

**The Taech'on Maskirovka:
North Korea's Clandestine Plutonium Reactors and
Uranium Milling Facilities.**



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North Korea used the construction of the Taech'on Hydroelectric Power System Plant Numbers 1 and 2 in Pyongan-Pukto, as a cover for its clandestine construction of a uranium milling facility and several plutonium production reactors respectively. The clandestine construction of a uranium milling facility was undertaken to limit observations concerning the quantity of uranium being produced, and therefore the number of uranium-based weapons the country can produce over a given period of time. The plutonium production reactors were constructed clandestinely in an underground facility for the obvious reasons of international anxieties concerning nuclear weapons proliferation. The reactors are a violation of the nuclear Non-proliferation Treaty (NPT).¹ Furthermore, the reactors operate outside IAEA observation and control.² The clandestine project was constructed under the cover of a legitimate large-scale civil-engineering project where the substantial amounts of required concrete and steel, could be hidden within the larger project. Neither facility is located at the actual power plant but under mountains located to their immediate east. Physical access to the secret projects is controlled from within the power stations.

Outside acceptance of the cover was so important that in response to US accusations surrounding the detected large-scale underground facility at Kumchang-ni, the North Koreans launched a military deception campaign, a Maskirovka, to enhance the legitimacy of the project's cover and refute any concerns otherwise. The North Korean Maskirovka was designed not only to mislead intelligence agencies following the country's nuclear weapons program, but also to control the direction of their analysis and the allocation of their resources. It succeeded.

Most of the information surrounding the Maskirovka is based on the testimony of a North Korean defector, Yi Chun-song, a reportedly former senior military official of the Korean People's Army (see Appendix 1).³ Yi attempted to defect to the Republic of Korea through China in 1999 and was allegedly detained and interrogated by Chinese authorities who later returned him to North Korea where he is believed to have been executed.⁴

The Korean Workers Party Plenum of 1981 announced the construction of the Taech'on Hydroelectric Power System in 1981.⁵ A total of 750 megawatts was to be generated by the entire system once complete.⁶ Completion of the project was set for 1988.⁷ A total of five hydroelectric power plants were to make up the Taech'on Hydroelectric Power System. Of the five planned plants, only Taech'on HPP Number 1 and Number 2 would be large-scale plants. Only two of the plants were built underground, Taech'on HPP Number 1 and Number 2. Only two required inordinately large amounts of steel and concrete, Taech'on HPP Number 1 and Number 2. Only two would be used as a cover for North Korea's clandestine nuclear weapons program, Taech'on HPP Number 1 and Number 2. Only

¹ Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Office for Disarmament Affairs. United Nations <https://www.un.org/disarmament/wmd/nuclear/npt/#:~:text=The%20NPT%20is%20a%20landmark,and%20general%20and%20complete%20disarmament.>

² IAEA Safeguards Overview: Comprehensive Safeguards Agreements and Additional Protocols. International Atomic Energy Agency <https://www.iaea.org/publications/factsheets/iaea-safeguards-overview>

³ Lee Choon Seon, a former senior military official in the North Korean People's Army, was interrogated while in the custody of the Chinese authorities. Before he could be brought to South Korea, he was repatriated back to North Korea where, according to Shindonga, he was probably executed. The original Chinese interrogation report was obtained by Shindonga and subsequently translated into Korean; “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다. 탈북 인민군 장성의 충격증인 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony],” Shindonga (Donga Ilbo's Magazine), 1 August 2001 <http://shindonga.donga.com>

⁴ Lee Choon Seon, a former senior military official in the North Korean People's Army, was interrogated while in the custody of the Chinese authorities. Before he could be brought to South Korea, he was repatriated back to North Korea where, according to Shindonga, he was probably executed. The original Chinese interrogation report was obtained by Shindonga and subsequently translated into Korean; “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다. 탈북 인민군 장성의 충격증인 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony],” Shindonga (Donga Ilbo's Magazine), 1 August 2001 <http://shindonga.donga.com>

⁵ North Korea's Nampo Lock-gate: Going Against the Tide. Directorate of Intelligence. Washington DC. 13 May 1986 <https://www.cia.gov/library/readingroom/docs/CIA-RDP86T01017R000606010001-7.pdf>

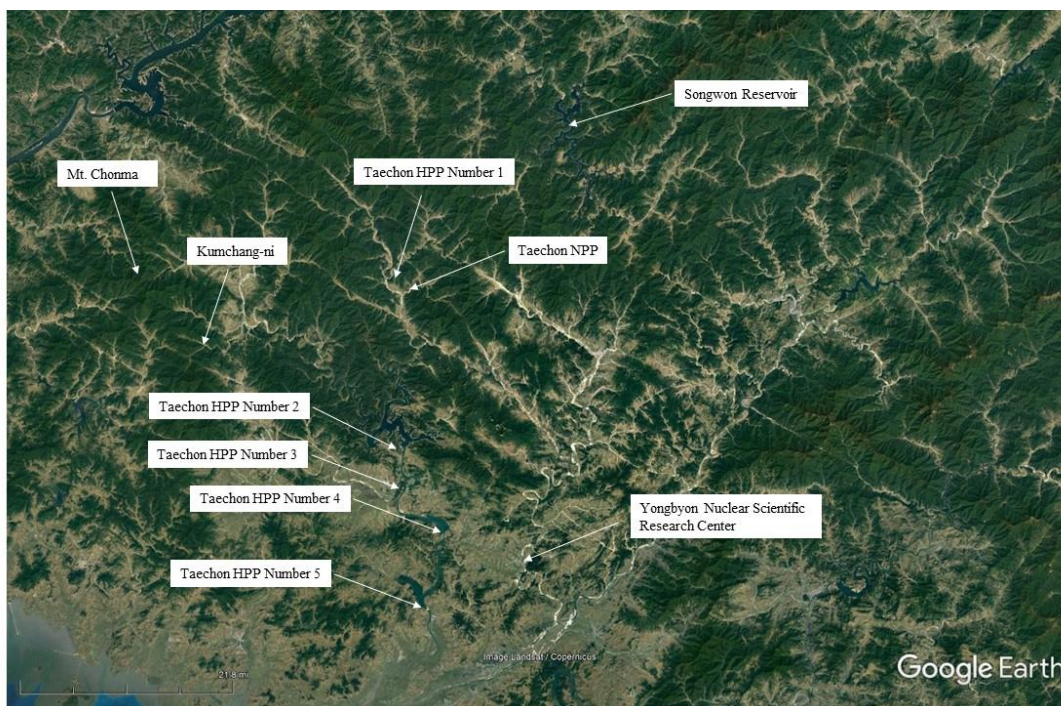
⁶ FUELING DPRK ENERGY FUTURES AND ENERGY SECURITY: 2005 ENERGY BALANCE, ENGAGEMENT OPTIONS, AND FUTURE PATHS REPORT PREPARED BY THE NAUTILUS INSTITUTE FOR SECURITY AND SUSTAINABILITY IN COLLABORATION WITH THE KOREA ENERGY ECONOMICS INSTITUTE (KEEI) Prepared by David Von Hippel and Peter Hayes DRAFT. 30 June 2007

⁷ North Korea's Nampo Lock-gate: Going Against the Tide. Directorate of Intelligence. Washington DC. 13 May 1986 <https://www.cia.gov/library/readingroom/docs/CIA-RDP86T01017R000606010001-7.pdf>

two were capable of providing cover for a clandestine uranium milling and reactor program, Taech'on HPP Number 1 and Number 2. Both were located in Pyongan-Pukto.

Economic necessity may have driven the design of the two plants though geography directed their location however, their construction was dictated as a cover for North Korea's clandestine plutonium producing reactors and its uranium milling facility. The Taech'on Hydroelectric Power System was a tailor-made cover for the facilities required to support Pyongyang's nuclear weapons ambitions.

Construction of Taech'on Hydroelectric Power System began in the 1980s and is detailed in Hy-Sang Lee's book, entitled *North Korea: A Strange Socialist Fortress*.⁸ North Korea's clandestine underground uranium milling facility appears to lie along the underground water carrying aqueduct supporting Taech'on HPP Number 1 and is located underneath a mountain at 40°11'52.09"N 125°35'7.51"E. North Korea's plutonium production reactors are located in a large underground facility attached to the Taech'on HPP Number 2 under a mountain located at 39°58'15.08"N 125°32'24.12"E. Proving or disproving the presence of North Korean nuclear reactors in underground cavities will be a major challenge to those attempting to verify their existence.



Taech'on HPP Number 1 was fed by 40-kilometer long, 28-foot wide concrete lined aqueduct extending southwest from the Songwon Reservoir. Spoil piles supporting the construction of the underground waterway are found aboveground about every two miles or so along its course until one gets near the power station, and then there are at least eight within a three-mile area. Taech'on HPP Number 1's supporting reservoir was formed by the construction of 525-foot high, 1890-foot long dam located in Chagang-do.⁹ According to the Food and Agriculture Organization (FAO), the reservoir encompasses an area of 7 square miles and has a capacity of 3200 million cubic meters of water.¹⁰ Taech'on HPP Number 2 is base-of-dam plant built underground.

⁸ Lee, Hy-Sang. *North Korea: A Strange Socialist Fortress*. Greenwood Publishing Group. 2001

⁹ The Great Songwon Mystery. My North Korea. 16 September 2019 <http://mynorthkorea.blogspot.com/2019/09/the-great-songwon-mystery.html>

¹⁰ Songwon Dam. Dams. The Food and Agriculture Organization (FAO) of the United Nations <http://www.fao.org/home/search/en/?q=songwon%20dam>

The dam supporting Taech'on HPP Number 2 is more than 1850-foot wide and in excess of 340-foot high (approximately 1 million cubic meters of concrete). According to the FAO of the United Nations, the reservoir covers an area of 54 square kilometers and boasts a capacity of 2900 million cubic meters of water.¹¹

Of the planned five hydroelectric power stations making up the Taech'on Hydroelectric Power System only Taech'on HPP Number 1 and Number 2 would be complete by 1988. Of the remaining three power stations, Pakch'on, Taech'on Youth Power Station No. 5 was built first. The Taech'on Youth Power Station No. 3 was built fourth (60MW). Taech'on Youth Power Station No. 4 was built last. All three are medium-scale power stations. All three are run-of-the-river, base-of-dam plants. All five plants in the Taech'on Hydroelectric Power System are tied to the North Korean national-level electrical power grid, though power from the last three reach that grid through regional distribution grids.

Construction on Taech'on Hydroelectric Power System Plant Numbers 1 and 2 began in 1983. 37-years ago. Taech'on HPP Number 1, the cover project for North Korea's clandestine uranium milling facility was commissioned in 1987. 33 years ago. The uranium milling facility was hidden to prevent observation of the quantities of uranium extracted hence the potential North Korean uranium-based weapons production capacity. Taech'on HPP Number 2, the cover project for North Korea's clandestine plutonium production reactors was commissioned in 1988.¹² 32 years ago. If true, the warning is explicit: North Korea has been refining uranium since the late 1980s, it began clandestinely producing plutonium as early as 1989. Current assessments of North Korea's weapons stockpiles are most likely, wildly inaccurate.



