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DEPARTMENT OF JUSTICE
WAR DIVISION
ECONOMIC WARFARE SECTION

REPORT ON

ORIENTAL CONSOLIDATED GOLD MINE

IN NORTHERN KOREA.

October 14, 1943

Submitted by:
Gerald C. Riley
Economic Warfare Section
Department of Justice
Los Angeles, California

TABLE OF CONTENTS

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ORIENTAL CONSOLIDATED GOLD MINE IN NORTHERN KOREA

I. IMPORTANCE OF ORIENTAL CONSOLIDATED GOLD MINE

The Oriental Consolidated Gold Mine in Northern Korea has been for many years one of the principal producers of gold in that country. According to the estimate of Mr. Harley Cupp, formerly the superintendent of the mine, this mine produced approximately thirty to thirty-five per cent of the total gold production of Korea. Prior to the Japanese embargo on gold in 1933, the products of this mine were often sold in foreign countries, but since 1933 the Japanese Government has directly purchased all of the gold produced at the mine. The mine is important, not only for its large production, but also for the completeness and modern style of its equipment.

II. BACKGROUND AND HISTORY OF THE MINE

The concession upon which the Oriental Consolidated Gold Mine is located comprises approximately 600 square miles. This concession was originally granted by the Imperial Korean Government to an American missionary named Reverend John Morris, in 1895, and this missionary in turn assigned the concession to a group of American and British capitalists who formed the Oriental Consolidated Mining Company. Work on the mine was commenced in 1896, and the mine has been operated continuously from that date until the present time. In 1939 the Oriental Consolidated Mining Company sold the mine to the Nippon Mining Company, a governmental controlled organization, which is the largest of its kind in Korea. The Oriental Consolidated Gold Mine was a success from its inception, and its size and importance steadily increased as the years went on.

III. LOCATION OF MINE

The Oriental Consolidated Gold Mine in reality consists of a group of three mines, all of which are located in a narrow valley within a short distance of one another. This valley is in the northwestern part of Korea, at a point designated as "X" on the accompanying map, Exhibit 1. More specifically, the mines are 25 miles northwest of the town of Unsan, and they are 60 miles almost due north of the town of Motyuri, which is the nearest railroad point. Motyuri is in turn approximately 75 miles north of Heijo. The valley in which the mines are located is a narrow one and is said to be surrounded on both sides by mountains which rise to a height of 3,000 feet. (1) The valley runs in a northerly and

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(1) A topographical map of Manchukuo published in 1932 by M. Kobaysahi & Co., Tokyo, however, shows no mountains in this vicinity above 1,500 feet.

(OVER)

southerly direction. At the extreme northern end is located the Tabowie Mine. About 3,000 feet south of this mine is the entrance to the Taracol Mine. The third mine, which is known as the Chintui Mine, is located due west of the Taracol Mine, across the top of the mountain and on the other side of the slope. A small river runs north and south through the middle of the valley, and most of the buildings comprising the mine, as well as the houses of the Korean mine workers, are located along the banks of this river.

IV. PHYSICAL APPEARANCE OF THE MINES

A. Tabowie Mine

At the northern end of the valley, where the Tabowie Mine is located, there has been built one rather large rambling building which is known as the mill, and three smaller buildings. The mill is a low rambling frame building with a sheet metal roof, and it is built on the east side of the river. Adjacent to it are several small buildings, one of which houses the electric motor used in operating the hoist at the mine, and the others which are tool sheds. Adjacent to these buildings are approximately a dozen houses which were the homes of American employees of the mine. A very short distance east of the mill is the entrance or collar of the Tabowie Mine, and this is, of course, right up against the side of the mountain.

B. Taracol Mine

3,000 feet south of the Tabowie mill, and located directly on the river, are the first buildings which comprise the Taracol Mine. The first building of this group, looking from north to south, is a small frame building which houses the electric motor used to operate the hoist at the Taracol Mine. Adjacent to this building is the entrance to this mine. 2,000 feet farther south, and also along the bank of the river, is a frame building containing the cyanide plant. Directly south of this are three small brick buildings housing the boiler shop, the Diesel engine garage, and the machine shop, respectively. Directly south of these is the flotation plant on the river banks, and adjacent to it on the west, the Taracol mill. The Taracol mill is similar in appearance to the Tabowie mill, it being a long rambling frame building with a sheet metal roof. West of the mill is a small power house containing dynamos and generators. Also west of the Taracol mill is a group of seven residences used by American employees. Farther south along the river is the native Korean village; this village also extends along the east bank of the river. The Korean homes are small adobe structures. There are approximately 15,000 Koreans living in the village on both sides of the river.

C. Chintui Mine

The Chintui Mine consists of merely a small building at the entrance to the mine.

