
BACKGROUND

Developed in the 1930’s by the Japanese industrialist Jun Noguchi, the Chosen Nitrogen Fertilizer Complex in the port city of Hungnam, North Korea (known as “Konan” by the Japanese) was the largest nitrogen fertilizer and chemical complex in the Far East. Other facilities in the area included an explosives plant about 1.5 miles to the southwest and the Motomiya Chemical Plant about 2.5 miles to the northwest (now Pongung). The Hungnam Chemical Complex, which remained undamaged throughout WWII, was demolished by B-29’s with the Far East Air Force (FEAF) during the early months of the Korean War. The Hungnam Nonferrous Metals plant, for instance, was attacked on August 24, 1950. The following day, in a message to Gen. George E. Stratemeyer, the Commanding General of FEAF, Gen. Emmett “Rosie” O’Donnell, the Commanding General of the FEAF Bomber Command, wrote the following:

For your information, study of strike photos taken during mission on Konan [Hungnam] yesterday reveals that the one building thorium plant indicated to us by the Joint Chiefs of Staff as critical target has been thirty-five percent destroyed and has suffered an estimated additional forty percent heavy damage. Plant area immediately adjacent to this building is heavily and accurately hit. Post strike photos are still not available because weather forced reconnaissance aircraft to land at Misawa. It is thought that buildings in this area were used to process monazite sand which is a primary source of thorium and other elements in the atomic energy program. I believe this was an excellent mission conducted by one group, the nine two group [92nd BG], and results will likely have far reaching implications."
August 24, 1950

Thorium processing plant (Hungnam, North Korea) demolished by B-29’s during the Korean War (1950).
Following the August 24, 1950 attack, the *New York Times* described a mission in which B-29’s staged heavy strikes against North Korean targets, dropping “more than 600 tons of bombs by radar on four major objectives.”³ The “heaviest blows,” however, were struck on “an outlying section of the chemical plant” at Hungnam.⁴ Later, an article in *Chemical Week* remarked that “the erasure of the plants by U.S. B-29’s evidently put quite a dent in the Reds’ war potential,” adding, “It’s hard to make chemicals in a flattened plant.”⁵

Thorium, which can be extracted from thorium oxide, which in turn can be extracted from monazite, can be converted into fissionable U-233 by means of a nuclear reactor — in much the same way as uranium can be converted into plutonium — was of great interest to the early Soviet nuclear weapons program, which culminated on August 29, 1949, when the Russians conducted their first atomic test.⁶ By 1951, about 49,000 tons of monazite, which may contain as much as 7,500 tons of thorium oxide,¹ had been excavated.⁸ According to documents discovered in 1993 at the Soviet archives, the North Korean leader Kim Il-sung had promised to ship far more monazite to the Soviet Union⁴ in exchange for military equipment shortly before the North Korean offensive against South Korea began. Although the program to secure fissionable material from North Korean mines was interrupted during the Korean War, it resumed afterward.¹⁰ Soviet officials investigated the exploitation of monazite deposits in North Korea “from the beginning of the occupation period in 1945,” when samples of the deposits were brought to the Soviet Union.¹¹

Rumors of nuclear activities at Hungnam began in October 1946 when David Snell — a reporter for the *Atlanta Constitution*, who had recently returned from military service in Seoul, Korea — reported, in a front-page headline story, how Japanese chemists at the Konan fertilizer and chemical complex had worked feverishly to develop the atomic bomb (including an alleged atomic test at sea) before Soviet forces arrived in the area. And how, upon their arrival, the Russians allegedly tortured Japanese scientists for their “atomic know-how.” Snell’s source was the Japanese head of security and counter-intelligence at the plant during the war.¹²

