Mining plan at TauTona changed in the interests of safety

TauTona mine (the name means 'great lion' in seSotho) is situated in AngloGold Ashanti's West Wits region and employs some 5,500 people (including contractors). The R1.2 billion Below 120 Carbon Leader project, approved by the AngloGold Ashanti board in 2003, will take the mine to 128 level and will result in mining being carried out at 3.9 kilometres below surface, giving TauTona the edge over Savuka as the deepest operating mine in the world.

Tragically, the mine experienced 16 fatalities in the period January to December 2006, compared with four in 2005. Of these, 12 were attributable to seismic falls of ground, two to gravity-related falls of ground and the remaining two to other causes.

"Of the 12 fatalities related to seismic falls of ground, 10 resulted from three discrete seismic events, on 10 January, 3 February and 23 October 2006," says General Manager Frank Russo-Bello. The three seismic events measured 3.0, 2.6 and 2.5 respectively on the Richter scale.

"A number of employees were injured in all of these events, and many more injuries could have resulted if effective rescue procedures had not been in place," says Russo-Bello.

The mine's response to the fatalities has been multi-faceted, aligned to the various legs of the fall of ground management strategy *(See case study Fall of Ground Management at www.aga-reports.com/06/FOGM.htm)*.

"We are in the process of changing the mining method from longwall to sequential grid mining in some of our mining areas." says Russo-Bello. Sequential grid mining involves pre-development of the orebody, allowing for advance knowledge of dykes, faults or other geological features. The area currently being mined at TauTona involves intersecting a number of such features. The percentage of off-reef mining, (the measure of the amount of mining being carried out in areas containing geological features), has dropped from 18% in January this year to just over 4% in December (see graph overleaf).

The change in mine plan around the TauTona shaft pillar will initially have a negative impact on production. "But," says Russo-Bello, "that is a price we are prepared to pay in the interests of safety." AngloGold Ashanti anticipates that it will take two years to return to planned production levels at TauTona.

The mine plan around the TauTona shaft pillar has also been subject to scrutiny at industry level. A workshop with the Council for Scientific and Industrial Research (CSIR) was held on 1 November 2006.

The October 23 accident, in which five employees died, led specifically to a replanning of Tau Tona's shaft pillar mining plan. The shaft pillar is the area around the main shafts. A plan to mine them was approved by the regulatory authorities and the board in 2001.

Following the accident, mining in the area was stopped and in agreement with the mining regulators and unions a panel of experts from AngloGold Ashanti, industry and research organisations reviewed the mine designs and studied the mechanism of the event. The group concluded that both macro and micro mine designs and support methods were satisfactory. They recommended that it was necessary to improve the geotechnical mapping of workplaces in order to identify zones of geological weakness and review the construction and support of dip gullies.

"Mining near the shaft pillar is being reduced," says Russo-Bello. "The seismic events we experienced this year were not directly attributable to mining near the shaft pillar, but reducing mining activity in itself reduces the likelihood of seismic events."

TauTona is also the subject of a two-year Safety in Mines Research Advisory Committee (SIMRAC) research project, involving the collection of seismic data from areas close to the shaft pillar. TauTona has a state-of-the-art seismic monitoring network, which is able to pick up even smaller-magnitude seismic events.

Support systems in use at TauTona are considered industry best practice, and have remained essentially unchanged, making extensive use of backfill (the use of waste material, or rock integrated with timber props, to support the hangingwall after the removal of ore from a stope).

An intensive communications and behaviour-focused campaign has also been implemented. Production was halted for two full days (20 April and 2 November), and tripartite workshops, involving high-level representation from the inspectorate and the National Union of Mineworkers, were held to review the risks involved in mining each section and to draw up action plans.

TauTona's target for next year is to achieve a 25% improvement in fall of ground accidents.