

# BRINGING NEW LIFE TO OLD VEINS AT THE SUPER PIT

Australian miners have been digging gold out of the Fimiston open pit mine for more than a decade since the previous underground workings were abandoned. But thanks to today's modern drilling methods and technology, they can now extract everything they left behind.

The Fimiston open pit mine in Western Australia – commonly referred to as The Super Pit – is one of the world's largest open pit mines which, when completed, will be four km long, 1.5 km wide and 650 m deep.

Here, on the outskirts of Kalgoorlie-Boulder, about 600 km east of Perth, Kalgoorlie Consolidated Gold Mines (KCGM) produces some 850,000 ounces of gold per year.

In the past, traditional underground mining methods were used to extract much of the high grade ore in the area, but huge quantities of low grade material still remain in the so-called "haloes" around the orebodies beneath the Golden Mile.

For years, the riches in these "haloes" were considered unobtainable. But now they are being successfully mined from the surface – with advanced drilling equipment from Atlas Copco.

## Gold for gold

When KCGM started operating at the Super Pit in 2000, drilling contractor Ausdrill was awarded the blast hole drilling contract. Ausdrill

*Secoroc COP 64 Gold: Helping the miners at the Super Pit to extract valuable ore in the old workings.*



*Located on the richest square mile of gold bearing ore ever discovered, the Super Pit is 290 m deep, 3 km long and 1.5 km wide. In the next decade it is expected that mining will be conducted 600 metres below the surface.*

had been on site since 1988 presplitting, probing and carrying out grade control, using Secoroc tophammer drill steel.

KCGM wanted to increase its annual in-pit-mining rate to 82 million tonnes and Ausdrill was awarded an initial two-year contract which has since been extended.

According to Paul Jago, Drill and Blast Engineer at KCGM, Ausdrill won the contract on its combination of price, service, reliability, infrastructure and most importantly its knowledge of the site, specifically operating in and around old underground workings.

"This site offers challenges due to the previous underground workings – over 3000 km of them," he says. "Although the floor of the Super Pit is predominantly low abrasive rock, we can break into voids or hit old railway lines, timber and water pipes. These are mostly known but can still present some surprises."

Ausdrill, in turn, decided to outsource its DTH hammer and drill steel supplies. Secoroc had just released its new hammer – the COP 64 Gold in Australia and although this promised a 25% increase in penetration rate combined with extended hammer and bit life, Ausdrill awarded the initial contract to another supplier based on past relationships and site knowledge.

"When we won the first tender, Secoroc products were a bit of an unknown in the hammer and bit side of things," says Laurie Steel, Mining Manager at Ausdrill. "And although they were competitive on pricing, we felt that the product was too new."

## Pit trials decisive

In the long term, however, such a potential increase in penetration rate was hard to



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Drill and Blast Engineer  
at KCGM.

## CONTINUOUS R&D ON SITE

TOGETHER WITH AUSDRILL, Secoroc Australia monitors the performance of its products in the Super Pit to determine where it should focus its R&D efforts. As soon as the DTH supply contract was signed, a site-specific R&D programme to lower overall cost per drillmetre got under way.

With the introduction of the latest Secoroc COP 64 Gold hammers, spline wear has been reduced by increasing splines from eight to twelve, which has increased bearing surface for the transfer of rotation to the bit.

Bits with 18 mm buttons from the Premium range have also been evaluated, which has added to increased reliability and longevity. It was found that the bit's three flushing holes performed better than the two flushing holes. Drill cuttings cleared faster and cleaner which increased bit life.

The hammer featured some minor design improvements to the control tube, buffer and compression rings, which added to increase service life. Penetration rates and clearances have also improved. The new hammers and bits are



also being extended to the other rigs in the fleet.

With the new Secoroc COP 64 Gold hammers, Ausdrill expects to get to a further 6% increase in penetration and up to 20,000 metres per hammer life. In addition, at its facility in Kalgoorlie-Boulder, Secoroc Australia has two Grind Matic air and electric bit grinding machines designed for DTH bits, and a new all-air Grind Matic Manual B-DTH which reproduce the original button profiles.

Matt Harris, contract supervisor at the Super Pit, who visits the site daily, reports that the bits with 18 mm buttons are averaging six to seven regrinds which is 250-260 m per resharpen, giving an average bit life of 1,800 m.



*Ready for drilling at Super Pit: A new DTH drill bit, featuring 18 mm buttons and a 12 spline shank design.*

ignore so throughout 2001 Ausdrill conducted extensive hammer and bit trials.

During the second half of 2001, Secoroc put its 6-inch QHD (Quarry Heavy-Duty) COP 64 Gold hammers with one of its Premium range bits featuring 16mm gauge buttons into the arena. The results confirmed penetration rate increases of around 20 % and increased hammer life to 14,000 - 18,000 metres.

"At the end of the trial, Secoroc came up trumps on product performance, price and service," comments Mr Steel.

Derek Edwards, Ausdrill's Drill Supervisor, says: "The great advantage of these hammers is that the performance doesn't really drop over the life cycle, which means faster drilling and greater penetration rates are maintained."

"The hammer can take the abuse and can adapt to various drilling conditions. With a maximum operating pressure of 30 bar (430 psi) the Secoroc COP 64 Gold easily handles high-pressure DTH applications."

A sturdy polygon-shaped piston,

combined with longitudinal milled slots in the cylinder, improves guidance and airflow. While the design of the cylinder ensures the hammer will last longer as well as being more durable.

Laurie Steel sums up: "KCGM saves money because with our increased penetration rates we are using less drills in

the pit, we've gone from eight to six drills and this has led to a subsequent reduction in manning costs." Paul Jago at KCGM adds: "We're very happy with Secoroc's performance because we've picked up penetration rates and it reduces our drill fleet which reduces our cost per metre drilled." M&C 3-02



*Secoroc representative Craig Marsh (right) on one of his service rounds at the Super Pit.*