When Snell requested permission to file the story with his “old paper” in Atlanta, the head of U.S. Army Intelligence in Seoul, Lt. Col. Cecil W. Nist, denied Snell’s request, adding, “We know all about Konan, of course.”¹³ Snell’s story in the *Atlanta Constitution* sparked harsh condemnation in Japan, the Soviet Union, as well as in the United States. Yoshio Nishina, the father of modern physics in Japan, called the story “a complete lie,” the Soviet press called Snell a provocateur, and Robert Patterson, the U.S. Secretary of War, categorically denied the story without amplification. Officially, the story as reported by Snell was a “complete fabrication.”¹⁴

**TWO CIA REPORTS**

Following a February 1965 visit to North Korea by Soviet Premier Alexei Kosygin, economic relations improved considerably. Then in June 1966, North Korea concluded an economic cooperation agreement with the Soviet Union which the CIA believes probably included “aid provisions for many of the unfinished projects” from an earlier agreement.¹⁵ By 1970, a number of “Soviet-assisted projects” were completed, including the chemical plant at Hungnam,¹⁶ which, as we’ve already discussed, was demolished two decades earlier. According to the CIA, Soviet trade statistics provided “the only consistent set of information on the value of drawings under the 1966 [Soviet-North Korean] agreement.” In 1969, the year when the CIA produced a number of reports on Hungnam, North Korea (including the two discussed in this article), exports to the Soviet Union totaled $126.6 million and imports $201.6 million.¹⁷

The information that follows is based on a pair of now-declassified “Top Secret” CIA “Basic Imagery Interpretation Reports.”¹⁸ The first, dated June 1969, is a description of the Hungnam Chemical Plant at Pongung, and the second, dated November 1969, is a detailed description of the Hungnam Nonferrous Metals Plant, also known as the Hungnam Copper Refinery (according to the CIA/USAF’s Basic Encyclopedia). Both CIA reports have since been declassified, and yet large sections of each remain redacted. The “latest imagery used” and the targets’ Basic Encyclopedia numbers are also redacted. The Basic Encyclopedia (BE) Number (BEN) is a ten-character number containing two parts: the World Aeronautical Chart (WAC) number — four
characters — and the installation number — either six numeric characters, one alpha and five numeric characters; or two alpha and four numeric characters.\textsuperscript{19} The World Aeronautical Chart provides complete world coverage with uniform presentation of data at a constant scale, and is used in the production of other charts.\textsuperscript{20}

\textbf{THE HUNGNAM CHEMICAL PLANT AT PONGUNG}

The CIA’s June 1969 “Basic Imagery Interpretation Report” on the Hungnam Chemical Plant at Pongung covered the period between late-1963 and February 1969. Based on photography, the plant was completed in October 1963, “operated continually throughout the period,” and “no significant changes have occurred since.” In addition to a photograph and a detailed line drawing of the plant, the report also includes a discussion of plant status and reference material, some of which remains heavily redacted. This report was based partially on an April 10, 1968 (“Top Secret”) CIA report and partially on an April 1969 (“Secret”) U.S. Army report.

The Hungnam Chemical Plant at Pongung, located in the northwest section of Hungnam, “is part of an industrial complex which also contains the Hungnam Nitrogen Fertilizer Plant [redacted], the Hungnam Copper Refinery [redacted], and the Hungnam Explosives Plant 17 [redacted].” As will be seen later, the “Hungnam Copper Refinery” was [more accurately] renamed the “Hungnam Nonferrous Metals Plant.” The plant at Pongung produced industrial chemicals and synthetic fibers. In addition, production facilities for caustic soda, calcium carbide, calcium cyanamide, ammonium chloride, and “probably” vinyl acetate were identified on photography. There were also facilities for the possible production of polyvinyl chloride and dyestuffs which “collateral information indicates [were] products of this plant.” Electric power was received from the regional grid through the Hungnam Transformer Station. A waterworks facility adjacent to the west side of the facility supplied it with water from the Songchon River. Well north, along the border between China and North Korea, the Songchon River flows into the Yalu River.