Clandestine Reactors:

It is unlikely that North Korea's clandestine reactor program consists of one large single reactor but more likely several smaller reactors, all located underground at Taech'on HPP Number 2. It took North Korea only six years to muster the materials and the technical knowledge required to build its upgraded 25MW(t) graphite moderated reactor at Yongbyon. Construction on the 25MW(t) reactor began in 1979. At the time, its construction was held as a North Korean state secret.¹³ North Korea's ability to construct a graphite moderated nuclear reactor would later be

¹¹ Songwon Dam. Dams. The Food and Agriculture Organization (FAO) of the United Nations <http://www.fao.org/home/search/en/?q=songwon%20dam>

¹² Lee Hy-Sang. North Korea: A Strange Socialist Fortress. Praeger. 2000

¹³ Beaumont, Peter., John Gittings. Secret nuclear cities of world's pariah state Control of the Korean peninsula or a peace treaty to ensure survival? Experts are split over Kim's aims. The Observer. 28 Dec 2002

put on public display in its attempted construction of a clandestine reactor in Syria.¹⁴ That Pyongyang could build such a reactor in Syria should leave little doubt that it could build one underground in North Korea. The security regime surrounding the clandestine Syrian reactor project was telling. The 25MW(t) Yongbyon reactor itself began initial operations in 1985.¹⁵

Though North Korea had begun construction on two larger 50MW(e) and 200MW(e) graphite moderated nuclear reactors for the production of plutonium and electrical power at Yongbyon and Taechon, work on the plants was suspended under the 1994 Geneva Agreed Framework.¹⁶ The 50-megawatt (electric) reactor alone would produce enough plutonium for North Korea to build an additional 7-10 nuclear weapons per year.¹⁷ While North Korea had planned larger reactors its only indigenously constructed and operational reactor remained the 25MW(t) Yongbyon reactor. As with Yongbyon any clandestine reactors constructed are probably simple graphite moderated reactors designed to support a Magnox nuclear fuel cycle, easy to operate and maintain.¹⁸ Reactors of which North Korea had experience operating and maintaining – safely.



While it is suggested that any underground facility could house a nuclear reactor, size matters. Tremendous amounts of concrete pouring into a smaller underground facility would arouse suspicion, while such amounts going into a known and validated civil-engineering construction site could be ignored. As a graphite moderated plutonium production reactor not necessarily intended for use as a producer of electrical power, no reactor pressure vessel would be required. This eliminates a major expected signature, one self-prophesized by many intelligence analysts, to confirm the existence of a nuclear power station. No such vessel would ever be seen in North Korea. A nuclear reactor is usually visualized as housed in a concrete encasement several foot thick. This necessary concrete is poured on-site as a cast-in-place reinforced concrete structure. Hence it would be for North Korea's simple graphite moderated reactors designed to support a Magnox nuclear fuel cycle.

¹⁴ Background Briefing with Senior U.S. Officials on Syria's Covert Nuclear Reactor and North Korea's Involvement. 24 April 2008 <https://fas.org/irp/news/2008/04/odni042408.pdf>

¹⁵ Slocombe, Walter B. Resolution of the North Korean Nuclear Issue. Federation of American Scientist <https://fas.org/irp/threat/fp/b19ch8.htm>

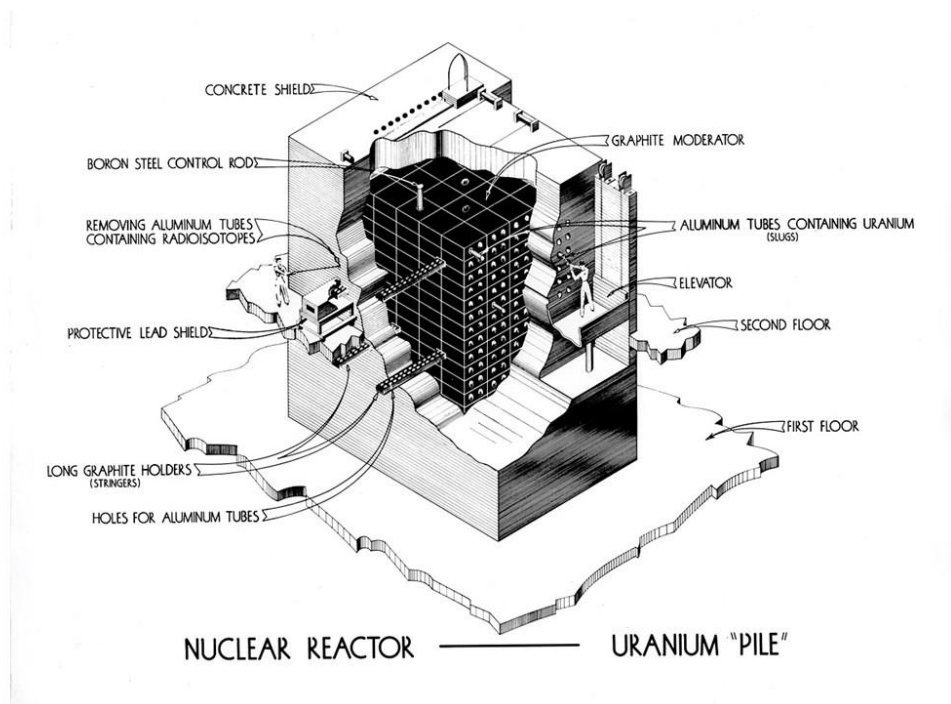
¹⁶ U.S. -DPRK Agreed Framework. Fact Sheet. Bureau of Nonproliferation. Washington, DC. 15 February 2001 <https://2001-2009.state.gov/t/isn/rls/fs/2001/5284.htm>

¹⁷ Yongbyon (Nyongbyon). Weapons of Mass Destruction (WMD). GlobalSecurity.org <https://www.globalsecurity.org/wmd/world/dprk/yongbyon-50.htm>

¹⁸ Chaim Braun; Siegfried Hecker; Chris Lawrence; Panos Papadiamantis. North Korean Nuclear Facilities After the Agreed Framework. Center for International Security and Cooperation (Report). Stanford University. 27 May 2016

The construction of an electricity production reactor requires about 40 metric tons of steel and 90 cubic meters of concrete per megawatt-electric capacity.¹⁹ Thermal efficiency is generally about 1/3, thus a 1000MW(e) plant actually produces 3000MW(t). By way of comparison the well-known plutonium production reactor at Yongbyon is 25MW(t). Plutonium production reactors are generally simpler in design and thus the steel and concrete requirements are reduced. Thus, a rough estimate for a Yongbyon style reactor of 100MW(t) capacity might be ~10,000 tons of steel and ~20,000 cubic meters of concrete.

The production and transport of large amounts of unwarranted steel and concrete from North Korea's known production centers to some singular site would have drawn the attention of national technical means analysts. The construction of two well-publicized and validated large-scale underground power stations, civil-engineering projects however, would attract little attention and serve as a cover to hide the production and transportation of the large amounts of steel and concrete required for the construction of the underground reactors. Once underground that concrete and steel would virtually disappear – from the visible spectrum.



As part of a much larger construction project, leaving cavities for installation of one or several small reactors would be trivial. Much of the rock originally removed during the excavation of an underground facility would be returned into the cavity as aggregate used in the concrete lining of the installation, as part of the reactor housing, in the construction of supporting dams and the improvement of construction access roads.

With construction of the Taech'on HPP Number 2 beginning in 1983 while work on the Yongbyon 25MW(t) reactor was ongoing, workers familiar with the construction of the reactor could be released to the Taech'on project as tasks at Yongbyon were completed. Construction of the 25MW(t) Yongbyon reactor actually served as a training exercise for the subsequent construction of additional reactors at Taech'on HPP Number 2. Study will show that workers on 25MW(t) Yongbyon reactor were confined to small areas, worked on similar projects, and moved as a group.

At some point from 1984 into 1985 North Korea began constructing a 50-200MW reactor at Yongbyon. In early 1989, US imagery intelligence detected activity revealing the construction of additional nuclear-related facilities at Yongbyon.²⁰ The reactor itself was projected to be complete in 1995. This additional construction included a research center, housing complex, high explosive site, a third reactor (initially estimated at between 50-200MW),

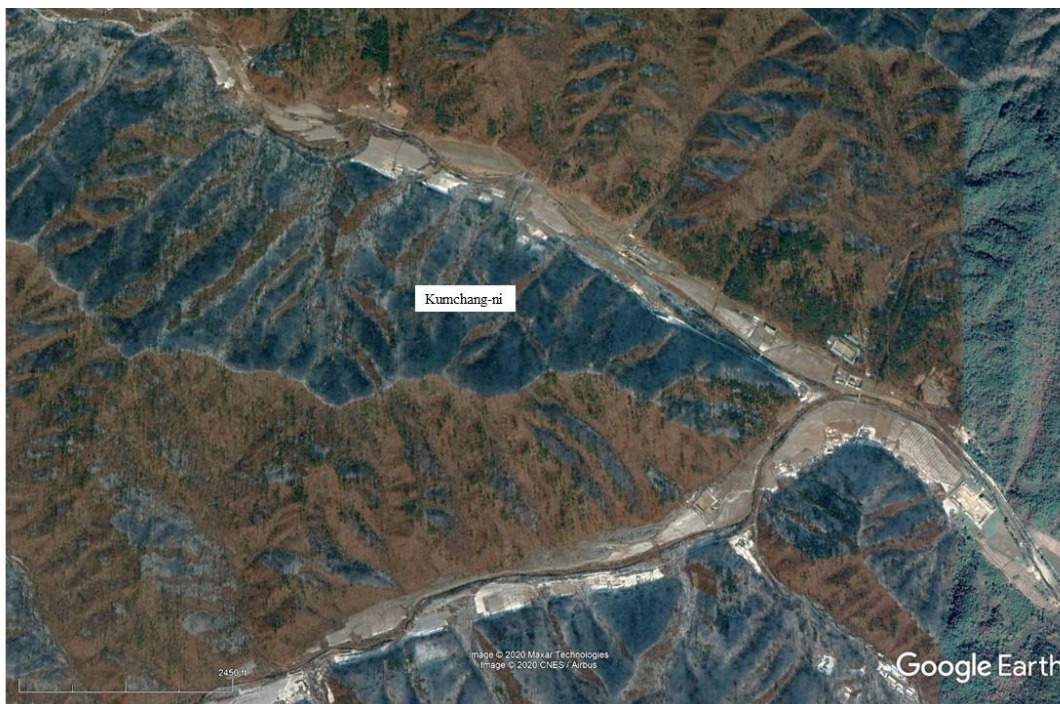
¹⁹ Metzler, Florian and Edward Steinfeld. Sustaining Global Competitiveness in the Provision of Complex Products and Systems: The Case of Civilian Nuclear Power Technology. MIT Political Science Department Research Paper No. 2013-3. 3 Apr 2013

²⁰ Yongbyon (Nyongbyon). Weapons of Mass Destruction (WMD). GlobalSecurity.org
<https://www.globalsecurity.org/wmd/world/dprk/yongbyon-50.htm>

and a spent fuel reprocessing facility. Under the 1995 schedule, all of the reactor's equipment and components, its graphite blocks and fuel-handling equipment should have been available and on-hand for the completion of the reactor.²¹ Construction of these reactors was halted under the 1994 Geneva Agreed Framework (AF).²²

Under the freeze the nuclear equipment and components for the facilities, such as the graphite blocks manufactured for the 50MW(e) and the 200MW(e) reactors under construction, were subject to monitoring by IAEA.²³ North Korea eventually informed the IAEA that it had manufactured only about 50 percent of the graphite blocks needed for the 50MW(e) reactor and none of the graphite blocks needed for the 200MW(e) reactor at Taechon.²⁴

According to the IAEA, North Korea explained that there was little reason for it to continue manufacturing equipment and components for the project after July 1993, as it had begun discussions with the US about replacing the graphite-moderated reactors with light-water reactors.²⁵ None of North Korea's graphite blocks or other equipment was ever inspected by the IAEA. It is possible that the graphite blocks and fuel-handling equipment intended for use at the earlier 50MW Yongbyon reactor North Korea had planned for completion in 1995, made their way into any underground cavities in the area of the Taech'on HPP Number 2.²⁶