This description is an accurate picture of the appearance of the mines in the summer of 1939, at the time when Oriental Consolidated sold the mines to the Nippon Mining Company. It probably is not completely

accurate as of the present, inasmuch as informant reports that the Japanese immediately commenced the construction of barracks to house the miners when they took over the mines. A sketch of the buildings comprising the three mines is attached hereto and marked Exhibit 2. The buildings on the sketch are designated as follows:

1. Tabowie Mill
2. Tabowie Mine
3. Hoist House for Tabowie Mine
4. Hoist House for Taracol Mine
5. Taracol Mine
6. Cyanide Plant
7. Diesel Plant
8. Boiler Room
9. Machine Shop
10. Flotation Plant
11. Taracol Mill
12. Chintui Mine
13. Chorrie Power Plant
14. Suribong Dam

V. METHOD OF OPERATION OF THE MINE

A. Cheap Labor

The Oriental Consolidated Mine had many advantages over an American mine, chiefly because of the large supply of cheap Korean labor. The ore mined was of a low grade; in fact, of such a low grade that similar quality ore could not be mined successfully in the United States; but because of the aforementioned cheap labor, successful mining operations were able to be carried out. In the three mines about 2,500 Korean miners were employed. Their wages averaged one and one-half to two yen a day, a yen being worth approximately thirty-three cents.

These laborers were used for the purpose of breaking the ore underground. Most of the ore was rather soft in structure and could easily be broken by hand labor. Occasionally air drills were used if rush production was necessary. The deepest level to which the mining shaft was driven was 3,500 feet. Between this deepest level and the surface were many intermediate levels. Usually a tunnel was dug from one shaft to another. Dynamite was used in starting the tunnel and from that point on the digging operations were performed mostly by hand labor.

B. Separating Valuable Ore from Waste

After the ore had been dug underground, the miners would separate the profitable ore from the material which was obviously waste. They would then shovel the waste in chutes to the next level, where it would be used for backfill. The valuable ore would be carted to the main shaft and dumped into pockets. From there it would be shoveled into an electric driven hoist and taken to the surface.

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C. Transportation to the Mill

On the surface of the mine the ore would be loaded into box cars which stood on a railroad track with a 24-inch gauge. These box cars had iron wheels. The natives would then push the box cars on the surface to the mill. The distance from the surface of Taracol Mine to the Taracol mill was about 2,000 feet. The distance from the surface of the Tabowie Mine to the Tabowie mill was considerably shorter.

D. Crushing the Ore

When the ore reaches the mill it is placed on steel tables, directly above which are located the stamping machines. The stamping machine, which consists usually of five horizontal steel rods, three inches in diameter, operated on cam shafts, and with heavy, flat steel pieces at the bottom of each rod, then pounds down upon the ore and crushes it to small bits. These rods had a lift and drop of 12 inches and they dropped 20 times per minute.

The crushed ore is then placed upon copper plated tables, over the surface of which quicksilver is spread. The quicksilver collects the amalgam and the surplus is washed down and collected in settling tanks. This surplus is treated by a flotation process. When the ore leaves the stamping machine it has been crushed to 20 mesh, which means that it is fine enough to pass through a screen which contains 20 openings to the square inch.

E. Further Processing

Twice a month the tables containing the amalgam were scraped clean and this amalgam was placed in round, steel barrels. The barrels were then sealed and large, wooden fires were built underneath them. The fire caused the quicksilver in the amalgam to burn off in the form of fumes. This quicksilver was funneled from the barrel into a pan of water, where it was deposited.

After this operation the barrel was opened and the contents were taken out and placed into earthen pots heated to a temperature of 2,000 degrees. The amalgam settled at the bottom of the earthen pot in the form of a hard cake. This cake was eventually removed from the pot; the waste material which had accumulated on top was scraped off; and the remainder, after being heated, was poured in molten form into brick molds. When this substance cooled off, the result was a gold brick. These gold bricks usually contained from fifty-five to fifty-eight per cent pure gold. The remainder of the contents was thirty-eight to forty per cent silver, and approximately five per cent waste material.

F. Assaying Plant

Each brick was assayed at the mine by drilling a minute hole into the brick and extracting therefrom a small portion for the purpose of analysis. Another assay was made at the Government mint at Osaka, where the gold bricks were shipped. As far as the mines are concerned, the gold bricks were the finished product. They were shipped to the mint in that condition.

VI. TRANSPORTATION

Since 1933 the entire product of the mines was sold to the Japanese Government and was shipped from the mines in the form of gold bricks to the mint at Osaka. The mine officials delivered the gold bricks to the Japanese postoffice at the little Korean town of Unsan, 25 miles from the mine. From that time on the gold bricks were transported under the supervision of the Japanese Government. The postoffice department transported the gold by truck from Unsan to Motyuri, and from there by rail and boat to Osaka. The motor highway from Unsan to Motyuri -- a distance of 35 miles -- is a typical Korean dirt highway, partially treated with rock and gravel. It is a practical road for motor transportation except during the extreme rainy season in the summertime.

VII. EQUIPMENT

The Oriental Consolidated Mining Company made a practice of keeping their equipment in a good state of repair and of spending adequate sums for replacement. The company, however, did not purchase and use various mechanical devices which would be necessary in an American mine, because of the plentiful supply of cheap native labor. Thus, the Korean miners performed by hand the work which in an American mine would be performed by air hammers and electric donkeys. Of course the process in the mills was not so much affected by the supply of cheap labor.