The Hungnam Chemical Plant at Pongung measures approximately 10,000 by 4,000 feet, and occupies 920 acres. It is secured on three sides by a wall and bordered on the fourth (on the west side) by a canal. The plant can be divided functionally into eight production areas: Probable Vinyl Acetate Production (Area A), Gas By-Product Production (Area B), Ammonium Chloride Production (Area C), Possible Dyestuff Production (Area D), Calcium Carbide and Cyanamide Production (Area F), Possible Polyvinyl Chloride Production (Area G) and Caustic Soda Production (Areas H and I). In the Caustic Soda Production areas, salt brine is electrolyzed to form caustic soda and chlorine in the electrolysis buildings. The map of the Hungnam Chemical Plant at Pongung on page 7 of the report is redacted.\textsuperscript{21}

\textbf{HUNGNAM NONFERROUS METALS PLANT}

The CIA’s November 1969 “Basic Imagery Interpretation Report” on the Hungnam Nonferrous Metal Plant covers the period between November 1962 and August 1969. In addition to a low-resolution photograph of the facility, the report also contains a detailed line drawing of the plant, a chronological summary of construction, and its operational status.
Thorium processing plant (Hungnam, North Korea) in a 1969 CIA Report.
A detailed analysis of the plant based on high-resolution photography showed that the primary products of the plant were refined nonferrous metals, “probably copper, lead, and nickel.” Secondary products including refined precious metals, gold and silver, which were recovered as by-products from the electrolytic solution used in the refining process. Nonferrous ores were transported to the plant by rail from nearby mines at Munchon (120km) and Nampo (350km). In addition, small quantities of ore were brought by rail into a receiving and storage area. After smelting, these ores were further refined, again by the electrolytic process.

The CIA believed that the sulfuric acid used in the electrolytic cells was “probably provided by the sulfuric acid production facilities at an adjacent fertilizer plant.” Precious metals were then recovered as by-products from the residues within the electrolytic cells. Electric power for the plant was received from the regional grid through a small transformer yard, west of the plant. The Hungnam Nonferrous Metals plant occupied an irregularly-shaped area approximately 1,500 by 500 feet, which contained about 18 acres. The entire plant is secured with two, controlled-access entrances. A rail spur from the main rail line between Wonsan and Tanchon entered the plant from the south. A road entered the plant from the north. Berthing facilities for both ocean-going and coastal vessels were located just south of the plant on the Sea of Japan.

In 1962, the Hungnam Nonferrous Metals Plant contained two electrolytic cell buildings and a precious metals recovery unit that were “probably operational.” In addition, an ore smelting facility was present, but the first evidence of its operation was in January 1966 when smoke was seen emanating from the plant. By October 1963, a third electrolytic cell building was observed, also “probably operational.” Between October 1963 and December 1964, a second precious metals recovery unit was constructed and coal handling facilities for the steam plant were added. And between May 1966 and November 1968, the smelter was expanded. Additional support facilities were also constructed during the “reporting period,” that is, between November 1962 and August 1969. Although the installation was previously named the “Hungnam Copper Refinery” (See the “The Hungnam Chemical Plant at Pongung,” above), the plant was later more appropriately re-named the “Hungnam Nonferrous Metals Plant.” The major plant facilities were an ore smelting facility, three electrolytic cell buildings, and precious metals recovery units.

According to the CIA, the Hungnam Nonferrous Metals Plant was “covered by overhead photography” since late-1962. At that time, the plant contained two electrolytic cell buildings, a smelter, a precious metals recovery section, and support buildings. Most of the refining facilities at the plant, however, “predate the Korean conflict.” The facilities that were heavily damaged during the war, were put back into operation about 1957 with assistance from the Soviet Union. Between 1962 and 1969, an additional electrolytic cell building was constructed and the steamplant, smelting section, and numerous support facilities were expanded. Meanwhile, some minor support facilities were dismantled. According to CIA analysts, “the existing refining facilities were probably in partial operation” by November 1962 “as evidenced by the presence of rail cars, trucks, and construction activity.” The third electrolytic cell building was “probably operational in October 1963, when it was first observed complete.” On the basis of “smoke emissions from associated stacks,” the smelting section was first observed in operation in 1966, and the casting section of the electrolytic cell building in March 1968. Smoke was observed emanating from these same stacks during all subsequent photography. By August 1969, the entire nonferrous metals plant appeared to be fully operational.

