

Concentrating

Concentrating, the process of separating and gathering the valuable minerals from the ore, is the second step in the copper production cycle.

Kennecott Utah Copper's (KUC) state-of-the-art Copperton Concentrator includes four Semi-Autogenous Grinding (SAG) mills, eight ball mills, and corresponding flotation cells. An attached facility extracts molybdenum disulfide, used in steel making.

Copperton, opened in 1988, expanded in 1992, and again in 2006, contains some of the largest SAG and ball mills in the world. In a SAG mill, much of the grinding is done by 5^{1/2}" steel balls, each weighing about 26 pounds. As the mill revolves, the balls and the basketball size pieces of ore pound against one another in a slurry. The ore leaves each SAG mill smaller than 5/8" in diameter and is then transported as a slurry to two adjacent ball mills where 2.5" steel balls, each weighing about 3 pounds, further grind the slurried ore to the consistency of face powder.

Slurry from the ball mills flows to the flotation cells where it is mixed with reagents and agitated to produce a bubbly froth. Ore particles containing most of the valuable minerals adhere to the bubbles, which float over the sides of the flotation cells. This material, called "concentrate," is then collected and filtered. The remaining particles sink to the bottom to become "tailings."

The concentrate, which contains about 26 percent copper and by-products such as gold and silver, is pumped through a pipeline to the KUC Smelter, located about 17 miles to the north, for further processing. The gold and silver follow the copper through the Smelter production process and are recovered from the precious metals facility at the Refinery.

The Copperton Concentrator processes about 150,000 tons of ore every day. This throughput results in the annual production of about 1,120,000 tons of copper concentrate, and 37,000,000 pounds of molybdenite (MoS₂) concentrate, a steel-hardening agent that is a by-product of the Bingham ore deposit.

Tailings, the barren, finely ground rock left over from the concentrating process, flow through a pipeline to KUC's 9,200-acre Tailings Impoundment about 14 miles to the north of Copperton. The old South Impoundment no longer operates and KUC has reclaimed more than 4,500 acres.