Victoria Copper Mining Co.

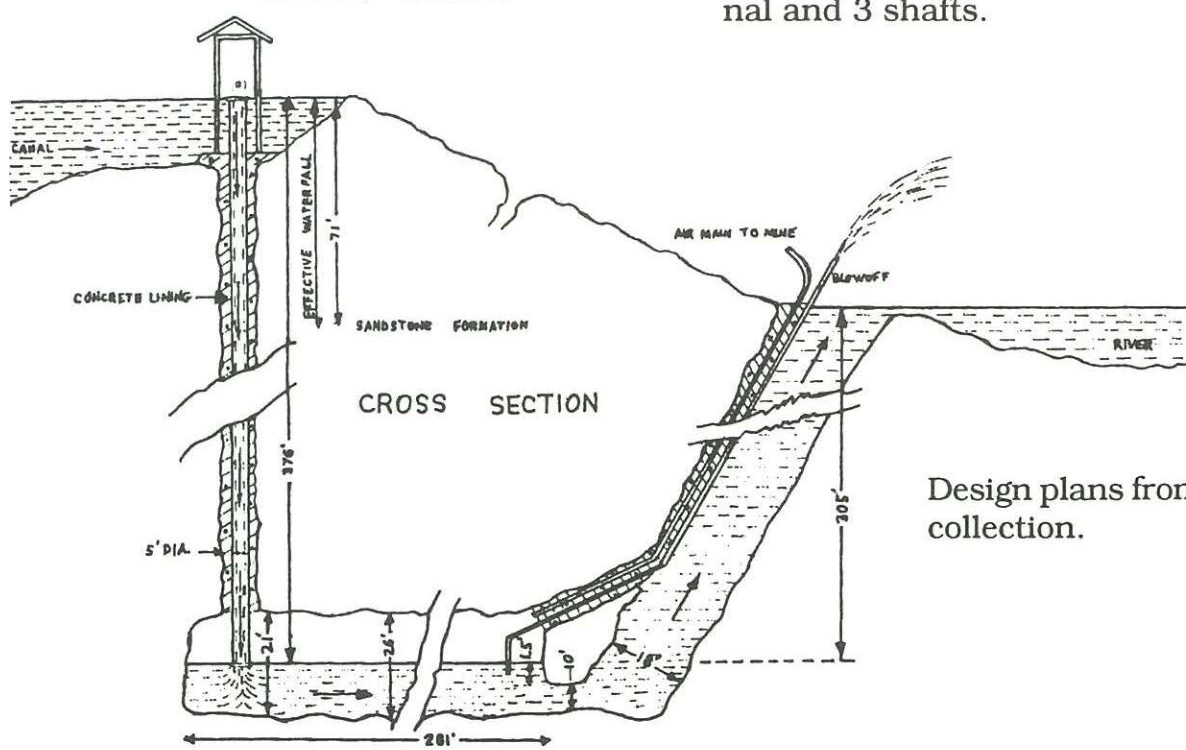
Dave Johnson

The Victoria Copper Mining Co. was organized January 16, 1899 and began operations on land that included the location of the first unsuccessful attempt at Lake Superior copper mining in historic times in the Winter of 1770-71. First opened in 1849 on a line of prehistoric pits containing masses of native copper, the property was known as the Cushin Mine. The name was changed to the Forrest Mine in 1850 and continued until reorganized as the Victoria Mining Co. in 1858, at which time the mine closed. Between 1849 and 1858 the mine produced 373,279 lbs. of copper, at a loss of $180,000, from five shafts numbered 1-5 that were 60' to 300' deep with 4,000' of drifts. The mine sat idle from 1858 until 1881 when it was unwatered but remained idle until work was begun March 1, 1899 by the newly organized Victoria Copper Mining Co.