AIR TARGET CHARTS
548TH RTG, 200 SERIES, 4TH EDITION, APRIL 1968

Both CIA reports — “Hungnam Chemical Plant at Pongung” and “Hungnam Nonferrous Metals plant” — relied on the same map reference: 548th Reconnaissance Technical Group (RTG), April 1968, 200 Series, 4th edition. As SMSgt (Ret.) Bill Forsyth explained, the 200 Series charts were radar charts developed mainly for SAC. Features like cities were portrayed as they would probably have been seen on a radar scope: high return areas would be a darker shade of magenta; small settlements/villages portrayed with circles: “We called them pop circles,” Forsyth said, with an emphasis placed
on vertical obstructions, such as antennas. For an April 1968 chart, the basic information would have been compiled from overhead satellite imagery: KH-4, now declassified. The first KH-4 (“Keyhole”) mission, launched in 1962, brought a major breakthrough in technology with the employment of the “Mural” camera, providing stereoscopic imagery. This meant that two cameras photographed each target from different angles, allowing imagery analysts to examine KH-4 stereoscopic photos as 3-dimensional. Since the first SR-71 Blackbird mission over North Korea was flown on January 26, 1968, three days after the U.S.S. Pueblo was seized, imagery from this mission over Hungnam would not have been used to compile the base information for a chart published in April 1968, Forsyth said, but rather, it “likely did a quick update of the information on the first SR

1 st Industrial Facilities (Non-Military). Since the first SR-71 Blackbird mission over North Korea was flown on January 26, 1968, three days after the U.S.S. Pueblo was seized, imagery from this mission over Hungnam would not have been used to compile the base information for a chart published in April 1968, Forsyth said, but rather, it “likely did a quick update of the information on the 3rd edition chart using SR-71 imagery, and rushed it to printing.” Forsyth arrived at the 548th in July of 1972, after assignments in Vietnam, exploiting drone imagery, Japan, SR-71 and U-2, and an assignment at March Air Force Base in California. After Vietnam fell in 1975, he worked mainly in North Korea at the 548th. “Loved the work,” Forsyth said. 23

CREDITS

2 “Bombing of Thorium Processing Plant,” Far East Air Force (FEAF), Aug. 24, 1950 (snippet), Air Force Historical Research Agency (AFHRA). The "U" shaped building seen at the center of #2 is a material cart loading ramp, used for moving raw material (ore) up before it’s dumped into the processing mill.

END NOTES

1 356 POWs, prisoners of the Japanese during WWII — mostly British, some Australian and a Canadian physician — were forced to work long hours under back-breaking conditions at a calcium carbide plant at the Motomiya Chemical Plant. Their experiences will be discussed in an up-coming book: “The Flight of the Hog Wild” by Bill Streifer and Irek Sabitov (a Russian journalist).
4 Ibid.
6 For a discussion of the CIA’s failure to predict when the Russians would conduct their first atomic test, see “The Shock of ‘First Lightning’: An Intelligence Failure?” American Intelligence Journal, Vol. 31, No. 1, 2013 by Bill Streifer and Irek Sabitov (a Russian journalist).
7 Californian monazite contains between 0.5% and 20% thorium; The Tuscaloosa News, Oct. 21, 1946, p. 3.
13 [Sources available upon request]
16 Ibid.
17 Ibid.
This information is based on an online interview with Bill Forsyth in April 2014.