

Copper Mine, South America

Plant Performance Service helps acid pumps dissolve performance problems and generate \$10 million in revenue

Situation

Pump Modifications Reduce System Performance

A South American copper mine uses seven vertical-turbine pumps to move refino, an acid used in the extraction process. In the operation, the pumps move the refino up a nearly 600-meter mountain to the copper ore aggregate distribution nozzles.

After hiring a local pump shop to modify the pumps, their performance faltered. Operators saw flow reductions of more than 20 percent, while the pump head diminished more than 15 percent. Rated for 315 cubic meters per hour at a 745-meter head, the pumps' performance degraded to less than 249 cubic meters per hour at a 630-meter head.

Solution

Pipe-flow Modeling Shows the Need for New Parts

Calling in plant performance experts from the ITT Plant Performance Service team in Chile, mine operators soon learned that their pumps were operating at an efficiency of only 64 to 68 percent, with a potential of 82 percent. The modifications intended to improve performance were a key reason. The parts and repairs did not meet OEM specifications, creating inefficiencies that cost the organization more than \$500,000 per year in excess energy expenses.

To test theories on the mine's problem, the PPS team built a precise pipe-flow model. They used identical parallel pumps, as well as corresponding elevations, pipe fittings, valve CVs and pipe relative roughness. Measurements proved that the model was 99.8 percent accurate.

While the current piping system could accommodate a flow of 1,650 cubic meters per hour, mine planners requested specifications for a system that could provide a refino flow of 2,600 cubic meters per hour. The ITT Plant Performance Service experts also showed how changing distribution nozzles at different elevations would affect flow.



This reclaim water system at a South American copper mine employs 1300-hp pumps from ITT Goulds Pumps.

After reviewing the model, mine operators saw a need to restore their pumps to OEM specifications. They also installed alloy impellers and bowl assemblies from ITT Goulds Pumps to boost pump efficiency.

Results

Elevating Efficiency Drives Bottom-Line Benefits

Adopting the recommended improvements has helped this mining operation turn copper into gold.

- The mine is saving \$500,000 annually on energy costs.
- Increased efficiency and a higher flow rate for refino has increased mine production revenues by \$10 million.

In the future, the company plans to add four new pumps alongside the current seven to achieve its optimal flow rate.