Another separate heap leaching plant should start operating in 1993. It is a smaller plant destined for recovering low-grade sulfured minerals (between 0.2 and 0.5%). Leaching solutions will be treated with solvent extraction and electrowinning processes.

A US$ 28 million investment will make it possible to obtain 15,000 additional tons of copper per year.

Chuquicamata New Mines.

Two large copper deposits have been discovered recently next to Chuquicamata. The first one, informally called "MM" (Mansa Mina) and officially named Mina Nueva, has a reserve of 200 million tons of mineral 240 meters deep. The second one was called "NN" and has reserves of 420 million tons that are 140 meters deep. Both deposits have an average 1.3% grade, which is higher than Chuquicamata's current 1,25% grade. Codelco is working intensely on a plan that will permit definite evaluation of these deposits.

The work includes construction of underground works such as pits, ramps and tunnels to extract samples to do metallurgical studies and assess the rock's structural behavior and mineralogy.

Explorations near Calama continue because MM could be the trunk of other important mineral bodies.

Just as some underground mines start exploiting adjacent deposits with surface methods, there are also open pits contemplating future underground methods. Such is the case, for example, of Chuquicamata which has implemented an emergency plan to transform a large section of the open pit into an underground exploitation.

The reason for this is the inclination of the west slope, the main production area, which has increased to such an extent that there is danger of collapse is feared. Big cracks have opened up threatening the slope's stability which already has an inclination of 32 degrees. The reason for this is that the exploitation programs did not widen the pit sufficiently in an effort to reduce costs and exploit higher grade minerals.

Codelco's new administration has requested studies of the U.S. companies Bechtel Corp., Davy Mackee International Corp., and Fluor Daniel Inc., all U.S. companies, to develop an underground mine with a production capacity of 30,000 and 80,000 tpd of mineral.

Another example is Chuqui Norte which has reserves of 1.9 (1.866) billion tons with an average grade of 0.89%.

Chuqui Norte is an important future project in Chuquicamata. This is a large oxide deposit north of the current mine, 150 meters deep, which would be exploited by underground methods. Its mineral would be processed by heap leaching to produce 150,000 tons of cathodes toward 1994.

The main problem is the extraction of the mineral by tunnels at a cost which is much higher than today's cost for open pit method.

The project would cost US$ 250 million.

Other projects near Chuquicamata could be open pit operations.

This is the case of El Abra which contains a total of 1.4 (1.422) billion tons with an average grade of 0.63% and other recently discovered deposits called Mansa Mina (MM) and NN.

The former, MM, has reserves of 200 million tons of mineral at a depth of 240 m. The latter was called "NN" and has reserves of 420 million tons 140 m deep. Both deposits have an average grade of 1.3%, which is higher than Chuquicamata's current grade of 1.25%. Codelco is working intensely on a work plan to make the definitive evaluation of these deposits possible.

This work includes construction of underground works like shafts, ramps and tunnels to obtain samples for metallurgical studies to know the rock's structural behavior and mineralogy. Explorations near Calama continue for MM could be just the trunk of other important mineral bodies.

Salvador Division.

Intensive mineral exploration is being carried out in the area in search of a longer-term solution to the Division's problems.

Copper and gold explorations are being carried out in the area between La Coipa and Salvador.

Salvador has faced decreased prime grades, due to significant dilution (contamination) of the mineral. The grade expected for the year was 0.9%, but only about 0.6% has been achieved which implies the same amount of work with lower production. In order to solve this problem the extraction rhythm was reduced to make it more selective.