

ABSTRACT

The technical and economic feasibility of energy recovery, using of a reverse-running pump, has been carried out. Water flow and pressure data for an underground pressure-reducing station, at AngloGold Ashanti Mponeng mine, was used. A statistical analysis resulted in a design flow and pressure.

Turbine curves for a HPH 28-1S pump were provided by Sulzer and regression models were used to predict system performance. Variable and constant speed systems were proposed. The expected energy recovered would be 318.5 kW and 319.1 kW for the variable and constant speed systems, respectively. The discharge water temperature for both systems would be 10.32 °C.

The constant speed system was preferred since the capital cost (R 3 776 900) and payback period was lower (2.3 years), while the NPV (R 11 645 000) and IRR (42.9 %) was higher. The system should be constructed to confirm the design calculations and predicted results.