

Until very recently exploitation of the ore deposit - carried out through the Block Caving method at a rate of 90,000 tpd of mineral - was centered on the secondary enrichment of the upper part of the deposit. This sector is being depleted, however, and a deeper area called "primary ore" with lower grades and greater hardness has been developed since 1976.

Exploitation has combined the Block Caving system with the use of LHD transfer in a system called Panel Caving.

Currently the El Teniente mine has 6 productive sectors, all of which use the Block Caving exploitation method and variants for handling broken ore. They are: Teniente 5 Pilares (until 1993), extraction with scrapers; Teniente 3 Isla (until 2002) and Teniente 4 Norte (until 1991), both with manual extraction; Teniente 4 Fortuna (until 1994), Teniente 4 Sur (until 2006) and Teniente Sub-6, all with mechanical extraction with LHD equipment. Teniente 4 Regimiento is being prepared (1993 to 2005), extraction with LHD, as well as Teniente Sub-5 (1994 to 2006), manual extraction.

Because of depletion in the remaining sectors of the Mine, the contribution of Teniente Sub-6 will increase steadily until 2007 when it will account for 100% of the El Teniente mine production.

Prime grades of the current operation are 1.4%. A gradual decrease in these grades is estimated, until they reach approximately 1% by the end of the century.

The mineral is loaded at Teniente 8 and transported to the new crushing plant in Colón, which in its first stage has a crushing capacity of 46,000 tons and in the second stage doubles its capacity, by installing a second module, as the increased production of Teniente Sub-6 makes it necessary. This is accomplished by installing, in successive stages, two 54" x 74" revolving crushers in one building.

The Mina Norte, Teniente Sub-6 project, initiated its productive stage on July 18, 1989. In January, 1990 a rock burst interrupted productive activities in the area by affecting the provisional transport gallery's stability. This gallery was recovered in April, but in the beginning of July, 1990 a new explosion caused the paralyzation of all activities and the systematic strengthening of all levels. It was concluded that this area is subjected to great stress and that rock bursts are different from those at Teniente 4, because they are not associated with blasts or lithological contacts but with the rock's structure.

In April, 1991 Teniente Sub-6 reinitiated productive activities.

However, on May 23 a new seismic event shook the level, and it was closed once again. Investigations determined that the area which had been definitively strengthened behaved well in the rock burst and that the worst damage occurred in the preparation and development areas which were strengthened with development support.

Definitive strengthening was immediately installed in those areas.

The nature of this rock burst was different from all previous ones.

This factor is also being investigated. Queens University of Kingston, Ontario has been involved in evaluation and diagnosis of El Teniente rock bursts.

In August, 1990 Codelco called for an international bid to carry out a technical audit on the state of the mine. This bid was awarded to the British Consulting Company, Techpro Mining & Metallurgy. This company determined that there were errors in the design, operation and strengthening of the Sub-6 level. The report states that geomechanical manifestations and seismic events that have taken place since 1976 were not considered when operations started in the primary rock, and that the authority's criteria of permanently ignoring adverse events in the mine should be severely criticized. The report recommends adequate strengthening and new operating practices, in addition to a careful study of the nature of the rock bursts.

El Teniente's copper production has decreased since the closing of the Teniente Sub-6 level, the main production area. The scarcity of mineral affected the supply of the Sewell and Colón concentrators and the Caletones smelter.

The closing of this sector would hinder completion of the short and medium-term production programs which planned to increase production to 114,000 tpd of mineral in 1992, which represents 360,000 tons of fine copper per year. The Minister of Mining estimated a decrease of 25,000 tons in the Corporation's production due to this problem. Among the new practices being evaluated is equipping the transfer dams with aluminium plates, which have proved efficient. Development with immediate definitive strengthening seems to be the best alternative, as it satisfactorily resisted the last rock burst.