

II.2.13.3 Collahuasi - Shell-Chevron-Falconbridge.

The Collahuasi project consists of the exploitation of several copper deposits, the most important of which are Rosario and Huintiquipa, in the First Region, ten kilometers east of Quebrada Blanca.

The project is being developed by Shell (through Billiton International Metals), Chevron and Falconbridge, in equal parts.

Investment is US\$ 35 million.

Rosario will start operating in 1993. It has reserves of 2.5 million tons of mineral with 10% of copper and 60 - 100 g/t of silver. The mineralization is mainly chalcopyrite, bornite and pyrite. Construction of the underground mine will take 15 months.

The exploitation system will be cutting and filling with a nominal capacity of 300-500 tpd of extraction, which can be extended to 100 tpd. The mineral will be transported to a crushing and milling plant and then to a concentrating plant. Estimated production is 25,000 tons of fine copper per year in the form of concentrates.

The feasibility of setting up a small processing plant in Collahuasi is being evaluated, with possible production of sulfuric acid that could be used in the development of Huintiquipa. This would require an additional investment of US\$ 25 to 30 million.

Huintiquipa is an oxide deposit with reserves of 8 to 9 million tons of mineral with 1.9 to 2.2% copper which would be recovered through heap leaching and solvent extraction/electrowinning to produce another 15 to 17 thousand tons of metallic copper. The development of Huintiquipa represents an investment of US\$ 40 million.

Due to the proximity of Collahuasi and Quebrada Blanca, Collahuasi has reached an agreement with Cía. Minera Quebrada Blanca (Cominco Resources) to share the use of some installations and infrastructure.

II.2.13.4 Iván-Zar - Rayrock Yellowknife Resources.

The Iván copper deposit is located 35 kilometers north of Antofagasta. Minera Rayrock Limitada, a subsidiary of Rayrock Yellowknife Resources of Canada, is in charge of its exploitation.

It includes an investment of around US\$ 40 million for an estimated production of 5,000 tons of copper. Since 1989 several studies have been made of mineral treatment and plant design. The feasibility study, entrusted to Kilborn of Canada, is in its final stage and negotiations are underway to obtain financing.

The project includes a concentration plant in Mejillones with a capacity of 10,000 tpy.

El Zar mine is near Iván. Together they have reserves of 5.8 million tons of oxidized and sulfured minerals with an average grade of 2.3%.

Rayrock also established a joint venture with Hecla Mining Co. to explore for gold in the former María Luisa Mine, located in Pullalli between Papudo and La Ligua.

II.2.13.5 Zaldívar - Outokumpu Oy

The Zaldívar deposit is located 200 km east of Antofagasta, near La Escondida. Its reserves are 180 million tons, with an average copper grade of 1.5 % and a cut-off grade of 0.4%.

Outokumpu purchased this mine from Sociedad Minera Pudahuel for US\$25 million, and has invested another US\$ 10 million in drillings and feasibility surveys. The Finnish transnational company plans to invest US\$ 310 million in the project. Seven hundred people will work on the production of approximately 80,000 tpy of copper through leaching, solvent extraction and electrowinning as of 1993. The mine will be an underground exploitation. The first stage, which will last for one year, started with a drilling program and construction of a 100 km tunnel. Earth work will be done by Compañía Minera del Pacífico, which did similar work at La Escondida only a few kilometers away.

Zaldívar's biggest problem is water supply. La Escondida obtains water from the Salar Negro 15 kilometers away, from aquifers; the search for other wells would be difficult and expensive.

Pilot plant testing of sulfured minerals with Sociedad Minera Pudahuel's TL Process is also part of the work to be carried out in the first stage. Normally the heap leaching process works well with oxides.

This is the only project where Outokumpu participates without Chilean partners.