdue University in Indiana where he later earned his doctorate in physics. He then taught for 18 years at the University of Ohio in Athens, Ohio as an assistant professor of physics, devoting most of that time on nuclear research for the U.S. Atomic Energy Commission and the Argonne National Laboratory as a Visiting Scientist. He also worked at the Brookhaven National Laboratory (New York), CERN (Switzerland) and Rutherford Laboratory (England).

From 1980, Kim ran a computer application software business, taught computer science at various universities, and starting in the mid-1990’s published the Korean Web Weekly, an anti-communist web-based magazine that covered various subjects concerning Korea. Kim’s site also

included a section entitled intelligence/counterintelligence. Kim died in 2005. His website, www.kimsoft.com, was taken down in 2009, sometime after Pyongyang allegedly hacked it, leading the South Korean government to “filter” it according to Article 7 (1) of the National Security Law of South Korea. The statute provides for up to seven years’ imprisonment for “those who praise, encourage, disseminate or cooperate with anti-state groups...being aware that such acts will endanger the national security and the democratic freedom.” The contents of his website have been saved and remain available offline.²

THE END

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¹ Until recently, Hungnam was a industrial port city on the east coast of North Korea, and Hamhung was a residential city. Then in late-2005, Hungnam was demoted to Hungnam District within the City of Hamhung.

² If a website, museum, library or university is interested in obtaining Dr. Kim Young-sik's website (www.kimsoft.com) in its entirety, please contact the author.