Smaller reactors support smaller heat signatures. Heat from any probable clandestine and underground North Korea plutonium production reactors could be dumped into the water powering Taech'on HPP Number 2's turbine-generators and flow outward through the plant's water exit system. Heat from these reactors could also be dumped into the reservoir supporting Taech'on HPP Number 2 through a previously installed water exit tunnel into the lake formed by the Taech'on Dam. A continuously operated heat dispersal system would attract little attention, especially if water exiting the facility was widely dispersed into the lake. The reservoir has long been an object of nuclear

²¹ Yongbyon (Nyongbyon). Weapons of Mass Destruction (WMD). GlobalSecurity.org

<https://www.globalsecurity.org/wmd/world/dprk/yongbyon-50.htm>

²² U.S. -DPRK Agreed Framework. Fact Sheet. Bureau of Nonproliferation. Washington, DC. 15 February 2001 <https://2001-2009.state.gov/t/isn/rls/fs/2001/5284.htm>

²³ Difficulties in Accomplishing IAEA's Activities in North Korea. GAO/RCED-98-210. NUCLEAR NONPROLIFERATION. Report to the Chairman, Committee on Energy and Natural Resources, U.S. Senate. United States General Accounting Office. July 1998

²⁴ Difficulties in Accomplishing IAEA's Activities in North Korea. GAO/RCED-98-210. NUCLEAR NONPROLIFERATION. Report to the Chairman, Committee on Energy and Natural Resources, U.S. Senate. United States General Accounting Office. July 1998

²⁵ Difficulties in Accomplishing IAEA's Activities in North Korea. GAO/RCED-98-210. NUCLEAR NONPROLIFERATION. Report to the Chairman, Committee on Energy and Natural Resources, U.S. Senate. United States General Accounting Office. July 1998

²⁶ Yongbyon (Nyongbyon). Weapons of Mass Destruction (WMD). GlobalSecurity.org

<https://www.globalsecurity.org/wmd/world/dprk/yongbyon-50.htm>

accusations originating in South Korea. In late 1998 South Korean news reports claimed that there are nuclear facilities under an artificial island in the Taech'on Reservoir.²⁷ When asked to point out the facility, the lawmaker making the claim pointed to the water outlet exiting Taech'on Hydroelectric Power Plant (HPP) Number 1.²⁸ Later that same year the Japanese Defense Agency also weighed in.



In an article published on 20 Dec 1998 the Kyodo News Agency quoting a Defense Agency report stated “The three nuclear-related sites cited by the agency include a nuclear reprocessing facility in Kumchangri, a trigger device testing compound in Kwisong and an underground facility in Taechon.”²⁹

Sans constant monitoring and measurement of the steel and concrete used in the construction of Taech'on HPP Number 1 and Taech'on HPP Number 2, any excess amounts of concrete and steel provided for the reservoir dams and underground facility construction would have escaped notice. This is particularly true when one considers that the excess material needed for construction of a reactor amounts to just a small percentage of that required for the overall underground construction project. At the time of their construction, constant monitoring of such an effort was technically possible but cost prohibitive. Without strong justification and with a strong cover story in-place, with no valid concerns surrounding an ongoing civil-engineering project, such justification would never come. During the construction of the Taech'on other large North Korean civil-engineering projects would work to distract and overwhelm national level imagery analytic resources – as intended by Pyongyang.

Construction of the Nampo Lock Gate, a five-mile-long combination dam and shipping lock gate or barrage built at the same time, consumed most national technical means analytic hours.³⁰ Construction on the lock gate began in 1982.³¹

²⁷ Taech'on N3955E12529. Weapons of Mass Destruction. Federation of Atomic Scientists <https://fas.org/nuke/guide/dprk/facility/taechon.htm>

²⁸ Taechon. Weapons of Mass Destruction (WMD). globalsecurity.org <https://www.globalsecurity.org/wmd/world/dprk/taechon.htm>

²⁹ North Koreans have 3 N-weapons facilities, Japanese report says. Agency also says 2 missile launch sites being built. Kyodo News Agency. 20 Dec 1998 <https://www.deseret.com/1998/12/20/19418761/north-koreans-have-3-n-weapons-facilities-japanese-report-says-br-agency-also-says-2-missile-launch>

³⁰ North Korea's Nampo Lock-gate: Going Against the Tide. Directorate of Intelligence. Washington DC. 13 May 1986 <https://www.cia.gov/library/readingroom/docs/CIA-RDP86T01017R000606010001-7.pdf>

³¹ Construction and Modification of North Korean Naval Combatants, January 1983 through July 1986 (S). Imagery Analysis Report. IAR-027/86. March 1987. Declassified in Part - Sanitized Copy Approved for Release 2012/07/26: CIA-RDP87T00758R000103060001-8 <https://www.cia.gov/library/readingroom/docs/CIA-RDP87T00758R000103060001-8.pdf>

With large-scale construction projects ongoing at Taech'on HPP Number 1 and 2, nuclear power stations under construction south of Taech'on and Yongbyon, ongoing construction throughout Pyongyang and the Nampo Lock Gate, an additional 20,000 cubic meters concrete could easily escape detection. The Central Intelligence Agency, the Defense Intelligence Agency and the Joint Publications Research Service (JPRS) all commented or issued reports on the Nampo Lock Gate.³² To ensure that the national-level imagery analytic effort remained continuously entertained, and distracted, in 1986 North Korea began construction on the Innam Dam on the Bukhan River.³³ Construction of the Innam Dam would entertain intelligence analysts for the next dozen years.



The dam was one of the largest civil-engineering works ever undertaken by North Korea.³⁴ The Innam Dam is 2330-foot wide and nearly 400-foot high. The reservoir created by the dam has an estimated capacity of 2.62 billion tons of water.³⁵ In June 1996 the dam reversed the flow of a branch of the Bukhan River and forced it north through two 45-kilometer long waterways, each 35-foot in diameter, passing through the Taebaek Mountains to the Yeonbyeon Cheongnyeon power generation plant near the east coast.³⁶

The Innam Dam was immediately seen as a threat by the South Korean government.³⁷ The Bukhan River is a tributary of the Han River, and war scenarios foresaw North Korea releasing flood waters that could engulf the South Korean capital of Seoul.³⁸ The Innam Dam represented a threat to the existence of the Republic of Korea.

³² Korean Affairs Report No. 315. JPRS 84587. FOREIGN BROADCAST INFORMATION SERVICE. 24 October 1983

<https://apps.dtic.mil/sti/pdfs/ADA349028.pdf>

North Korea's Nampo Lock-gate: Going Against the Tide. Directorate of Intelligence. Washington DC. 13 May 1986

<https://www.cia.gov/library/readingroom/docs/CIA-RDP86T01017R000606010001-7.pdf>

North Korea Country Handbook Marine Corps Intelligence Activity 3300 Russell Road, Suite 250 Quantico, Va. 22134-5011 (703) 784-6126 Dsn: 278-6126. May 1997 <http://documents.theblackvault.com/documents/korea/nkor.pdf>

North Korea: The Foundations for Military Strength. DIA. October 1991 https://fas.org/irp/dia/product/knfms/knfms_toc.html

³³ Politics, or a real dam threat? Korea JoongAng Daily. 5 January 2003 <https://koreajoongangdaily.joins.com/2003/01/05/politics/Politics-or-a-real-dam-threat/1905765.html>

³⁴ Lee, Hy-Sang. North Korea: A Strange Socialist Fortress. Greenwood Publishing Group. 2001

³⁵ "Peace Dam" to Block Flood Attack from North. Seoul Finally Completes 18-Year Construction Project. The Seoul Times. 11 September 2020

<https://theseoultimes.com/ST/?url=/ST/db/read.php%3Fidx=2610>

³⁶ Politics, or a real dam threat? Korea JoongAng Daily. 5 January 2003 <https://koreajoongangdaily.joins.com/2003/01/05/politics/Politics-or-a-real-dam-threat/1905765.html>

³⁷ "Peace Dam" to Block Flood Attack from North. Seoul Finally Completes 18-Year Construction Project. The Seoul Times. 11 September 2020

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³⁸ "Peace Dam" to Block Flood Attack from North. Seoul Finally Completes 18-Year Construction Project. The Seoul Times. 11 September 2020

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When the 25MW(t) graphite moderated reactor at Yongbyon was completed in 1986, its workers were available for deployment to other projects but it is unlikely they were forced to labor on the Imnam Dam. In 2006 a North Korean defector, Im Young Su (pseudonym - age 25), reported that 30,000 construction soldiers had died during the construction of the dam, its aqueducts and power station.³⁹ According to Im, “We called Imnam Dam the ‘Bank of Death.’”⁴⁰ More likely-than-not, the now-skilled laborers on the Yongbyon reactor project, were seamlessly moved to work projects ongoing at the Taech’on HPP Number 2 on its possible underground reactors.

Similarly, ventilation also matters and unlike most North Korean underground facilities imagery suggests that Taech’on HPP Number 1 and Number 2 possess air handling systems far in excess of what is required for a single large-scale underground facility supporting a hydroelectric power station.⁴¹ It is unlikely that systems forcing the air into the underground are located far from the belowground tunnel network but it is possible. Ventilation is usually located immediately above an underground or along its route and is often located near the entrance to the facility but, not always. There are always exceptions to the rule and this could be key to understanding where the functional facility, the work being done, is actually located. If the underground area relied on a forced-air handling system, that system could actually be located some distance away, perhaps several miles if costs were no concern. Such a system could escape observation by those solely examining facilities in the immediate area. If the regime demanded that the facility be completely hidden then it could be done. Kim Il-sung willed it writing:

“Above all, you must channel efforts into construction of the Thaechon [Taechon] Power Station.

Because of the slow progress in the construction of the Thaechon Power Station, meetings were held on several occasions to deal with the matter, but the construction has not yet been finished. You must make every effort ad finish it quickly.

There will be no knotty problems in the construction of the Thaechon Power Station, because all the tunnels have already been dug out. If officials organize work well, construction will be finished quickly.”⁴²

As with the Yongbyon 25MW(t) reactor, none of the probable reactors at the Taech’on HPP Number 2 are connected directly to North Korea’s national- or distribution-level electrical power grids.⁴³ They were never intended for power production but the production of plutonium.⁴⁴ North Korea’s existing reactors are instead connected to the nation’s sub-distribution electrical power grids. The very modest electrical power needs of any clandestine and underground North Korean reactors (shutdown/startup/emergency backup) could be met by the electrical power generated by the Taech’on HPP Number 2 with a backup source of electrical power being provided by Taech’on HPP Number 1.

None of the reactors likely operate without the simultaneous operation of turbine-generator sets at Taech’on HPP Number 1 or 2. The two power stations are already interconnected by single-circuit 220- and 66-kV power lines. The two lines, along with direct connections to the two turbine-generator sets of the Taech’on HPP Number 2 provide constant multilayered redundancy in electrical power during reactor operations. Engagement of the backup systems would be immediate and seamless. The two power stations probably operate as “spinning reserves” to support any emergency operations at the reactor. Diesel fuel generators might also be in play within the underground area. Further backup would come from North Korea’s national electrical power grid and eventually from the completion of Taech’on HPPs, 3, 4 and 5.

