

# case study

## South Africa

eMalahleni Water Reclamation Project

The eMalahleni Water Reclamation Plant - situated in the Witbank coalfields of South Africa's Mpumalanga province - has turned a major liability into a valuable asset that has created far-reaching benefits for the environment, the local community, and its feeder collieries.



The award-winning project is a public-private partnership that was jointly undertaken by Anglo Coal South Africa, BHP Billiton Energy Coal South Africa (BECSA) and the eMalahleni Local Municipality, and has been described as a “world class initiative and an exemplary model for development”.

Approximately 130 million m<sup>3</sup> of water is stored in Anglo Coal's underground workings, a figure that is rising by over 20 megalitres per day. A wide range of options to manage this water has been maximised and exhausted over a considerable period; the company therefore undertook extensive research into various treatment solutions, with desalination being one of them.

Following over a decade of research and development, Anglo Coal entered into a R300 million joint initiative with BECSA (15% water input) and a bulk supply agreement with the water stressed eMalahleni Local Municipality. The result was two competing global resource companies coming together to solve a common problem and provide a sustainable solution that benefits the communities that reside around their mining operations.

Commissioned in 2007, the plant desalinates rising underground water from Anglo Coal's Landau, Greenside and Kleinkopje collieries, as well as from BECSA's defunct South Witbank Mine. By doing so, it prevents polluted mine water from decanting into the environment and the local river system, while also alleviating serious operational and safety challenges. Using the latest in water purification technology, it is currently

desalinating record production volumes of 23 megalitres of water to potable quality per day, 18 megalitres of which is pumped directly into the municipality's reservoirs, meeting some 20% of its daily water requirements.

The plant's all-time record of 25.8 megalitres in one day was achieved in September 2008, while a weekly record of 169 megalitres and an all-time best output of 632 megalitres in one month were accomplished in August.

Additional water is piped to Greenside, Kleinkopje and Landau collieries as well as various nearby Anglo Coal service departments for domestic use and for mining activities, such as dust suppression. These operations are now self-sufficient in terms of their water requirements, which eases the serious supply problems of the local municipality.

The plant will also supply eight megalitres of potable water per day to Zondagsfontein, an Anglo Inyosi Coal greenfield project, BECSA's Klipspruit mine and the Phola coal washing plant, a joint venture between the two mining houses.

## Critical need for water

The eMalahleni Local Municipality has long grappled with supply and demand problems in catering for the water needs of an area experiencing considerable industrial, commercial and residential growth. The plant is also aiding the provincial government in meeting its Millennium Development target to ensure that no household goes without a potable, reliable and predictable water supply by the end of 2008.

Apart from benefiting the local community by supplementing the low domestic water supply, it has created a number of job opportunities. During the construction phase, between 650 and 700 temporary jobs were created, while 40 permanent positions were created for the running of the plant. Eighty-six percent of the workforce comprises Historically Disadvantaged South Africans, while 91% have been sourced from surrounding communities in an area of high unemployment.

## Enterprise development

During 2007, Anglo Zimele, Anglo American's enterprise development and empowerment arm, created a black empowered enterprise that utilises some of the plant's water for the retail bottling industry. Known as the White River Beverage Company, the business markets a brand known as 4Life to the South African bottled water market which is growing by approximately 15% per annum and enjoys a turnover of in excess of R850 million per year (US\$83 million). So far, the enterprise has created jobs for seven people. Only a very small percentage (<0.01%) of the water produced at the plant is currently bottled - hence there is considerable opportunity for growth.

## Zero waste facility

The plant operates at a 99% water recovery rate and the ultimate goal is for it to be a zero waste facility through the 100% utilisation of its by-product. The 100 tonnes of gypsum it produces daily is not only costly to dispose of, but is an environmental and post-closure liability.



Water treatment plant

Anglo Coal has launched two R16 million (US\$1.6 million) research and development projects that may offset the cost of the water treatment facility and reap further financial and environmental benefits.

The first study, which is being co-funded by the National Research Foundation's Technology and Human Resources for Industry Programme, is looking into the conversion of waste gypsum into sulphur, limestone and magnesite.

The second is investigating the by-product's use in the production of usable mining and building products. The local banking sector has been mandated by government to provide assistance in eliminating the country's massive backlog in housing, which has spurred them into seeking alternative building materials.

The boom in the construction industry has caused conventional resources such as bricks and cement to be in short supply, and has driven up the cost of housing.

As part of this study, the company has built a three-bedroom house constructed almost entirely out of gypsum-based building products.

It is currently undergoing a range of tests to prove its quality and social acceptance, and should the project be successful it is envisaged that a black empowered entity will be created to manufacture and market gypsum building products on a mass scale.

## Future developments

Anglo Coal is about to embark on phase two of the plant, which will see the facility desalinate 50 megalitres (with a maximum capacity of 60 megalitres) of water per day. It is believed this phase will be completed by mid-2010, and input from other mining companies is being considered.

The project has been designed to take into account the remaining 20-25-year life of contributing mines, and to cater for post closure liabilities which will require the desalination of mine water in excess of 30 megalitres per day. The plant will continue to run post mine closure.

## Awards & recognition

During 2007, the plant won two categories of the *Mail & Guardian's* Greening the Future Awards (innovative environmental strategies that improve business performance and water care) and the sustainability category of Nedbank Capital's Green Mining Awards. These awards seek to recognise mining and beneficiation companies for their contribution to sustainability and the environment ■