



## Progress in reducing SO<sub>2</sub> emissions at Vaal River operations

A number of additional air pollution control measures to improve operational and environmental performance and monitoring, have been implemented at Vaal River's East Gold and Acid Flotation (EGAF) plant, which facilitates gold extraction from pyrite and produces sulphuric acid (H<sub>2</sub>SO<sub>4</sub>) for the uranium leach process. This follows on the progress made in 2006, reported in the Report to Society 2006 case study.

More money is being allocated to plant repairs, added to which repair work will take place annually instead of every two years. Extensive repairs worth R15 million – R9 million more than the previous biennial shutdown of 2006 – were effected on the plant between July 2006 and August 2007. An amount of R17.5m has been budgeted for repairs in 2008. Work during the shutdown in August 2007 comprised:

- replacement of the hot heat exchanger;
- repair to the converter;
- rebuilding of the No. 2 roaster refractory lining; and
- increased sulphuric acid conversion efficiency

Since 2005, the administrative process of data capturing has been streamlined to manage information on SO<sub>2</sub> emissions while a continuous emissions monitoring system at the stack, with a dilution probe system (which gives a stack reading in parts per billion) including an SO<sub>2</sub> analyser, is in use. This assists plant personnel in controlling the plant's SO<sub>2</sub> emissions and improving its efficiency.

Ambient air quality monitoring, a key focus of the National Environmental Management: Air Quality Act, (Act 39 of 2004), is being conducted in a departure from the previous Air Pollution Prevention Act (APPA) which focused more on point source emissions rather than on the receiving environment. Modern ambient air quality monitoring equipment is being used to determine emissions. These include:

- an SO<sub>2</sub> analyser, which instantaneously measures ambient emissions;
- a meteorological (weather) station to measure meteorological parameters. The measurements are taken 10m above the surface (the recommended height for meteorological monitoring);
- a surface PM10 monitoring station to measure particulate matter; and
- an upper air meteorological station (100m above surface), to profile meteorological variations; this data will be used to calculate mixing height required in atmospheric modelling.

Vaal River has one upper and two surface meteorological stations, while West Wits has one surface meteorological station.

Says Malusi Buthelezi, AngloGold Ashanti's senior environmental co-ordinator for air quality: "Pollution disperses either horizontally or vertically, depending on the atmospheric conditions of the area," explaining that the climatology in the North West province is not conducive to the dispersion of emitted pollutants especially during the period of atmospheric stability in winter. It is therefore important to monitor emissions and ensure adherence to air quality standards.

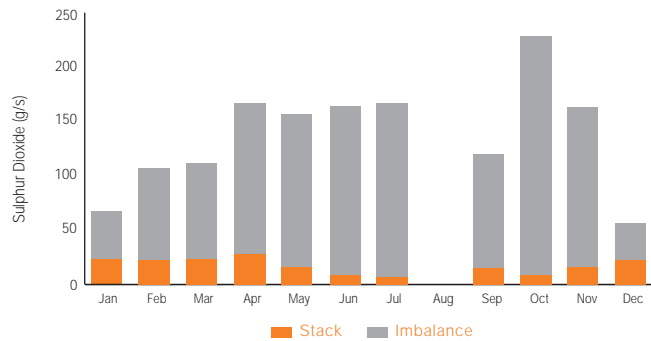
Although stack emissions (set at 40 grams per second (g/s) by the provincial air pollution officer at the time) have decreased, concern remains over the sulphur imbalance (set at 15g/s). (See graph.) Buthelezi suggests that the increasing trend up to July 2007 reflects the fact that repair work to the plant was only undertaken in August, and also points to problems associated with the current sampling programme.

Spikes in the daily average SO<sub>2</sub> exceedances during 2007 (see graph) – above the plant's guideline of 1,600ppm for stack emissions and the DEAT standard of 48ppb for ambient emissions – are attributable to the shortage of pyrite and to the plant operating at half its capacity, says Buthelezi. "A lack of this feed material in the sulphuric acid production process, as well as a lower grade pyrite, resulted in several exceedances."

# Progress in reducing SO<sub>2</sub> emissions at Vaal River operations continued

While the acid plant's SO<sub>2</sub> stack emissions have been reduced significantly since the implementation of air pollution control measures in August 2006 fugitive emissions remain a challenge. Says Buthelezi: "Our aim is to improve our sulphur accounting by implementing air pollution control measures and improving our mass balance to comply with our registration certificate and the envisaged DEAT stricter emission limits and ambient air standards." Buthelezi adds that at the same time AngloGold Ashanti will conduct dispersion modelling to better understand the dispersion potential of the plant emissions and the relationship between ambient air data and stack emissions data.

Stack emissions and sulphur imbalance  
2007



\*Sulphur imbalance: the total amount of sulphur unaccounted for by the mass balance. This could be referred to as fugitive emissions.