Case Study
Oil-Free Screw Compressor

Barbeton Mines (Gold mines)
South Africa

2011

Three units of oil-free screw compressors with variable speed drive (VSD) are used for the aeration of slurry reactors in a gold mining complex.

Customer Overview

Barberton first produced gold in 1886, after the discovery of the first gold nugget by Edwin Bray.
The mining complex consists of three mines: Fairview, Consort and Sheba. At present Barberton produces approximately 100,000oz of gold per annum.
Barberton Mines is the birthplace of BIOX® ('Biological Oxidation'), an environmentally friendly process of releasing the gold from the sulphide that surrounds, using organisms that perform this process naturally.
Barberton is still used as the training facility for all BIOX® plants globally.

Challenge

The process itself uses a combination of three bacteria that occur naturally, to break down the sulphide mineral matrix in the ore being treated, thus freeing the occluded gold for subsequent cyanidation. The bacteria attach themselves to the metal sulphide surfaces in the ore, resulting in the accelerated oxidation of the sulphides.
The BIOX® process involves the continuous feeding of the flotation concentrate slurry to a series of stirred reactors.
Low pH levels and a high slurry temperature enhance the efficiency of the process and it is important that these parameters are controlled within narrow ranges so as to maintain the right balance of bacteria in order to achieve the optimum rate of oxidation.
The reactors are aerated and the slurry temperature is maintained at the optimum level of 40-45ºC. As the oxidation reactions of sulphide minerals are exothermic, it is necessary to cool the tanks so as to maintain the slurry temperature within the optimum range. This is done by circulating cooling water and removing the excess heat via a cooling tower.

Solution

We propose 3 units of oil-free screw compressors with variable speed drive (VSD).

Gas : Air
Inlet pressure : 0,95 mbar abs.
Discharge pressure: 2,60 mbar abs.
Differential Pressure: 1,65 mbar g.
Inlet capacity: 2039.9 - 2870 (VSD) m^3/h
Absorbed power : 140.3 kW
Motor: 160 kW

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