

II.3.1.- Choquelimpie - Sociedad Contractual Minera Vilacollo

Choquelimpie is located in Chile's First Region, the northern Altiplano, more than 4,500 meters above sea level and 190 km from the city of Arica.

The company belongs 42.4% to Shell Chile, 36.4% to Norghate and 23% to Citibank-Chile. It bought the Choquelimpie gold and silver deposit from Procesadora de Metales (Promel) for US\$ 8 million.

Mining operations carried out by its subsidiary Compañía Minera Altiplano started in August, 1988. At present the services of Imopac, a subsidiary of Compañía de Acero del Pacífico S.A. de

Inversiones, are being used to remove the material. In 1990 production was approximately 3,100 kg of gold and about 25,000 kg of silver. Total investment in the project is US\$ 42 million including the purchase of the deposit.

Choquelimpie reserves are 10 million tons of ore, which would last for five years at an exploitation rate of 5,500 tpd. To supply the plant, the company has started exploration in eight other mineralized areas in the same region.

One of the problems of the plant, apart from its high-altitude location, is ore grade which is 1.8 g of gold per ton plus 50 g of silver.

The plant was built in 1988 at a cost of US\$ 27 million. The technology used is heap leaching with cyanidation; the use of this procedure at high altitudes is the company's own technology.

The plant was initially designed to process 3,500 tons of ore per day. However, when it was assembled the tertiary crusher was eliminated and two on-line secondary crushers were installed, which made it possible to increase the capacity to 5,500 tpd with little investment.

After crushing, the mineral is agglomerated in pellets to reach the appropriate size for leaching. In this process the mineral is mixed with water, cyanide, lime and cement. By improving the crushing system, the elimination of this stage of agglomeration is expected in the near future.

The process ends in precipitation with zinc, where a precipitate is obtained with a grade of 7% gold and between 50 and 60% silver.

At the end of 1990 a roaster started operating for the elaboration of doré bars from the precipitates. The cost of the investment was around US\$400,000.

Explorations and drillings carried out before the exploitation made it possible to determine reserves of 6.7 million tons of oxides with 2.2 g/t of gold and 80 g/t of silver. At present minerals with a grade of 1.8 g/t gold and 50 g/t silver are being exploited.

In order to prolong the mine's life beyond 10 years, an effort will be made to look for additional reserves of 2 million tons of oxides and 1 million tons of sulfur. There are 4 million tons of blocked out reserves of sulfur, but it is estimated that additional resources could be found to reach some 10 million tons.

Investment in the project was approximately US\$ 33 million; 76% of this amount was spent on the construction of a processing plant.

In order to minimize the initial investment, heap leaching technology was preferred which permits recovery of only 70% of the gold content compared to 80% when agitated leaching is used.

The deposit is exploited as an open pit located 4,700 meters above sea level, and it includes a 340-hectare area of the Choquelimpie hill, including a dump. Also to minimize the investment, mining operations - drilling, blasting, loading and transport of minerals and slag - are carried out by Imopac Ltda., a contractor which is a subsidiary of the Compañía Mineral del Pacífico.

II.3.2.- Minera Challacollo - Gildemeister.

This is a 100-year-old gold and silver operation located 170 km. southeast of Iquique. Ninety-nine percent of the deposit is owned by Gildemeister, and it was evaluated in 1981 when reserves of 3 million tons with an average grade of 350 g/t of silver and 1.2 g/t of gold were determined in the first stage. There is a cyanidation by agitation pilot plant located 2 Km. from the mine which processes 3,000 tpm. In the mid-term it plans to expand to 15,000 or 18,000 tpm with an investment of US\$ 3 million. The initial project was approximately US\$ 2 million.

Minera Challacollo has a production of 900 kg of fine silver and 800 g of metal doré gold per month, which it delivers to Enami at its purchasing agency in Pozo Almonte.