A single circuit 220-kV line extending from Taech’on HPP Number 1 to Number 2 was probably installed in 1987 or 1988 when Taech’on HPP Number 1, and later Taech’on HPP Number 2, went operational. Which plant went operational first is a non-issue. The electrical power produced at one could be used to support the construction of the

³⁹ “Thirty Thousand Constructing Soldiers Died in Geumgangsán Plant.” Daily NK. 14 Feb 2006 <https://www.dailynk.com/english/thirty-thousand-constructing-soldi/>

⁴⁰ “Thirty Thousand Constructing Soldiers Died in Geumgangsán Plant.” Daily NK. 14 Feb 2006 <https://www.dailynk.com/english/thirty-thousand-constructing-soldi/>

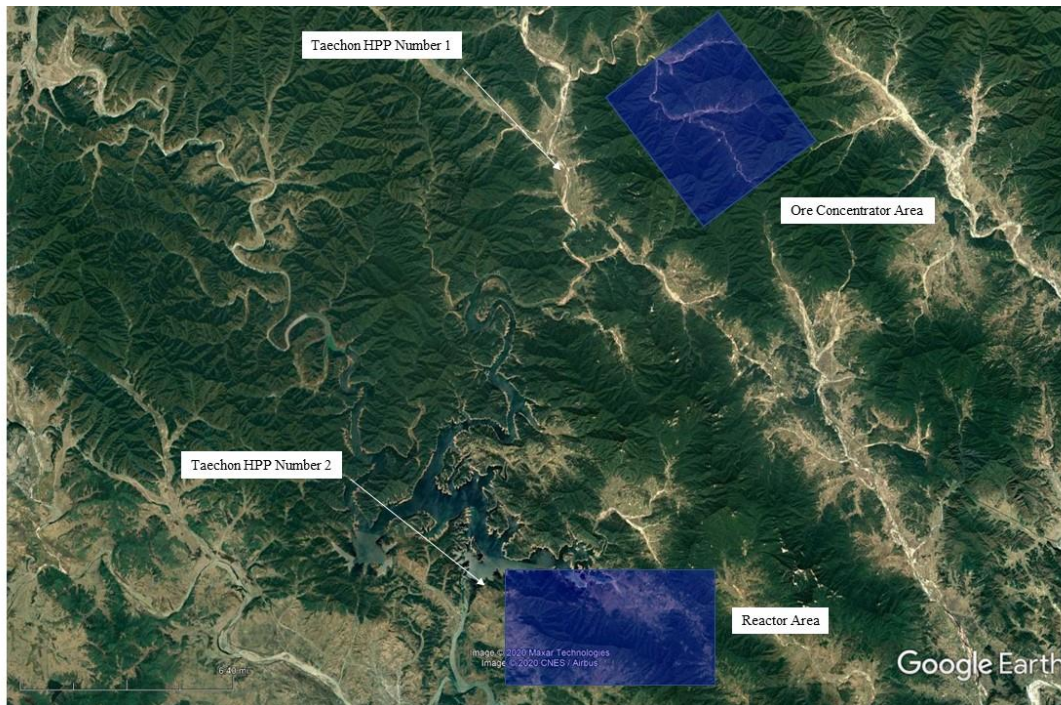
⁴¹ 2020 CNES/Airbus. Google Earth. Imagery Date: 20 Sept 2016

⁴² Kim Il-Sung. Works 41. January 1988-May 1989. Foreign Languages Publishing House. Pyongyang, Korea. 1996

⁴³ Ullah, A.H. Jaffor. Second Beijing Talks over North Korea fizzles: What next? Point-Counterpoint. The Daily Star. New Orleans. Vol. 4, Number 271. 2 March 2004 <http://archive.thedailystar.net/2004/03/02/d403021504116.htm>

⁴⁴ Hayes, Peter. “SHOULD THE UNITED STATES SUPPLY LIGHT WATER REACTORS TO PYONGYANG?” NAPSNet Special Reports. 16 November 16 <https://nautilus.org/napsnet/napsnet-special-reports/should-the-united-states-supply-light-water-reactors-to-pyongyang/>

other. Examination of the electrical power towers supporting the 220-kV line suggest that it was constructed to support a double-circuit 220-kV line which apparently never appeared. The 66-kV line, a near necessity as a redundant source of electrical power for Taech'on HPP Number 1 was not established until nearly a decade later. The 66-kV line was probably a substitute for the originally planned but never installed second 220-kV circuit. Any delay in the installation of a clandestine and underground reactor probably resulted in use of the powerlines originally planned for installation between Taech'on HPP Number 1 and Number 2 as the second circuit, elsewhere in support of other projects.



Geologically, the area of Taech'on HPP Number 2 met all requirements for a safe location for the construction of several plutonium producing reactors. The site of Taech'on HPP Number 2 had been surveyed for a large-scale hydroelectric power plant and dam. Geologically, the entire area is comprised of stable and solid rock. The now derelict Taech'on Nuclear Power Plant (NPP) (39°55'39.57"N 125°34'10.32") is located less than four miles south of Taech'on HPP Number 2.

Cooling water for the Taech'on NPP would have probably come from the reservoir created to supply water to the Taech'on HPP Number 2. This may account for the two reservoir water outlets located along the south bank of the Taech'on Water Reservoir at 39°58'22.27"N 125°31'31.59"E. One would support the hydroelectric power station, the second the Taech'on NPP. The additional water outlet could have easily been diverted to support cooling of an underground nuclear reactor and any underground clandestine graphite-moderated nuclear reactor if it was not originally planned that way. Cooling water for the Yongbyon NPP was to come from the nearby Kuryong River. A direct road extends from the Taech'on HPP Number 2 to the Taech'on NPP. At one time, apparently a rail line once extended between Taech'on HPP Number 2 and the Taech'on NPP. Locating the nation's uranium milling facility and nuclear reactors in these areas also supports long-held suspicions that most of North Korea's nuclear materials production facilities are located in Pyongan-Pukto.

Additional excavation, visible on commercial imagery taking during the late 1990s, suggests the original number of clandestine reactors housed in the mountain located at 39°58'15.08"N 125°32'24.12"E may have been increased.⁴⁵ Taech'on HPP Number 2 was reported to be under reconstruction in 1999.⁴⁶ 21 years ago. Hydroelectric power stations undergo regular maintenance and repair but rarely reconstruction. Such plants may be expanded internally through the installation of additional turbine-generator sets however, the number of water outlets from the original

⁴⁵ 2020 Maxar Technologies. Google Earth. Google. Imagery Date: 3 May 2004

⁴⁶ Lee Hy-Sang. North Korea: A Strange Socialist Fortress. Praeger. 2000

construction period remained the same over time. These exits would have been designed to support a carrying capacity in excess required to remove water during emergency operations however, the installation of an additional turbine-generator set would likely exceed original design capacities and require some further and visible alteration. There is none.



Adits (Latin *aditus*, entrance) leading into the mountain east of the Taech'on HPP Number 2 existed before the subsequent excavation detected on imagery of 2004 took place.⁴⁷ At that time, these adits lacked sizable spoil piles. Imagery analysis and research would indicate that spoil from their original period of construction was removed from the area as the underground facility housed underneath was expanded.⁴⁸ The spoil may have been trucked out in an effort to downplay the existence of any underground facility under the mountain. However, in oil-poor North Korea the removal of spoil is rarely observed. The missing spoil remains disturbing. There was however another explanation, one far more ominous. This is that the noted entrances were not constructed from the outside into the mountain, but from inside the mountain to the surface above, hauling the spoil down into the mountain and out through conveyor belts supporting the construction of Taech'on HPP 2. Burrowing into a mountain and then outward to establish vents is historically a time-honored construction method used in North Korea. This method of establishing vents would be similarly observed by US inspectors at Kumchang-ni.

Large though these vents are they were not personnel passageways to some underground below. On imagery of 2004 there are no paths or trails leading to the openings.⁴⁹ The adits are vents possibly housing an air handling system, or placed there to support some natural air flow system allowing air to enter and exit the underground area.

If imagery research proved this to be true, and these vents were truly built from the inside to the surface above as it appears, then some North Koreans operation held in a large-scale underground facility is indeed located inside this specific mountain. In simpler terms North Koreans are inside that mountain. Possible air handling facilities located along the base of the mountain suggest that the openings are indeed vents. Electrical power to these units is probably provided from within the underground facility. Most likely air enters the underground from these vents and exits the underground facility at its base. Other vents also exist. Access to the reactor area is likely controlled through a

⁴⁷ 2020 Maxar Technologies. Google Earth. Google. Imagery Date: 3 May 2004

⁴⁸ 2020 Maxar Technologies. Google Earth. Google. Imagery Date: 3 May 2004

⁴⁹ 2020 Maxar Technologies. Google Earth. Google. Imagery Date: 3 May 2004

security presence inside the underground power station with entry controlled through the underground power station. With access to the facility controlled at the power station the requirement for a visible security presence (a signature of high-value targets) outside the underground is now far less, lowering the suspicion of outside observers. A similar access control regime is believed to be employed at North Korea’s clandestine uranium milling facility near Taech’on HPP Number 1 to access the country’s uranium milling operation.



Clandestine Milling Facilities:

Natural uranium (NU, U^{nat}) refers to uranium with the same isotopic ratio as found in nature. A uranium mill extracts natural uranium from its base ore concentrating the ore’s uranium oxide content – yellowcake. Uranium milling consists of a series of mechanical and chemical processes, which extracts natural uranium from uranium bearing ores and reduces natural uranium to a dry powder-form material called “yellowcake” (chemically U_3O_8) due to its yellowish color. Yellowcake usually contains 0.711% uranium-235, 99.284% uranium-238, and a trace of uranium-234 by weight (0.0055%). Approximately 2.2% of its radioactivity comes from uranium-235, 48.6% from uranium-238, and 49.2% from uranium-234. Yellowcake is then refined to obtain almost pure uranium in the form of triuranium octoxide (U_3O_8).

North Korea’s current uranium milling facility known as the Pyongsan Uranium Concentrate Plant has not been operational since the first half of the 1990s. The Pyongsan Uranium Concentrate Plant was one of just two natural uranium production plants declared to the International Atomic Energy Agency (IAEA) when it joined the NPT in 1985.⁵⁰ On 14 May 1992, the Director General of the IAEA, Hans Blix, visited the Yongbyon Nuclear Scientific Research Center, the Pun’gang-ni District of Hamhung;⁵¹ the Pakch’on Uranium Concentrate Pilot-scale Plant and the Pyongsan Uranium Concentration Plant: the latter was observed to be in operation at the time of that visit.⁵² The

⁵⁰ IAEA Director General Hans Blix Tours North Korean Nuclear Sites/ Conferences, Videos & Testimony. Institute for Science and International Security. 11 May 1992 <https://isis-online.org/conferences/detail/iaea-director-general-hans-blix-tours-north-korean-nuclear-sites/10>

⁵¹ Sociological – Education, leaders. Scientific; Biographic. Daily Newspaper. Minju Choson. Pyongyang. Central Intelligence Agency. Information from Foreign Documents or Radipo Broadcasts. 18 September 1952 <https://www.cia.gov/library/readingroom/docs/CIA-RDP80-00809A000700170096-6.pdf>

⁵² CURRENT SITUATION OF NUCLEAR POWER DEVELOPMENT IN DEMOCRATIC PEOPLE’S REPUBLIC OF KOREA. REPORT ON THE INVESTIGATION CONCERNING THE FUNDAMENTAL POLICY OF JAPAN FOR ATOMIC ENERGY SUCH AS LEGISLATION RELATING TO ATOMIC ENERGY IN 1992 FISCAL YEAR. (Japan Machinery Federation, Tokyo (Japan)), ETDE/JP-mf-94707417, March 1993, in Japanese, pp. 55-76 (76 p).

