Electronics Boosts Performance and Cuts Costs at the Savannah Project

Project Summary

ELECTRONICS ACCURATELY NAVIGATES THROUGH COMPLEX BLAST GEOMETRY

When complex blast geometry and a nearby major pump station presented challenges to mining at the Savannah Project, they were delighted with controlled electronic blasting of a pivotal stope.

Mine operator Panoramic Resources' drill and blast engineering team worked closely with DynoConsult to successfully design and initiate the blast using HotShot®'s precise electronic detonator timing. This was essential for the complicated 252 hole shot over two levels, involving a combination of up and down and slashing rings initiated in four different directions.

The controlled blast succeeded in preventing any damage to pump infrastructure and resulted in improved fragmentation of the ore and less over-break.

Additional benefits included a 54% saving on rock breaking costs, reduced lost time and wear on the crusher and bogging equipment, and, most importantly, improved safety through eliminating risk to charge crews working under open brows.

The engineering team at Panoramic Resources found that with proper shot design, greatly improved fragmentation, with correspondingly less over-break, is achievable in addition to minimizing damaging ground vibration.

Background

UNDERGROUND ORE PRODUCTION

Panoramic Resources Limited is a Western Australian based nickel sulphide producer with two underground mines in Western Australia. It operates the Savannah Project 130 kilometers north of Halls Creek.

Open pit operations closed in January 2006. Ore production continued underground, in the order of 650,000 tonnes per annum. The intrusive-style orebody consists of a major lens of massive sulphide mineralization along the hanging wall contact, with minor lenses hosted in the footwall.

The main ore body was offset by the 100 fault, underneath the completed open pit and the 500 fault, which forms the base of the resource.

Project Goals

UNLOCKING THE VALUE OF THE OREBODY

The drill and blast team planned to unlock the value of the 2190_6095 stope at the mine without disturbing a major pump station and its supporting infrastructure, located only 40 metres from the stope. This pump station was critical in the management of the calculated and expected water inflow that occurs periodically in the Kimberley region.

Technology Applied

SUPERIOR TIMING ENABLES STRONG BLAST PERFORMANCE

The 2190_6095 stope was drilled out from the 2190 level, with 15 main production rings of up and down holes. This resulted in the planned stope starting under the 100 fault in the 2215m RL level and going down to the 2165m RL level where bogging of the broken ore occurred.

Initially, pyrotechnic detonators were used – in fact, for the first six firings. The blasts were successful but gave mixed results,

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Groundbreaking Performance

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with some unplanned over-break at the brow, a few 'lumps' at the draw point and a lot of oversize on the ROM. In addition, a 'ridge' had formed in the floor after firing six. Firing seven was with HotShot due to the complicated geometry of the shot and as access would be lost during the blast.

Based on previous experience, the drill and blast team were confident that this stope firing could be executed without compromising the integrity of the pump station through excessive vibration. In addition, there should be a reduction in the amount of oversize and back-break compared to the previous six blasts in this stope.

The tremendous flexibility of electronic initiation was shown when significant discrepancies were found in blasthole depths on the initial plan. The timing of stope firing was adjusted to reduce the impact on the hanging wall.

Combining experience and skills, Panoramic Resources and DynoConsult created a blast plan without any overlap of initiating times, the nearest being 4ms apart. This plan ensured vibrations at the pump station and other infrastructure were the lowest practical amount possible.

Fault finding was performed with minimal fuss despite wet and muddy conditions. The HotShot control equipment interrogated the system, so the detonators could be tested to ensure working order. This allowed rigorous testing of network integrity prior to blasting. The blast was fired from the surface where a low, evenly spaced rumble gently shook the firing point to the delight of all those assembled.

Value Added

IMPROVED SAFETY, BETTER BLASTING AND A 54% SAVING ON ROCK BREAKING COSTS

The most compelling argument for using electronics was improved safety. With pyrotechnics, charge-up operators would have been exposed twice at the brow. HotShot enabled the firing of a rise, slot and rings in one shot, aiding in removing risks to charge crews.

Panoramic Resources' production engineer Mark Shannon said, 'Electronics performed strongly, and greater precision allowed effective solutions to complex mining problems. This would not have been possible without HotShot. Broken dirt was uncommonly fine and very easy to bog. Ore fragmentation exceeded expectations. The stope brows had little overbreak, without a trace of a scat on the pump station floor.'

'We were able to demonstrate a 54% saving on rock breaking costs. ROM rock breaking had averaged 5.7 hours per day the month prior to this stope, but in the first month of the 2190_6095 stope this decreased to 5.0 hours per day. As the stope emptied, this dropped to 2.6 hours per day. Improved fragmentation from HotShot saved approximately $7000 in rock breaking costs alone.'

'The use of HotShot electronic detonators, despite the extra initial outlay for the detonators, has saved Panoramic Resources a considerable amount of money, not only for the process department, but also for the mining department due to less wear and tear on the bogging fleet.'

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