

Peñoles bio-leach demonstration plant

On 18 September 2001, the first copper cathode was pulled from the electrowinning tankhouse at the base metal, bio-leaching demonstration plant at Servicios Industriales Peñoles' research facility in Monterrey, Mexico. BATEMAN undertook the detailed engineering, procurement, construction and commissioning of the plant.

The plant processes 2,6 tonne/day of copper sulphide concentrate to produce 500 kg/day of copper cathode. The processes involved include concentrate handling, regrinding, bio-

leaching, solid-liquid separation, filtration, solvent extraction (SX) and electrowinning (EW) to produce full sized, commercial cathodes.

The plant will demonstrate the

economical viability of the bio-leach-SX-EW technologies as a favourable alternative to the conventional smelter-refinery method of producing copper cathodes.

The bio-leach technology was provided by Mintek of South Africa and BacTech of Canada, which entered into a partnership with Peñoles to demonstrate and market this proprietary technology. The bio-leach section of the plant includes experimental reactors for future bio-leaching research, five agitated, conventional, atmospheric-leach reactors, thickeners and filters to separate the pregnant leach solutions from the leached residue and also to separate the solid product of neutralisation and for pH control. The leached residue is treated in other Peñoles facilities for recovery of precious metals.

The main SX plant utilises the BATEMAN reverse-flow mixer settler, and consists of three stages of extraction, two stages of stripping and one stage of washing and scrubbing of the loaded organic phase. A bleed or secondary SX stage is used to process a portion of the main raffinate, prior to final neutralisation aimed at controlling the acid and iron in the system. This is an arrangement similar to those used at the Myanmar Ivanhoe Copper Company Limited (MICCL) plant in Myanmar and at Mount Gordon, Australia. The EW section consists of six polymer-



A general view of Peñoles' bio-leach demonstration plant.



Tankfarm.



Solvent-extraction circuit.

concrete cells of standard commercial cross-section, although of reduced length, and contain full size stainless-steel mother blanks to produce full-deposit copper cathodes.

After plant commissioning, Peñoles retained BATEMAN to train the new operators of the SX-EW circuit.

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Copper-electrowinning cells in the tankhouse.