Pakch'on Ore Concentrator and the Pyongsan Uranium Concentrate Plant represented two of six total nuclear facilities subject to inspection by the IAEA.⁵³

Oddly enough the Pungung District was at one time under the management of Yi Sung-ki, director of the Chemistry Institute at the Academy of Science's Hamhung Branch and first director of North Korea's Nuclear energy Research Institute.⁵⁴ Yi is later referred to by Japanese and South Korean sources as the "godfather" of weapons of mass destruction (WMD), including chemical and nuclear weapons.⁵⁵ Yi Sung-ki attended and graduated Kyoto Imperial University, one of several complexes working under the WWII-era, Joint Imperial Japanese Atomic Energy and Weapons Research Program. Between attending the university and his time on its staff he was at the school for more than a decade. Yi Sung-ki was at the pinnacle of Japanese wartime physics where he is suspected of gaining insight into then-ongoing fission-weapons research, development and organization.⁵⁶ Returning to Blix....



At the time of Blix's visit the Pakch'on Uranium Ore Concentrator Pilot-Scale project was scheduled to be closed in 1992. The facility was subsequently confirmed as closed by the South Korean Technical Center for Nuclear Control in late 1992.⁵⁷ It is likely that the equipment disassembled from Pakch'on made its way directly to the new underground facility along the aqueduct supporting Taech'on HPP Number 1.⁵⁸ According to Hans Blix North

⁵³ Moon, Duk-ho. North Korea's Nuclear Weapons Program: Verification Priorities and New Challenges. Consul Korean Consulate General in New York. Cooperative Monitoring Center Occasional Paper/32. Cooperative Monitoring Center Sandia National Laboratories. SAND 2003-4558. Unlimited Release. December 2003 https://www.sandia.gov/cooperative-monitoring-center/_assets/documents/sand2003-4558.pdf

⁵⁴ Kang In-son. Dr. Yi Sung-ki, Godfather of North Korea's Nuclear Development and World-Renowned Discoverer of Vinylon – His Life in the North and the South. Biography of North's Nuclear Expert Yi Sung-ki. Document Number. DEA1-000030954. AFS Number. 912c0281A. 21 October 1991

⁵⁵ North Korea Chemical and Biological Weapon Milestones – 1969-2005. Wisconsin Project on Nuclear Arms Control. 1 July 2005 <https://www.wisconsinproject.org/north-korea-chemical-and-biological-weapon-milestones-1969-2005/>

⁵⁶ Kang In-son. Dr. Yi Sung-ki, Godfather of North Korea's Nuclear Development and World-Renowned Discoverer of Vinylon – His Life in the North and the South. Biography of North's Nuclear Expert Yi Sung-ki. Document Number. DEA1-000030954. AFS Number. 912c0281A. 21 October 1991

⁵⁷ North Korea: LESS THAN MEETS THE EYE. Bulletin of the Atomic Scientists March/April 2003. Vol. 59, No. 2, pp. 38-39 DOI: 10.2968/059002010

⁵⁸ Bermudez, Joseph S. Victor Cha, Bonny Lee. Pyongsan Uranium Concentrate Plant (Nam-chon Chemical Complex): Infrastructure Development and Status. Center for Strategic and International Studies (CSIS). 1 Aug 2020

Korea extracts its uranium from uranium-bearing anthracite coal.⁵⁹ This was the same method as employed by the Japanese bomb program on the Korean Peninsula during WWII.

Imagery reveals that the Pyongsan Uranium Concentrate Plant's conveyor belt systems were removed long ago, leaving the incapable of moving the large amounts of coal within the facility. North Korea relies upon its source of natural uranium.⁶⁰ The plant's rotary kiln, used to burn off impurities contained in the extracted uranium, had been disconnected as early as 2003. The roofs of some of the larger buildings within the installation had been removed at some point before 2003. Some settling ponds had been allowed to dry completely. Some were plowed into the ground and then developed into seed beds for agriculture. Some wasteland that had apparently been used as a small sludge area was also allowed to settle, eventually plowed, and turned over to agricultural uses. Such activity is rarely, if ever, associated with a uranium separation plant. Though some of the buildings at the Pyongsan Uranium Concentrate Plant were subsequently renovated and parts of the plant have seen some improvement, that is not evidence that the plant had been restored to its former capacity as North Korea's sole uranium concentration plant.



The reduction of coal to ash, an initial step in the process was subsequently transferred to North Korea's thermal power stations – most likely the Ch'ongch'on Heat and Thermal Power Plant (HTPP) (39°40'22.59"N 125°43'2.59"E) – located nine miles southeast of the earliest reactor at the Yongbyon Nuclear Scientific Research Center (one-time Pungung District – Hamhung) also located in Pyongan-Pukto. Other functions formerly centered at the Pyongsan facility were also transferred to the Ch'ongch'on HTPP. Smaller, but similar rotary kilns to those formerly held at the Pyongsan Ore concentrator are located at the Namhung Youth Chemical Complex (39°39'6.35"N 125°41'21.65"E) less than two miles west of the Ch'ongch'on HTPP and again, located in Pyongan-Pukto. Efforts to suggest the plant remains a viable operation stem from a lack of specific knowledge concerning ore concentration facilities.

Confirming Perceptions; Maskirovka:

In front-page dispatch from Seoul in 2000, the Sankei Shimbun reported that a former North Korean military official, Yi Chun-song, who fled to China the previous year (1999) revealed the existence of a facility at Mount

⁵⁹ IAEA Director General Hans Blix Tours North Korean Nuclear Sites/ Conferences, Videos & Testimony. Institute for Science and International Security/1 May 1992 <https://isis-online.org/conferences/detail/iaea-director-general-hans-blix-tours-north-korean-nuclear-sites/10>

⁶⁰ 2020 Maxar Technologies. Google Earth. Google. Imagery Date: 22 Jan 2003
2020 Maxar Technologies. Google Earth. Google. Imagery Date: 25 Sept 2011

Chonma during interrogation by Chinese officials.⁶¹ There was no underground facility under Mount Chonma. There never has been. The entire Yi story was a classic military deception operation, Maskirovka.

NOTE: Yi is also referred to in some reports as Lee Choon-Seon, a major in the North Korean People's Army, who was debriefed while in the custody of the Chinese government. In those reports before the South Korean government was able to bring Lee to South Korea, Yi was repatriated to North Korea where it is guessed he was executed.⁶² Yi is sometimes also referred to as Choon Sun Lee.⁶³ Regardless, in every case the defector was eventually returned to North Korea where he is always referred to as - executed. His name appears on quotations as presented in the quote.



What Yi Chun-song had described was a refining or milling process saying “The underground plant is comprised of 10 areas – two concentration grounds measuring 3,000 square meters each, a drying room of 400 square meters, four 400 square-meter wide dissolution rooms for uranium extraction and refining, a room for packing uranium into containers, storage for the finished products, and a room where the workers change into anti-radiation suit or take breaks.”⁶⁴ According to Lee, although known as the "Cheonmasan [Chonma] Power Plant," the facility was an underground uranium milling plant producing yellowcake.⁶⁵ Yi had never indicated that Mt. Chonma contained an enrichment facility. Concerns regarding the possibility that Mt. Chonma was a secret uranium enrichment facility were erroneously deduced or inferred from the information available.

⁶¹ Lee Choon Seon, a former senior military official in the North Korean People's Army, was interrogated while in the custody of the Chinese authorities. Before he could be brought to South Korea, he was repatriated back to North Korea where, according to Shindonga, he was probably executed. The original Chinese interrogation report was obtained by Shindonga and subsequently translated into Korean; “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony]. Shindonga (Donga Ilbo's Magazine). 1 August 2001 <http://shindonga.donga.com>

⁶² Lee Choon Seon, a former senior military official in the North Korean People's Army, was interrogated while in the custody of the Chinese authorities. Before he could be brought to South Korea, he was repatriated back to North Korea where, according to Shindonga, he was probably executed. The original Chinese interrogation report was obtained by Shindonga and subsequently translated into Korean; “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony].” Shindonga (Donga Ilbo's Magazine). 1 August 2001 <http://shindonga.donga.com>

⁶³ Mt. Chun-ma [Pegasus]. Weapons of Mass Destruction (WMD). GlobalSecurity.org <https://www.globalsecurity.org/wmd/world/dprk/chunma.htm>

⁶⁴ Kuroda, Katsuhior. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbun, June 9, 2000. Cited in the June 20, 2000 CONGRESSIONAL RECORD—SENATE 11433 SENATE – Tuesday, June 20, 2000

⁶⁵ David Albright and Holly Higgins. “North Korea: It's Taking Too Long.” Bulletin of the Atomic Scientists. January 2002. Vol. 58 No. 1

“According to Lee, North Korea initially planned to build a ‘nuclear production base’ in the Mt. Chonma area in 1983. Tunnel excavation began in 1983, and full-scale construction of the facility began in 1984.”⁶⁶ Note in his statement that Lee specifically was referring to the “area” of Mt. Chonma, not necessarily the mountain itself. The information given by Lee matches the timeline and construction of Taech’*on* HPP Number 1 and Number 2. Taech’*on* HPP Number 1 can also be argued being located within the area of Mount Chonma: The two locations, Taech’*on* HPP Number 1 and Mt. Chonma, are only about 25 miles apart. Like most other North Korean nuclear facilities, Mt. Chonma is located in Pyongan-Pukto. Mount Chonma lies only about 10 miles north of the geographical center of the province.



Pyongan-Pukto is also the location of Yongbyon Nuclear Scientific Research Center containing several reactors, the Pakch’*on* Uranium Ore Concentrator and the aforementioned former Pungung-ni District of Hamhung.⁶⁷ The never completed Yongbyon and Taech’*on* NPPs are also located in Pyongan-Pukto. The stated purpose of the construction project was a power plant with the necessary underground waterway passing through Mt. Chonma. However, according to Yi the tunnels were actually to house a nuclear material production site. Yi indicated that tunnel construction was complete at the end of 1986, with equipment installation beginning in early 1987.⁶⁸ According to Yi the facility began producing yellowcake at the end of 1989.⁶⁹ The facility as described by Yi and not at Mt. Chonma was actually located upstream of the Taech’*on* HPP Number 1, along its supporting aqueduct.

