The Thin Layer Leaching or TL process was created in Chile as a significant improvement on the North American license of Holmes & Narver. It consists of a special thin layer heap leaching process.

After crushing, the mineral is agglomerated to maintain the chemical and physical properties in the heap. When agglomerated in a rotary drum or other device, variable quantities of water and concentrated sulfuric acid are added. Once agglomerated, the material is piled up at different heights and undergoes leaching with an acidulated solution distributed by sprinklers. The liquid drains off and is collected and sent to tanks where copper is subsequently extracted from the solution. This dripping takes place in the very thin layers that surround the mineral, which gave the name to the process, although the heaps can be as high as six meters, compared to the 0.8 meters used in the Holmes & Narver process.

II.2.6.2 La Cascada.

Since 1989 Sociedad Minera Pudahuel has also owned La Cascada mine in the First Region (former Sagasca). Reserves here are 13 million metric tons. This ore deposit has been difficult to exploit due to the characteristics of the mineral. The mine and the plant have a capacity of 120,000 tpm. Production at La Cascada is 17,000 tons of fine copper.

La Cascada deposit, formerly Sagasca, is located 110 kilometers east of Iquique, 1,700 meters above sea level and it corresponds typically to an "exotic copper" mine made up of the deposit of silicated copper minerals.

Traditionally the exploitation has been open pit. Underground exploitation started in 1990 in areas with great overburden, using the system of cabins and pillars in ascending levels and floor fillings with leaching gravel.

Sixty percent of the current plant's feeding comes from the underground mine and 40% from the open pit, at a rate of 4,000 tpd.

Information on the equipment used in Pudahuel is contained in Directory XI.2, Equipment Inventory.

II.2.7 Carolina de Michilla - Antofagasta Holdings.

II.2.7.1.- Carolina de Michilla.

The Carolina de Michilla mining district is located 108 kilometers north of Antofagasta and 17 kilometers from the coast road linking Tocopilla and Antofagasta, which is the capital of the II Region. The mining district is located in the coastal mountain range, and it includes a 450 Km2 area where more than 15 important copper mines are located.

65.5% of Carolina de Michilla is owned by Antofagasta Holdings PLC, a company registered in London, that is related to the Andrónico Luksic group, which has interests in mining, industry and railways mainly in Chile.

For investment purposes Carolina de Michilla S.A., part of the Luksic group, formed a new corporation called Inversiones Select Holdings Ltd. with a capital of US$ 38 million to be contributed by Select Copper Holding Ltd. which has its headquarters in Jersey (Channel Islands).

The exploitation rate is 115,000 tpm. The underground Susana Mine provides 15,000 tpm. for the plant. Another pit, called Graebe, is a deposit formed by a thin bed of ore, a mixed mine, which has an average grade of 2.71% of copper and reserves of more than a million tons. It provide 35.000 tpm..

Another pit is beeing currently prepared to start its exploitation in 1993. It's call Estefanía and will provide 10.000 tpm at the begining of 1993 to be increased to 60.000 tpm, 14 month later.

The remaining are produced through contract work.

Carolina de Michilla also operates the Michilla concentration plant in the Second Region. Production is about 25,000 tons of fine copper, in concentrates that are processed in Paipote o Chagres.

Expansion plans for Carolina de Michilla are quite advanced. The company plans to duplicate copper production, reaching around 40,000 tpy, by adding an electrowinning plant. The estimated capital cost is about 30 million dollars. The company is blocking out additional reserves which would increase production to 17 million tons, with a 1.8% copper grade. Operations will be expanded to the Lince project which includes an open pit mine.