The principal items of machinery and equipment owned by the mines were as follows: Hoisting equipment, including electric motors which supplied power for the hoists; two 500 kilowatt power Diesel units of Ingersoll-Rand make; sixteen stamping machines; various steel tanks, barrels, etc.

VIII. FLOTATION PROCESS

Reference has previously been made to the process whereby amalgam was separated from waste material by means of tables covered with quicksilver. A further process was employed at the mills to salvage the gold which remained in the waste material. This process was known as the flotation process. At the time that the waste material was washed off of the tables which were collecting the amalgam, this material was funneled into large vats, where it was treated with pine oil and chemicals. This treatment caused the valuable part of the waste material to settle at the bottom of the vats, and this sediment was in turn collected and taken into the cyanide plant. At the cyanide plant the sediment was dumped into huge steel tanks where it underwent further chemical treatment and was eventually funneled into smaller settling tanks. Twice a month these settling tanks were cleaned out and the sediment therein contained a considerable portion of gold. This sediment was then put through the same processes which the original amalgam mentioned above had been put through.

IX. POWER

In the early days of the Oriental Consolidated Mines, power for the operation of the mines was secured from Heijo and was steam power. The power lines were surface lines and followed the course of the railroad

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from Heijo to Hotyuri, and then across the country to the mines. However, some years back the mining company constructed two hydro-electric plants in order to secure better power. The first hydro-electric plant was located at Lake Chorrie, five miles south of the mines. A dam was constructed at the eastern end of Lake Chorrie and from there the water was conveyed by wooden flumes for a distance of about a mile southward to the Chorrie hydro-electric power plant. This power plant is built adjacent to the west bank of the river which flows through this entire valley. Power is generated by water turbines. Farther down this same river, about 25 miles south from the Chorrie power plant, the company erected a second dam on the river, called the Suribong Dam. The water created by this dam flows by underground tunnel to the Suribong hydro-electric plant, which is also built on the river. This plant rests directly at the foot of high hills and would be difficult to identify from the air.

In addition to the power generated by these two plants the company, in 1938, commenced to purchase power from a Japanese power company named Seisen Godo Denki Kabushiki Kaisha. The electric power sold by this Japanese company was obtained from the great Japanese power plant northwest of Kanko. In 1937 and 1938 the mines were being enlarged and the company found that it was cheaper to purchase this new power than to develop power of their own. Thus, in 1935, the electric power used by all of the mines was as follows:

Suribong Hydro-Electric Plant	4,978,890 kw. hours
Chorrie Hydro-Electric Plant	2,006,890 kw. hours
No. 1 Diesel-Electric Plant	1,504,800 kw. hours
No. 2 Diesel-Electric Plant	1,079,740 kw. hours
Tabowie Auxiliary Plant	39,360 kw. hours
Total	9,609,680 kw. hours

In 1937, however, the electric power used was obtained from the following sources:

Suribong Hydro-Electric Plant	4,220,480 kw. hours
Chorrie Hydro-Electric Plant	2,410,850 kw. hours
Diesel-Electric Plant	..... kw. hours
Purchased from S. G. D. K. K.	5,382,325 kw. hours

Approximately the same ratio obtained in 1938 as in 1937.

The Japanese power company maintained a substation at Unsan with surface lines directly from the substation to the mines.

X. PRODUCTION

As has been previously stated, the Oriental Consolidated Mines produced approximately thirty to thirty-five per cent of the gold output of Korea. The original ore at the mines contained less than one per cent gold, but at the same time this ore averaged $5.00 worth of gold per ton. The following figures taken from the official annual reports of the Oriental Consolidated Mining Company will give an

accurate idea of the amount of ore mined for the year 1938, together with its value and the estimated ore reserved in the various mines.

	Tons Mined	Total Value
Tabowie Mine	79,518	$ 505,322.72
Taracol Mine	73,640	468,936.79
Chintui Mine	54,263	398,312.77

Estimated ore reserve as of January 1, 1939:

	Tons	Total Value
Tabowie Mine	100,000 (Valued at $35 per ounce)	$ 576,800.00
Taracol Mine	200,000	1,026,900.00
Chintui Mines	150,000	851,340.00

In addition to these figures, each year ore was brought to the mill by Korean miners who were mining independently at various points of the concession. This ore wasknown as Tribute Ore. Thus, in 1938 the mill received 17,818 tons of Tribute Ore, valued at $497,635.36; and as of January 1, 1939, it was estimated that a reserve of 22,500 tons of Tribute Ore existed at a value of $600,000.

XI. SOURCE

1. The informant, Mr. Harley Cupp, was employed at the Oriental Consolidated Mines from 1924 until the sale of the mines to the Japanese in the summer of 1939. During the early years of his employment Mr. Cupp had charge of the Cordwood Timber Department of the mines. It was his duty to supervise the cutting of the timber which existed in large quantities in the surrounding mountains, and to further supervise the transportation of this timber to the mines. Later, informant was made general superintendent of the mines and he held this position for approximately six years, up to the time of the sale. Informant was apparently familiar with all phases of the mining operations.

2. Annual Reports of the Oriental Consolidated Mining Company from 1926 to 1938, inclusive.