The original Chinese interrogation report was obtained by *Shindonga* (Korea’s oldest monthly news magazine) and subsequently translated into Korean.⁷⁰ Later articles would claim that the Chinese report was obtained by the

⁶⁶ “Bureau of Engineers.” Federation of American Scientists. 22 November 1998 www.fas.org

⁶⁷ Sociological – Education, leaders. Scientific; Biographic. Daily Newspaper. Minju Choson. Pyongyang. Central Intelligence Agency. Information from Foreign Documents or Radipo Broadcasts. 18 September 1952 <https://www.cia.gov/library/readingroom/docs/CIA-RDP80-00809A000700170096-6.pdf>

⁶⁸ “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector’s Shocking Testimony].” *Shindonga* (Donga Ilbo’s Magazine). 1 August 2001 <http://shindonga.donga.com>

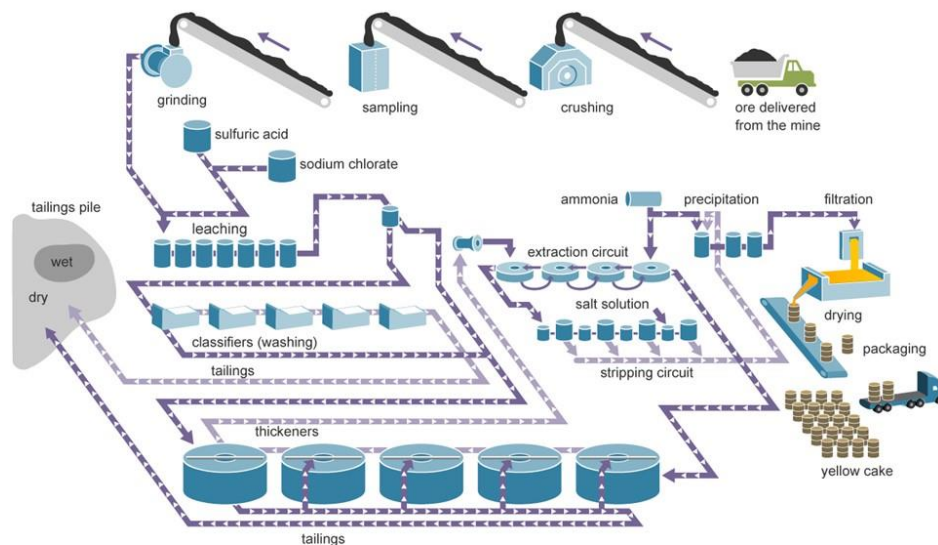
⁶⁹ “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector’s Shocking Testimony].” *Shindonga* (Donga Ilbo’s Magazine). 1 August 2001 <http://shindonga.donga.com>

⁷⁰ “북한 인민군 장성의 충격증언 [Defector DPRK General’s Shocking Testimony].” *Shindonga* (Donga Ilbo Magazine). August 2001. “사면조가에 몰린 북한의 마지막 승부수: [정밀 분석] 제2차 북핵 위기 A to Z [North Korea Backed into a Corner: 2nd Nuclear Crisis A to Z].” *Shindonga*

Korean Central Intelligence Agency.⁷¹ How is an original, perhaps sole report, lost by the Chinese? If it was the original and sole report then the Chinese had been lax on security, or the loss of the report to the South Korean press was planned. When entire reports are stolen it is usually because those in possession of the report want it stolen. There is even a term for such operations; a “false flag.” The term originated in the 16th Century. Such operations have been around for a while as they obviously work. These operations are purposefully designed to control the perceptions of outside observers and in this case did its job well – 34 years well.

If Yi was legitimate then his career represented a man of achievement and privilege; he was a graduate of Pyongyang University of Technology, he had studied at the Frunze (now Bishkek) military university of the former USSR from 1958 to 1962.⁷² He had attended the Pyongyang University of Technology at a time when North Korea was nearly bereft of technicians and technocrats.⁷³ Yi had been on a pathway rarely open to the average North Korean. His achievements, if he ever existed at all, indicate that he was a onetime party stalwart.

Typical conventional uranium mill



Source: U.S. Energy Information Administration

Yi Chun-song was however, never in the hands of US intelligence or any other American authority. Apparently, Yi was similarly, never in the hands of Chinese intelligence or Chinese military officials. Evidently Yi was held by the local Chinese if he was ever in custody at all.⁷⁴ He was interrogated but never debriefed, in custody but never jailed. Though a statement was taken, no one ever approached Yi with an organized list of questions specifically directed toward the collection of intelligence. There was no methodology employed to ferret out more information. It was coffee table talk. It is unlikely that Yi could have withstood an intense intelligence gathering interrogation. As explained below, there were too many gaps in Yi's tale if he ever really existed at all. The fact that his statement was not secured in China to prevent its being obtained outside of the Chinese constabulary should have also raised eyebrows. It didn't.

⁷¹ Mt. Chun-ma [Pegasus]. Weapons of Mass Destruction (WMD). GlobalSecurity.org

<https://www.globalsecurity.org/wmd/world/dprk/chunma.htm>

⁷² Kuroda, Katsuhior. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbun. 9 June 2000. Cited in the 20 June 2000 CONGRESSIONAL RECORD—SENATE 11433 SENATE—Tuesday, 20 June 2000

⁷³ Kuroda, Katsuhior. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbun. 9 June 2000. Cited in the 20 June 2000 CONGRESSIONAL RECORD—SENATE 11433 SENATE—Tuesday, 20 June 2000

⁷⁴ Kuroda, Katsuhior. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbun. 9 June 2000. Cited in the 20 June 2000 CONGRESSIONAL RECORD—SENATE 11433 SENATE—Tuesday, 20 June 2000

It is suspected that some of the comments recorded during the interrogation are inaccurate, misleading or outright lies. It is also possible that, as officials of the US government had publicly revealed American interest in large-scale North Korean underground facilities as early as 1998, the person interrogated actually represented what Sun Tzu in *The Art of War* described as a “doomed spy,” a person used by Pyongyang to lend credibility to some previously established deception.⁷⁵ That he was a North Korean general officer, military official also reported to be former vice director of the Operation Bureau of North Korean Ministry of People’s Armed Forces, added to his credibility.⁷⁶ As a result, some parts of the story would be completely true and revealing. Some parts of the story would be partially true and some parts ambiguous, just misleading enough to throw those seeking to validate the information off balance. Much of what Yi described lay in the past, some of what he said lay in the present, some however lay in the future. Some of the information would however be totally false and should have been easily discounted. It wasn’t.

US accusations concerning the underground facility at Kumchang-ni and the subsequent visit of a Department of State inspection team had triggered the Yi deception. According to David Albright and Holly Higgins in an article for the *Bulletin of the Atomic Scientists* “When the United States was first negotiating access to Kumchang-ni, U.S. officials told their North Korean counterparts that they wanted to inspect an underground facility in the general area. The North Koreans became nervous, according to one account. But when the U.S. officials told them it was the Kumchang-ni facility, the source said, North Korean officials were visibly relieved.”⁷⁷ Were they instead concerned about an inspection of an underground facility connected to Taech’on HPP Number 1? Did the request to visit Kumchang-ni trigger the Yi maskirovka? Why did no one recognize the North Korean’s relief when US officials demanded the visit to Kumchang-ni vice any other facility?



“On May 18-24, 1999, a US Department of State team traveled to the Democratic People’s Republic of Korea with the purpose of visiting the underground facility at Kumchang-ni. The visit took place on an exceptional basis at the invitation of the DPRK. The U.S. team consisted of fourteen members, including relevant technical experts. After initial consultations with the DPRK authorities, the team began its visit to the site at Kumchang-ni on May 20. The visit was completed the evening of May 22. After reviewing data gathered from the visit with the DPRK authorities,

⁷⁵ Sawyer, Ralph D. *The Seven Military Classics of Ancient China, Including the Art of War*. Westview Press. Boulder, Colorado. 1993

⁷⁶ Kuroda, Katsuhio. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbum 9 June 2000. Cited in the 20 June 2000 CONGRESSIONAL RECORD—SENATE 11433 SENATE—Tuesday, 20 June 2000

⁷⁷ Albright, David., Holly Higgins. North Korea: It’s Taking Too Long. *Bulletin of the Atomic Scientists* First Published 1 January 2002. Research Article <https://doi.org/10.2968/058001016>

the U.S. delegation departed the DPRK on May 24.”⁷⁸ “At the site, the US delegation viewed a large underground tunnel complex. Excavation of the complex, as currently configured, was almost complete but a great deal of additional finishing work remained to be done with almost all of the tunnels still bare rock.”⁷⁹

US accusations in the press had served to warn North Korea that its large-scale underground facilities were being monitored. The numerous press statements issued by the US State Department, comments and further analysis by the media, had informed North Korea’s America watchers exactly what US analysts were reviewing, what they were looking for through what was being reported. It was a simple matter to track such statements and eliminate any outward indicators that clandestine reactors existed in North Korea, or that it had removed its uranium milling capability into an underground facility. Appearance was everything. By closely monitoring the movements and actions of US investigators once onsite, the North Koreans gained further insight concerning outward signatures indicating the presence of a clandestine and underground nuclear reactor, signatures they could now work to avoid or eliminate altogether, and probably did at Taech’on HPP Number 2.

Operating a uranium refinery, milling facility or a reactor underground is not beyond the realm of possibility. Highly vocal US Department of State suspicions concerning the underground facility at Kumchang-ni had confirmed all three possibilities. Placing a uranium refinery or milling underground would be far more expensive than conducting operations at an aboveground facility but it was not impossible. Unlike Pyongsan placing the North Korean uranium refinery facility underground would prevent its observation. It would make it impossible for remote sensors to determine when the facility was operating, its potential efficiency or inefficiencies and its level of output. Knowledge of such factors should have been vitally important to the intelligence communities monitoring North Korea’s nuclear weapons program and searching for the country’s uranium enrichment facilities. Unobserved is denied. Out of sight is out of mind, undetected.

Hiding the basic task of concentrating ores for uranium oxides hid the potential end result. Outsiders monitoring how much uranium bearing-coal was being processed could come to some conclusions about how much uranium oxide could be extracted, and can eventually predict how many uranium-based weapons could be produced over a given time. By visiting the facility at Kumchang-ni the State Department and its investigators had revealed even more details regarding their interests and concerns. Fumbling North Korean guides aside, they were wholly consumed with collecting intelligence on the American investigators. None of the intelligence gathered by the North Koreans however had indicated any US interest in the Taech’on HPP Number 1.

The Yi “report said that the arched entrance of the tunnel is 7 meters wide and 6 meters high. A pathway of about 2.5 km is connected to the entrance, and there is a corner at the end of the pathway. Making a 90-degree right turn and going along the path about 1 km, you will find a 6-km-long main tunnel with a width of 15 meters and height of 6 meters. The inside surface of the tunnels is covered by aluminum plates, and there are 3-meterwide drains and ventilation openings there.”⁸⁰

This was the central and most important piece of information contained within the Yi report that could lead to the site’s identification. For the disinformation campaign to succeed the effort had to contain a kernel of truth so pure that it could not be denied but so obvious that it could not be accepted – this was it.

The problem for the North Korean’s was this; to divert attention from what might be judged as unacceptable to the West, they had to redirect the focus of international intelligence communities away from the obvious – this entrance – and they did. The Yi report contained many kernels of truth but sufficient falsehoods and misdirection to cast doubt on its identification and confusion among those following its trail. The largest unknown concerning Yi’s report of the underground path way was this: Was it described from the inside looking out, or the outside looking in? From inside the tunnel at the concentration facility, the description given matches the path of the aqueduct

⁷⁸ Press Statement by James P. Rubin. Report on the US Visit to the Site at Kumchang-Ni, Democratic People’s Republic of Korea. US Department of State. Office of the Spokesman. Press Statement. 25 June 1999 <https://1997-2001.state.gov/briefings/statements/1999/ps990625a.html>

⁷⁹ Press Statement by James P. Rubin. Report on the US Visit to the Site at Kumchang-Ni, Democratic People’s Republic of Korea. US Department of State. Office of the Spokesman. Press Statement. 25 June 1999 <https://1997-2001.state.gov/briefings/statements/1999/ps990625a.html>

⁸⁰ Kuroda, Katsuhior. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbun. 9 June 2000. Cited in the 20 June 2000 CONGRESSIONAL RECORD – SENATE 11433 SENATE – Tuesday, 20 June 2000

supporting Taech'on HPP Number 1 exactly. From outside looking in, the directions given were the absolute reverse. Apparently, North Korea thought the intelligence communities of those nations who were watching the country knew more than they did, they didn't.

Using information, mostly that made public by North Korea decades earlier, the existence of the entrance and its contents had long-since been known. The North Korean press had covered the Taech'on construction project proudly as part of the *juche* state. Some analysts had tracked the construction of the facility from near the first shovel of dirt removed for its tunnel to the present day. They had followed and mapped each and every spoil pile that appeared along the path of the tunnel as it was constructed. They had used these piles to determine the direction of the aqueduct, its depth, and its location underground. The piles of dirt and rock removed from the tunnel construction project were imaged, measured, the quantity of dirt and rock calculated, consideration was even given to the expansion of the rock under the pressure that existed underground to its size once removed. Analysts knew, or thought they did, what was inside the tunnel when it became operational in the late 1980s. There was nothing to see here...or was there? Actually, there was.



