

Indonesia's first dual ESP for mine dewatering increases discharge by >95%, eliminating requirement for new well

A mine operator used an innovative design with two stacked electric submersible pumps (ESPs) in existing casing to tackle increasing inflow of geothermal water, avoiding drilling a new well for an additional ESP and minimizing capex.

The objective

PT. Tambang Tondano Nusajaya (TTN) operates the Araren open-pit gold mine in North Sulawesi, Indonesia. To prevent influx of hot groundwater—at temperatures up to 100 degC [212 degF]—into the pit from an underlying geothermal reservoir, the company has installed REDA ESP™ pumps (J-Series and L-Series) in seven wells, at a depth of 260 m [850 ft]. Drawdown tests and groundwater flow modeling were used to design the optimal solution, which includes Sensia variable speed drives and Phoenix xt150™ standard ESP monitoring systems for maximizing performance. Pump materials were selected to handle the mildly corrosive fluid, which may contain small amounts of H₂S. Each ESP was discharging more than 151 m³/h [950 bbl/h] into a holding pond for treatment, but as mining activity progressed, a higher discharge

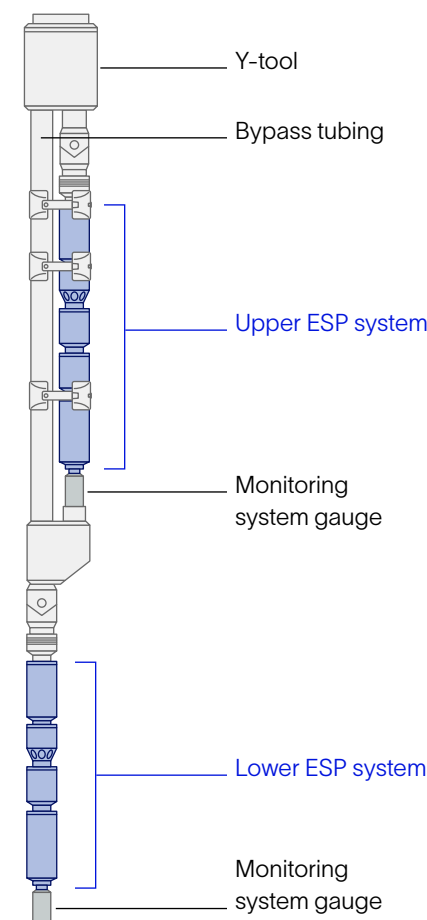


Araren open-pit gold mine in Indonesia.

rate was required. TTN wanted a cost-effective solution that would avoid drilling additional wells.

The solution

SLB proposed adding 89-mm bypass tubing and a second ESP above the existing one in each well. The new tubing connects to the lower ESP and a Y-tool joins the separate conduits from the two pumps. The upper REDA ESP pump has a smaller OD to accommodate the bypass,



Dual-ESP configuration used to increase dewatering capacity of existing well.

but it features more stages and provides a comparable discharge rate. TTN decided to trial the new solution in one well.

The results

The dual ESP nearly doubled the discharge rate to 295 m³/h [1,855 bbl/h], cost-efficiently improving pit dewatering. Because of the wide selection of REDA ESP pumps available, a dual-ESP design can be used to provide a range of discharge rates for a given casing size. Additional ESP accessories installed in downhole and surface equipment can help operators modify available ESP assets to match requirements by leveraging the maturity of integration between ESP technologies, design, and service execution.

"The SLB ESP is one of the best bore pumps we employ. If these bore pumps are put in the right place on the aquifer flow path, they can reduce long-term operating costs compared with traditional surface/line-shaft pumps because of less maintenance and more run time. Big thanks to the SLB team for making this happen!"

Marco Senduk
Dewatering Engineer
PT. Tambang Tondano Nusajaya