UNDERGROUND CASE STUDY

Electronics Boost Performance and Cut Costs at the Savannah Project

PROJECT SUMMARY

DELIVERING UNDERGROUND ORE PRODUCTION

Panoramic Resources Limited is a West Australian based nickel sulphide producer with two underground mines in Western Australia. It operates the Savannah Project 130 kilometres 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 ore body consists of a major lens of massive sulphide mineralisation 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 ORE BODY VALUE

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.

Personnel conducting an inspection of a fired stope.

TECHNOLOGY APPLIED

FLEXIBLE TIMING ENABLES SUPERIOR 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 for the first six firings. The blasts were successful but gave mixed results, 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 done with electronic detonators due to the complicated geometry of the shot and due to access being lost during the blast.

Based on previous experience, the drill and blast team were confident 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 electronic detonator 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.

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VALUE ADDED

ELECTRONIC DETONATORS DELIVER BETTER RESULTS

The most compelling argument for using electronics was improved safety. With pyrotechnics, charge-up operators would have been exposed twice at the brow.

The electronic detonator system 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 Dyno Nobel’s electronic detonators. 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 also 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 electronic detonators saved approximately $7000 in rock breaking costs alone.

“The use of Dyno Nobel’s 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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