The tunnel reported by Yi matched the mapped aqueduct tunnel supporting Taech'on HPP Number 1. If North Korea could plan forward in the future to remove its uranium concentration facility into a deep underground at Taech'on HPP Number 1, that same planning would allow space for reactors in the underground facilities at Taech'on HPP Number 2.

Hundreds of imagery and intelligence analysts had looked at the entrance and researched the known facilities previously associated with the location. Any number of intelligence and imagery analysts had made the leap from identification to confirmation of a uranium milling facility located along the aqueduct supporting Taech'on HPP Number 1 however, while many of the observables described by Yi could be confirmed, much of the information he gave could not be corroborated through imagery alone. The principal use of aerial and satellite imagery, that of confirming human intelligence, had failed.

Consider Yi's comment about the helicopter landing pad, "There is also a helicopter pad outside the facility and two checkpoints to control access to the site."⁸¹ When Yi made his statement in 1999, there was no helicopter landing pad in the area. The checkpoints were present, but obscure, and they were not at the entrance to the facility but

⁸¹ "북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony]." Shindonga (Donga Ilbo's Magazine). 1 August 2001 <http://shindonga.donga.com>

nearer the actual underground facility to the east. The entrance to the underground power station served to secure the underground refinery itself. No one could penetrate that entrance short of a direct attack. An actual marked helicopter landing pad would however appear sometime around 2016 (40°11'7.11"N 125°36'16.45"E). A helicopter may have gone to Taech'on HPP Number 1 as previously reported, but the observable of an actual helicopter pad would not appear on imagery until 16 years after the Yi report was received.⁸² Yi wasn't just reporting the present, he was undercutting the present with the future. He knew at that very moment what he was saying. In a sense, he never lied, he just ignored time. No one thoroughly questioned him or examined his statements in any effort to penetrate the mask he presented. He was never panned to the mat.

The facility that most fit the description as described by Yi, the Taech'on HPP Number 1, was never confirmed or accepted by the worldwide intelligence community as North Korea's uranium milling facility. There was never any leap from what Taech'on HPP Number 1 was said by Yi to be, to what Taech'on HPP Number 2 could be, or that the entire civil-engineering project was simply a cover for North Korea's necessary nuclear weapons facilities. There was no follow-on and intense collection effort to determine the true nature of Taech'on HPP Number 1 as it had been presented by the North Koreans themselves, or as it matched up to what Yi had later described. For Taech'on HPP Number 1 and Taech'on HPP Number 2, every day was the usual day. Again, many analysts took the leap, few landed on their feet. The actual shortcoming was the culture of imagery analysis itself: Never report anything you cannot absolutely prove, never make waves for management, maintain the *status quo ante*.

As the possible refinery was underground, the civil-engineering construction project never thoroughly monitored in face of the other massive attention-grabbing construction projects, such as the Nampo Lock Gate, the Imnam Dam or the Ryugyong Hotel (a colossal 105-story, 1,080-foot tall, pyramid-shaped skyscraper in Pyongyang) there were never any flags raised. There was little that went into the production of a uranium refinery or a plutonium producing reactor, built under the cover of a civil-engineering construction project, that would directly indicate the existence of nefarious facilities or additional underground space. There was never any "so what" moment that an analyst could point to as a confirmation point. Had the aqueduct to the Taech'on HPP Number 1 with its additional facilities or Taech'on HPP Number 2 with its reactors been built aboveground, there would have been a lot of "so what." There was never a lot of "so what" left of Yi either.

If Yi did exist and had been interrogated in China then local officials had returned him to North Korea knowing he would have been immediately executed. While historically China has returned many fleeing North Koreans back to the country, there are no actual reports of any military defectors ever being returned. A search of the internet, a source known for fake news, turns up many stories of North Korean military defectors reaching South Korea through China. None of reports, fake or real however, ever reveal any North Korean military defectors inside China, being returned to North Korea. It just didn't happen.

Even China collects intelligence. Any military defector regardless of rank knows some valuable information even if they are not aware of what they might know. In the hands of a skilled interrogator, even the information held by a private or corporal can prove immensely valuable. A ranking member of North Korea's elite escaping into China would have been an intelligence bonanza to the Chinese yet, there was never any official mention acknowledgement of the tale by Beijing. It was as if it had never happened and probably never did happen. This should have been an indicator to the intelligence community that something about the story was very, very, wrong. It wasn't.

Muffled Getaway:

During his lifetime Kim Il-sung personally managed North Korea's nuclear energy and weapons program.⁸³ Kim Jung-il was far less involved but assumed the mantle of the program after the death of the elder Kim in 1994. The elder Kim came to see the country's nuclear program as ensuring the coming transition to power of his son Kim Jung-il.⁸⁴ In the view of Kim Il-sung, a nuclear weapon would ensure the continuation of the Kim dynasty.⁸⁵

Kim Il-sung and Kim Jong-Il together publicly visited the Nampo Lock Gate project several times. Joint public visits by the two anywhere were rare, occurring less than 30 times per year from 1980 to the elder Kim's death in

⁸² 2020 CNES/Airbus. Google Earth. Google. Imagery Date: 20 Sept 2016

⁸³ Jonathan D. Pollack. No Exit: North Korea, Nuclear Weapons, and International Security. International Institute for Strategic Studies. 2011

⁸⁴ Jonathan D. Pollack. No Exit: North Korea, Nuclear Weapons, and International Security. International Institute for Strategic Studies. 2011

⁸⁵ Jonathan D. Pollack. No Exit: North Korea, Nuclear Weapons, and International Security. International Institute for Strategic Studies. 2011

1994. Numerous obelisks erected in the area of the lock gate attest to visits by the Great Leader Kim Il-sung. Kim Il-sung and Kim Jong-Il alone, rarely visited the construction sites of the Taech'on Hydroelectric Power System. They never went to any of the Taech'on Power Stations together. The nearby town located adjacent to Taech'on HPP Number 2 possesses only one obelisk indicative of a visit by Kim Il-sung however, there is no such monument at the actual power station. Appearances can always be deceiving as North Korea knows how much foreign intelligence agencies value such monuments as an indicator of regime leadership interests in such projects however, after the death of Kim Il-sung, obelisk construction went out of fashion. Such a monument does exist however at Taech'on HPP Number 1. Built in an earlier era, the obelisk is probably a fair indicator that the Great Leader himself had visited the site and why not? With a tunnel several miles long, lined with concrete, with large visible drains along the passageway, vents in the ceiling and eerie fluorescent lamps buzzing overhead it must be an impressive sight.

“19 January 1999: General Secretary Kim Jong Il gave on-site guidance to the Thaechon General Hydro-Electric Power Plant. He was accompanied by chief secretary of the North Phyongan Provincial Committee of the WPK Kim Phyong Hae (Vice Director of the Propaganda and Agitation Department), secretary Kim Kuk Thae (Secretary for Party Cadre Affairs and director of the Cadres Department) and first vice department directors of the WPK Central Committee Pak Song Bong and Ri Yong Chol (Vice Chairman of the National Defense Committee).”⁸⁶ The Central Committee? The National Defense Committee? The Propaganda and Agitation Department)? Quite the entourage for a hydroelectric power station.

Yi's fate, if he ever existed at all, remains unknown.

Yi was most probably Kang Sok-ju. the architect of North Korea's nuclear diplomacy. Reuters states that Kang "engineered the development of the North's nuclear programme...."⁸⁷ He was in charge of supervising North Korea's relations with the United States, which became his area of expertise. He was intimately involved in all aspects of North Korea's nuclear weapons program. As Leslie Groves, Robert Oppenheimer, Werner Heisenberg, Nishina Yoshio, Lavrentiy Beria and Vasilyevich Kurchatov had long-since proved, only someone intimately familiar with all aspects of a nuclear weapons program could manage such a beast. Similarly, as all had long-since proved only someone intimately involved with that program could design and accurately present a deception package to hide that program. Kang was intimately familiar with Western efforts to track identify North Korea's program. Kang knew how gullible and susceptible to deception the world outside the country really was. The world wanted answers badly and Kang – provided bad answers.

Kang passed away on 20 May 2016.

⁸⁶ Where is Kim Jong Il 1999. Interested in where the "Dear Leader" has been? Here is a rundown of his schedule in 1999. (All material modified from KCNA unless otherwise noted) https://www.oocities.org/yi_sun_shin_adm/KJTrack1999.html

⁸⁷ "North Korea's top nuclear diplomat promoted to vice premier." Reuters. 22 September 2010

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LENGTH: 290 words

HEADLINE: N. Korea has secret uranium production facility: daily

DATELINE: TOKYO, June 9 Kyodo

BODY: North Korea has been producing uranium at a secret underground complex at Mt. Chonma near its border with China since late 1989, a Japanese newspaper reported Friday.

The Sankei Shimbun reported in a front-page dispatch from Seoul that a former North Korean military official who fled to China last year revealed the existence of the Chonma facility during interrogation by Chinese officials.

According to a report drawn up based on his statements, North Korean soldiers started building the complex—a large tunnel under the 1,116-meter mountain in the northwestern part of the country—in 1984, the Sankei said.

The facility was completed in 1986 and the production of uranium, which can be used as raw material for producing nuclear weapons, started at the end of 1989, the report said.

The facility, known as the (Mt.) Chonma Power Plant in North Korea, has some 400 workers, including 35 technicians and 100 people in management posts. The remainder are manual laborers who are all political prisoners detained for life.

The document also reportedly touched on the United States, which had inspected a separate underground complex suspected to be a nuclear facility in Kumchangri, about 30 kilometers southeast of Mt. Chonma.

The US did not notice the existence of the Chonma facility during the inspection, although forests in the Kumchang-ni area were noticeably polluted by water discharged from the Chonma facility, the daily said, quoting the report.

The 66-year-old former North Korean military official attempted to defect to a third country after fleeing to China, but he is believed to have been sent back to North Korea by Chinese authorities, the daily quoted South Korean sources as saying.

⁸⁸ Lewis, Jeffrey. SIZE MATTERS. Arms Control Wonk. 4 March 2007 <https://www.armscontrolwonk.com/archive/201418/size-matters/>

⁸⁹ N. Korea has secret uranium production facility: daily. Copyright 2000. Kyodo News Service Japan Economic Newswire. TOKYO. 9 June. Kyodo. Thursday. 8 June 2000

Mr. BROWNBACK: There are even recent newspapers reports out that I want to submit for the RECORD about the development of nuclear material. This was in a newspaper in Japan, about North Korea's secret underground facility producing uranium for use in its weapons programs. These are weapons programs. They are the largest proliferator around the world.

I ask unanimous consent to have this document printed in the RECORD.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

[From the Tokyo Sankei Shimbun, June 9, 2000]

SANKEI SHIMBUN: DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM
(By Katsuhior Kuroda)

SEOUL, 8 June — North Korea has reportedly utilized natural uranium produced in the country as raw material for its nuclear weapons development program. Meanwhile, Sankei Shimbun has obtained a detailed report on North Korea's secret underground plant for refining natural uranium and its material production procedures. The secret underground plant is widely called "Mt. Chonma Power Plant," located at Mt. Chonma in North Pyongan Province. North Korea has operated the plant in secret since the end of 1989 for uranium production for the nuclear weapons program, the report said.

