

The Chino Mine/Santa Rita Open Pit

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By Dave Moats

The Santa Rita del Cobre Mine was old when the gold rush began. Lt. Col. Jose Manuel Carrasco, it is said, ignored his orders to destroy the Apache and, instead, did a favor for one of the Indians who showed Carrasco a piece of native copper and told him where to find more. Around 1800, Carrasco and a party of 24 arrived in Santa Rita and opened the second oldest copper mine in the territory that later became the United States (only Lake Superior's deposits were known earlier).

Indians harvested the copper that "grew from the ground in fern-like pieces" and Mangas Coloradas or "Red Sleeves", chief of the Apache nation following the death of Apache chief Juan Jose, sent arrows tipped with copper flying into Gold Rush camps as his "calling cards" after friendly Indians were massacred in 1837 by a howitzer Americans had concealed in the brush. Eventually, the Indians cut off all supplies, starving remnants of the camp fled southward and Santa Rita remained a ghost town until 1860.

Trappers seeking beaver along the Gila River learned about the mine. Kit Carson wrote of storing a load of furs in an old mine opening in Santa Rita. Sylvester Pattie decided to remain after making a deal with Ortiz, came close to buying the property, and left in disgust when a trusted employee absconded with \$30,000 of his working capital.

In 1872, Cochise, successor to Mangas Coloradas, agreed to move his tribesmen to selected reservations. Martin B. Hayes took over the old copper workings including the one known as the "Chino" or "Chinaman." However, Geronimo continued to war against the whites. While Geronimo was held captive (1877 - 1882), J. Parker Whitney bought Hayes out and the Santa Rita continued to operate. Richer veins played out. At that time, no one knew the low-grade sulphide rock would become the foundation of one of New Mexico's greatest industries. By the turn of the century, a new way of copper mining, which involved the quarrying from an open mine, made even low-grade copper ore a valuable resource. In 1909, the Chino Copper Company was formed and "modern" mining began in earnest. Steam shovels filled rail cars with rock containing 2.73% copper ore while mine foremen supervised from horseback. In 1939, a smelter was built and Chino became a fully integrated copper mining and processing center. The mine itself is one of the largest open-pit copper mines in the United States. Mining takes place 24 hours a day, 365 days a year. After the solid rock is broken with explosives, five story tall electrically powered shovels scoop the ore into huge haulage trucks that sit atop 12 foot tall tires and can carry about a half-million pounds per load. More than two billion tons of rock and dirt have been moved at the Chino Mine since steam shovel mining began in 1910. An average ton of rock moved contains less than 10 pounds of copper, so the most difficult part is separating the copper-bearing mineral from thousands of pounds of rock. The highest quality ore from the mine (0.65% copper) goes through a crushing and grinding process. Large rocks are crushed to less than six inches in size, then further reduced in a wet grinding process to the size of marbles and finally to the consistency of granulated sugar. The result is a slurry in which copper minerals are liberated from the rock. The copper minerals and rocks are separated in a floatation process. The end product of this process is a copper concentrate, containing up to 30% copper, which is pumped through a pipeline to the Chino Smelter. At the smelter, the dried copper concentrate mixture is fed into the furnace along with 97% pure oxygen. This mixture, combined with the heat in the furnace, causes the concentrate particles to "flash" and melt. The molten slag is then separated from the copper-rich molten matte. Further processing converts the matte from 60% to 99.8% copper, which is then poured into anode molds on a casting wheel. Each copper anode, the finished product of this process, weighs 850 pounds.

The Chino facility also boasts a state-of-the-art Solution Extraction-Electrowinning (SX-EW) plant, which facilitates copper recovery from low-grade ores. This modern method begins by leaching copper from large stockpiles of low-grade material. The copper-bearing solution, which has percolated through the ore stockpiled, is pumped to the Solution Extraction (SX) plant. At this plant, copper is removed from the solution creating a copper-laden electrolyte which is then pumped into cell (tanks) in the Electrowinning tank house. Hanging in the cells are conductive anodes, alternating with thin "Starter sheets" of pure copper. A direct electrical current is passed through the electrolyte reducing some of the copper ions to copper metals which deposits on the started

sheets. In about a week, the starter sheets grow to weigh about 200 pounds each. This 99.99% pure copper is the highest quality copper produced at Chino Mines Company.

Phelps Dodge Corporation, owners of Chino, is the nation's largest copper producer, one of the State's largest private employers, and one of the State's largest private landholders.

(This information had been gleaned from the Phelps Dodge brochure, the Silver City "Mimbreno and More", "Savage Scene" by W. C. McGraw, and "Life Among the Apache" by J. C. Ceremony.