



The Pueblo Viejo Gold Mine

THIOTEQ™ for copper recovery

Increasing output of metals by precipitating copper sulfide in the gold mining industry.

The THIOTEQ™ technology represents the best commercial and environmental solution to maximise copper recovery and to minimise environmental impact on the site. The bioreactor is easily adjustable to meet the desired quantities of H₂S for copper precipitation, even after two months of scheduled shutdown.

The challenge

- To prevent loss of copper to tailings.
- To recover copper from low concentration process streams (100 to 400 mg/l).
- To avoid sodium addition which could hamper the performance of the neutralisation plant.
- To minimize environmental impact.

The solution

- Precipitate copper sulfide upstream the neutralisation plant.
- Apply the THIOTEQ™ technology for cost effective on-site and on-demand H₂S generation.
- Make use of Paques expertise on H₂S processes with 200 references worldwide.

The benefit

- Production of high grade copper concentrate (CuS) to be sold at copper market price.
- Production of H₂S over large turndown ratios.
- Short payback time (~3 years).

Facts and figures

Process

- The Pueblo Viejo Mine processes 24,000 tons per day of polymetal ores containing gold, silver, copper and zinc.
- Full operation was achieved in 2014.

Revitalizing resources

- Recovering up to 12,000 tons of copper per year.
- Recycling up to 6,500 m³/h of process water after the neutralisation plant.



BARRICK

The challenge

The Pueblo Viejo Mine is located in the Dominican Republic and is operated by Pueblo Viejo Dominicana Corporation ("PVDC") - a joint venture between Barrick (60%) and Goldcorp (40%). PVDC processes ores containing gold, silver and copper by conventional crushing, grinding and pressure oxidation in autoclaves, cyanidation and refining.

After autoclaving, a thickener separates the solids, which continue to the gold/silver circuit while the remaining liquid contains soluble copper at concentrations between 100 and 400 mg/l. This stream is neutralised before being recycled back to the wash thickeners.

The soluble copper would normally be precipitated during the neutralisation stage and lost in tailings with the disposed gypsum.

In order to prevent copper loss, a copper recovery plant using Paques THIOTEQ™ technology was commissioned in 2014.

The solution

The THIOTEQ™ technology recovers dissolved metals from liquids by the formation of pure metal sulfides. The required sulfide for this process is generated on-site and on-demand in the form of H₂S gas, avoiding the addition of sodium, which could hamper the neutralization plant performance. The H₂S is generated from elemental sulfur in a high rate bioreactor operated

at ambient temperature and pressure.

Because the bioreactor is operated "offline", i.e. bacteria are not in direct contact with the metal-containing process stream, the THIOTEQ™ technology can be applied to other metallurgical streams at different pH and temperatures. This feature enables applications

such as metal precipitation from electrolyte bleeds or from acid leaching process streams.

Recovery of zinc and removal of arsenic can also be achieved using the THIOTEQ™ technology.

The benefit

THIOTEQ™

The copper plant at PVDC was designed for the recovery of 12,000 tons per year of copper requiring around 20 tons per day H₂S, making this system the largest biological H₂S generator in operation worldwide.

The THIOTEQ™ technology is operated at 10% H₂S concentration in the rich gas. The H₂S gas is contacted with the copper containing process stream, resulting in a recovery of 99% of the metal. A high grade copper concentrate of up to 60% copper is produced.

Copper resources are recovered from process streams and given back to the miners. The recovered copper starts a journey crossing the Atlantic Ocean to smelters worldwide.

Metal resources from the Caribbean to the world!

Using the THIOTEQ™ technology, Barrick Pueblo Viejo embraces its vision of generating wealth through responsible mining by capturing the maximum value of metals in ore and minimising impact on the environment through the use of sustainable methods.