EX-MILITARY OFFICIAL WHO FLED TO CHINA UNVEILS EXISTENCE OF PLANT

The report was drawn up based on statements made by North Korean military official Yi Chun-song [name as transliterated], 66, during interrogation by Chinese authorities. Yi is former vice director of the operation bureau of North Korean Ministry of People's Armed Forces who served as commander in chief at a missile station. He fled from North Korea to China last year and was held in Chinese authorities' custody.

The report said that the "Mt. Chonma facility" has a uranium refining capacity of 1.3 grams a day. By simple calculation, the production during the past 10 years of operation would amount to approximately 5 kg. Concerning North Korea's uranium production plants, there are some unconfirmed information including plants in Pakch'on and Pyongsan, but this is the first time that an accurate location and details of the inside of the facility were unveiled.

According to the report, the "Mt. Chonma facility" is built in a large tunnel under the 1,116-meter mountain. Soldiers of the 2d Division of the Engineering Bureau of the Ministry of People's Armed Forces started constructing the facility in 1984 and completed the work in 1986. The uranium-producing operations started in 1989.

Approximately 400 people, including 35 engineers and 100 managers, are working at the plant. The rest are physical laborers who were all political prisoners sentenced to life in prison. The uranium minerals are brought into the facility from mines in Songchon, South Pyongan Province, and Sohung, North Hwanghae Province, by the transportation unit of the Ministry of People's Armed Forces.

The report said that the arched entrance of the tunnel is 7 meters wide and 6 meters high. A pathway of about 2.5 km is connected to the entrance, and there is a corner at the end of the pathway. Making a 90-degree right turn and going along the path about 1 km, you will find a 6-km-long main tunnel with a width of 15 meters and height of 6 meters. The inside surface of the tunnels is covered by aluminum plates, and there are 3-meterwide drains and ventilation openings there.

⁹⁰ Kuroda, Katsuhior. DPRK SECRET UNDERGROUND FACILITY PRODUCING URANIUM. Tokyo Sankei Shimbun. 9 June 2000. Cited in the 20 June 2000 CONGRESSIONAL RECORD—SENATE 11433 SENATE—Tuesday, 20 June 2000

The underground plant is comprised of 10 areas—two concentration grounds measuring 3,000 square meters each, a drying room of 400 square meters, four 400 square-meter wide dissolution rooms for uranium extraction and refining, a room for packing uranium into containers, storage for the finished products, and a room where the workers change into anti-radiation suit or take breaks.

The report said there is a waste disposal facility in the plant in addition to the areas mentioned above. The packed uranium products are carried out of the facility through a passage at the end of the tunnel and transported to an underground storage area in Anju by helicopter. The report added that although forests in the Kumchang-ni area, 30 km southeast of Chonma, were polluted by water discharged from the Chonma facility, the United States could not detect signatures of the Chonma plant despite the technical team's inspections in Kumchang-ni.

According to Yi's career record attached to the report, Yi graduated from Pyongyang University of Technology, and studied at Frunze (now Bishkek) military university of the former USSR from 1958 to 1962. A South Korean source said that Yi attempted to defect to a third country after fleeing to China, but it is highly likely that he was sent back to North Korea by Chinese authorities.

In 2011 the Nuclear Threat Initiative (NTI) produced additional information on Mt. Chonma in Cheonmasan Uranium Milling Facility and Suspected Uranium Enrichment Facility.⁹¹ The NTI report provided additional information not contained in the short newspaper articles above.

LAST UPDATED:	September 30, 2011
OTHER NAME:	Mt. Cheonma Uranium Milling Facility; Cheonmasan Power Plant; Mt. Cheonma Power Plant
LOCATION:	Daegwan-gun, North Pyeongan Province, North Korea. Note: The facility is located underneath Mt. Chonma that rises 1,116 meters above sea level. It is 40km to the southwest of Daegwan-eup, Daegwan-gun, and 30km to the northwest of Geumchang-ri. No one reportedly lives within 10km of the facility. ⁹²
SUBORDINATE TO:	Probably the 5th Machine Industry Bureau, Korean Workers Party
SIZE:	About 10 rooms; approximately 535 workers, including about 100 management personnel, about 35 technicians, and about 400 political prisoners assigned to dangerous and physically taxing duties. About 16 technicians work in the underground operations.
FACILITY STATUS:	Unknown

Cheonmasan is regarded as a uranium milling facility that is possibly also a site for uranium enrichment. Most of the information regarding this facility is based on the testimony of North Korean defector Lee Choon Seon, a former senior military official of the Korean People's Army who defected to China in 1999 and was captured by the Chinese authorities.⁹³ His testimony for the first time publicized the existence of this underground facility. According to Lee, although known as the "Cheonmasan Power Plant," the facility is actually an underground uranium milling plant that produces yellowcake.⁹⁴ Additionally, this facility reportedly vents its exhaust fumes at the Geumchang-ri Underground Facility, which was suspected of clandestine nuclear-related activities but later was shown to be a series of empty and unfinished underground tunnels upon site inspection in 1999 and again in 2000.

According to Lee, North Korea initially planned to build a "nuclear production base" in the Mt. Cheonma area in 1983. Tunnel excavation began in 1983, and full-scale construction of the facility began in 1984. Lee stated that the Second Division under the Air Force Construction Bureau of the Ministry of the People's Armed Forces was in charge of the construction. [Note: This contradicts other reports that claim the Third Engineer Bureau of the Nuclear Development Unit builds all underground nuclear facilities].⁹⁵ The stated purpose for the construction project was for a power plant and the needed underground waterway passing through Mt. Cheonma. However, the tunnels were actually to house a nuclear material production site. The tunnel construction was completed at the end of 1986, and equipment installation began in early 1987. The facility began to produce yellowcake at the end of 1989.⁹⁶

⁹¹ Cheonmasan Uranium Milling Facility and Suspected Uranium Enrichment Facility. Nuclear Threat Initiative. 30 September 2011 <https://www.nti.org/learn/facilities/740/>

⁹² "북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony]." Shindonga (Donga Ilbo's Magazine). 1 August 2001 <http://shindonga.donga.com>

⁹³ Lee Choon Seon, a former senior military official in the North Korean People's Army, was interrogated while in the custody of the Chinese authorities. Before he could be brought to South Korea, he was repatriated back to North Korea where, according to Shindonga, he was probably executed. The original Chinese interrogation report was obtained by Shindonga and subsequently translated into Korean; "북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony]." Shindonga (Donga Ilbo's Magazine). 1 August 2001 <http://shindonga.donga.com>

⁹⁴ David Albright and Holly Higgins. "North Korea: It's Taking Too Long." Bulletin of the Atomic Scientists. January 2002. Vol. 58 No. 1

⁹⁵ "Bureau of Engineers." Federation of American Scientists. 22 November 1998 www.fas.org

⁹⁶ "북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony]." Shindonga (Donga Ilbo's Magazine). 1 August 2001 <http://shindonga.donga.com>

According to Lee, uranium ore from mines in Seongcheon-gun in South Pyeongan Province and Seoheung-gun (서흥군) in North Hwanghae Province is milled here.⁹⁷ However, there are no known reports of uranium mines in those areas. It is possible Lee was confusing them with uranium mines in Seoncheon-gun, South Pyeongan Province and in Pyeongsan-gun, North Hwanghae Province.

[Note: The pronunciation of "Seongcheon-gun" and "Seoncheon-gun" are similar, and they are about 20-40km apart in the same province. Seoheung-gun is adjacent to Pyeongsan-gun in North Hwanghae Province, and the mine could be in the mountain range that separates the two counties (gun). Lee could have been referring to what is known as the Pyeongsan Uranium Mine.]

A regiment in the Transport Bureau under the Ministry of the People's Armed Forces apparently delivers uranium ore to the facility in Soviet-made trucks.

The facility has three steel security gates between the entrance and the production site. Inside the facility, there are about 10 rooms that are found about 600m to the right from the third security gate. The size and function of each room are as follows:⁹⁸

Work Room: A dressing room where technicians and workers change into protective gear. This room is also used as a lounge.

Ore Room No. 1: This room contains equipment and tanks for the "separation" or concentration of uranium ore. This room is about 50m x 60m.

Ore Room No. 2: This room contains equipment to further process the output from Ore Room No. 1. This room also contains tanks and is about the same size as Ore Room No. 1.

Drying Room: This room is used to "dry" the output from Ore Room No. 2. This room is about 20m x 20m with a 20m-high ceiling.

Smelting Rooms No. One-Four: These rooms house equipment for smelting and are about 20m x 20m with 20m-high ceilings. The walls in these rooms are covered with 20-mm thick aluminum plates.

Packaging Room: This room is used to pack the refined uranium in airtight containers. This room is about 20m x 20m with a 4m-high ceiling. The walls in this room are also covered with 20-mm thick aluminum plates.

Output Storage Room: This room is used to store the containers of refined uranium. This room is about 30m x 20m with a 4m-high ceiling.

About 100 meters from the Output Storage Room is another tunnel off to the right. At about 20 meters into the tunnel is an underground nuclear waste disposal area of about 100m x 50m in size, and about 5m high that is covered with 5-mm thick aluminum plates. There is also a helicopter pad outside the facility and two check points to control access to the site.⁹⁹

This facility has a director and three deputy directors responsible for administration, general affairs, and technology, as well as a general technological director. All of these positions are staffed by Korean

⁹⁷ “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony],” Shindonga (Donga Ilbo's Magazine), 1 August 2001 <http://shindonga.donga.com>

⁹⁸ “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony],” Shindonga (Donga Ilbo's Magazine), 1 August 2001 <http://shindonga.donga.com>

⁹⁹ “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector's Shocking Testimony],” Shindonga (Donga Ilbo's Magazine), 1 August 2001 <http://shindonga.donga.com>

People’s Army personnel. The general technological director supervises all technicians and the following seven divisions at the facility:¹⁰⁰

Production Division: Production of nuclear material

Technology Division: Technical appraisal of ore and analysis of content

Planning Division: Establishment of production plans and implementation of production directives

Labor Division: Allocation of duties among technicians and workers

Labor Safety Division: Supervision of personnel and facility safety

Equipment and Material Division: Purchase, repair, and maintenance of production equipment and materials

General Affairs Division: Administrative matters for employees and their families

About the Author

Originally from Douglasville, Georgia, Dwight R. Rider was a Senior Intelligence Associate with Intelligence Decision Partners, and Shadowblade Technologies of Virginia. He possesses more than 38 years military-civilian experience as a targeting intelligence specialist, electronic warfare officer, electric power, weapons of mass-destruction, and underground facilities analyst specializing primarily in East and Southeast Asia. He holds a Master Degree in Strategic Intelligence awarded by the Defense Intelligence Agency, and is a *Magna Cum Laude* graduate of the University of Nebraska. He is the author of *Hog Wild-1945: The True Story of How the Soviets Stole and Reverse-Engineered the American B-29 Bomber*; *Tsetusuo Wakabayashi, Revealed*; and *Japan’s Biological and Chemical Weapons Programs: War Crimes and Atrocities – Who’s Who, What’s What, Where’s Where. 1928-1945* which discuss Japan’s wartime atomic energy and weapons of mass destruction programs. He currently resides in Sumter, South Carolina. He can be reached at: dwrider24@gmail.com

¹⁰⁰ “북한 핵물질 생산기지는 평북 대관군 천마산 지하에 있다: 탈북 인민군 장성의 충격증언 [Nuclear Facility is Underneath Mt. Cheonma: North Korean Defector’s Shocking Testimony],” *Shindonga* (Donga Ilbo’s Magazine). 1 August 2001 <http://shindonga.donga.com>