When the mine opened in 1899 as the Victoria Mine, the No. 2 Shaft was chosen for new operations and enlarged to two compartments 8' x 12' . By 1910 the No. 2 Shaft had reached 2,089' in depth, bottoming out 38' below the 22nd level and contained 25,035' of drifts and 6,750' of crosscuts. The total openings tributary to No. 2 Shaft were 35,872' and estimated to show 400,000 tons of stamp rock, with 300,000 tons blocked out for stoping.

The outstanding feature of the Victoria Mine was the water-powered air compressor system which was constructed between 1904-06. The Taylor Hydraulic-Pneumatic plant, designed by C. H. Taylor of Montreal Canada, was completed in May 1906 and began furnishing 4,000 to 5,000 hp. under a full head of water with a measured efficiency of 82%. The plant was the most powerful single-unit air compressor in existence and was only the fifth such installation in the world. The system developed power by means of a dam, canal and 3 shafts.

THE TAYLOR HYDRAULIC AIR COMPRESSOR
VICTORIA, MICHIGAN



Design plans from the author's collection.

The dam was 225' wide and 24' high, with two wings 100' and 160' long respectively. The canal diverting water from the dam was 4,800' long, 4,000' being earthwork and 800' being cut through sandstone. The end of the canal opened out in a forebay, at the extreme end of which the compressor shafts were located.

The three intake shafts of the compressor were 5 ' in diameter, spaced 19' from center to center. The shafts were sunk through solid sandstone by first drilling 5" preliminary holes bored to a depth of 343', then enlarged to 5' in diameter by reaming with a specially designed bit having four cutting arms, each 30" in length, driven by a No. 9 Rand drill.

The concrete lined shafts allowed air to be carried downward, in bubbles, by the falling water from the canal. Leading from the bottom of the 3 shafts was a 360' tunnel, running to a large air chamber excavated from solid sandstone. The water seal at the intake end was formed by 3/8" steel sheets, firmly concreted into the bottoms of the shafts..

The air chamber was 281' long, 18' wide and 26' high, with a maximum capacity of 80,264 cubic feet of compressed air. The water seal at the upflow end was formed by an arch of rock 40' long, below which a tunnel 10' high led to the upflow shaft, which was 16' x 18' in section, sunk at 72 degrees with a vertical depth of 271', leading to the surface, where the water was again discharged to the river. The power head developed was 72', and the pressure head 271', giving a maximum air compression of 117 lbs. psi.

Imprisoned air, pulled down the shafts by suction, and swept along the tunnel in bubbles, by the rushing water, was released in the compression chamber, and the constant accession of fresh air caused compression, the air being held from escaping backwards by the superior pressure of the falling water.

The compressor was provided with suitable head-pieces, a 24" supply pipe connecting with a 12" pipeline leading to the mine and mill, and there was a 12" blow-off pipe, acting as a safety vent. When the air chamber became fully charged, the safety vent discharged with tremendous force, the air carrying with it some of the water that it pulled down, throwing a spray hundreds of feet into the air with a terrific roar.

The compressor was completely automatic, and practically isothermal, separation being practically complete, and the air unusually dry. Absolutely no fuel of any type was required to operate this power system, which came as near to furnishing perpetual motion as could be devised at the time.

The compressed air plant was designed to power the mine hoists, stamp mill, drills, locomotive, sawmill, carpenter shop and blacksmith shop.

Copper production figures following completion of the compressed air system were as follows:

546,334 lbs. in 1906, 1,207,237 lbs. in 1907, 1,290,040 lbs. in 1908, 1,062,218 in 1909 and 1,164,564 in 1910. The mine remained in operation until 1923, and when the mine closed the air compression system was left in place. The air compression system was reactivated in the 1930's to supply power for the building of a dam on the Ontonagon River as a WPA Project.

Sources:

The Copper Handbook Vol. X by Horace J. Stevens, Pub. by M.A. Donohue & Co. Chicago, 1911.

Copper - Copper Mines, Copper Statistics, Copper Shares by D. Houston & Co. New York 1906.