ABB controls world newest copper mine

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ABB supplied power and automation solutions for Antofagasta's new flagship Esperanza copper mine in Chile. The solutions include three of the world's largest gearless mill drives, process and electrical control systems, power quality systems, a substation and a System 800xA integrated operations center that controls the entire production process including onshore facilities at a purpose built port 145 kilometers from the mine.

Officially opened in April 2011, Esperanza is renowned for its deployment of cutting edge technology. It is, among other things, the first large scale mine to use raw seawater in its metal producing processes the water is pumped from the coast through 145 kilometers pipeline to the mine, 2,300 meters above sea level.

Helping the mine perform at the peak of productivity and efficiency are ABB products and systems which drive the huge grinding mills, control the mine and power the purpose built port and seawater pumping station on the coast.

Esperanza has a daily throughput capacity of 97,000 tonnes of ore. After extraction in the open pit mine, the ore is crushed in a huge 40 foot semi autogenous grinding mill and two 27 foot ball mills, all three of which are driven and controlled by ABB gearless mill drive systems with a massive power output of 22.4 and 18.6 MW respectively.

When the contract for the mine's gearless mill drive systems was awarded to ABB in 2007, Esperanza was only the second mine in the world to install a SAG mill and the first to install ball mills with these capacities and power ratings. These records have subsequently been superseded by ABB at other mines but at the time they were at the technological limit of what SAG and ball mills were mechanically capable of achieving.

The gearless mill drive systems enable the grinding mills to achieve the best possible grinding results and process efficiency by adjusting the speed or direction of the mega sized mills and ensuring a constant particle size, regardless of changes in the size or hardness of the ore.

The ore is transported to and from the grinding mills by long heavy duty conveyor belts. The belt motors are driven by powerful ABB medium voltage variable speed drives, which provide dynamic control of the motors and enable soft starting and stopping of the belts, thereby saving energy and minimizing mechanical wear and tear.

After processing, the concentrate is transported through the pipeline to the port where it is thickened and stockpiled, ready for loading onto ships. An ABB 110/23 kV substation connects the site and its onshore and offshore facilities to the power grid.

A mine and ore processing plant like Esperanza consumes huge amounts of electric power, and requires power quality equipment to maintain voltage stability and a high power factor. The site's power distribution network is controlled by an ABB supervisory control and data acquisition system and is protected from destabilizing voltage spikes and harmonics-induced power losses by an ABB filter system.

One of the most impressive ABB solutions for Esperanza is the System 800xA distributed control system which integrates all the automation systems process, power distribution, gearless mill drive, motor and conveyor, pipeline and port into a common control environment and provides interfaces with the plant management and maintenance systems.

(Sourced from www.automation.com)