

BEACONSFIELD INVESTIGATION

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Members may be interested in the outcome of the investigation undertaken following the Beaconsfield Mine disaster, in which one miner was killed, and two were trapped for an extended period of time. The following are the findings and recommendations.

1. At 9.23 pm on 25th April 2006 a mining induced seismic event of a reported magnitude of 2.3ML (local magnitude scale) caused rockfalls on, inter alia, the 915m Level and 925m Level at the Beaconsfield Gold Mine (BGM).
2. The seismic event was caused by a slip along a shear; the C-HW (hangingwall) Shear
3. The main fall of ground on the 925 Level was attributable to;
 - a. The progressive stress/strain driven degradation of the quartz ankerite reef due to HW and FW (footwall) convergence and possibly blasting,
 - b. The presence of geological structures in the immediate fall areas – both the Tasmania Shear and bedding parallel shears forming release planes and allowing increased lateral closure,
 - c. The proximity of the production brow,
 - d. The shaking associated with the incoming seismic waves generated by the 2.3ML event in the immediate hangingwall rocks adjacent to the 925 level, and,
 - e. The recommended support system (a mixture of split sets and threadbars) installed on the 925 Level in the area of the fatal FoG was unable to maintain the stability of the excavation, and the failure of the ore body extended to a depth greater than the length of the installed ground support
4. Although rockfalls that occurred in October 2005 and April 2006 occurred in approximate locations the causative seismic events originated in two different structures some distance from each other.
5. The main fall on the 925m Level killed Larry Knight and entrapped Todd Russell and Brant Webb who were working on the brow of a stoping panel.
6. s mining activity had progressed beyond a depth of 800m the pressure on the ore body in some locations commenced to exceed the inherent rock strength. In other areas of the mine, the removal of ore unclamped geological features.
7. This caused an increase in seismic activity throughout the mine and also increased the number of rock falls, especially adjacent to firing times.
8. Some miners had raised concerns about the increase in seismic activity, the removal of the crown pillar at about the 805m Level and the pillarless mining method. It should be noted that no consultant recommended or was likely to recommend that the crown pillar on the 805m Level should not be mined, but this information had not been communicated to the miners.
9. Because of inadequate communication and consultative processes within BGM, Senior management were not aware of many of the concerns raised. This was despite management's attempts and beliefs that they had appropriate systems in place.
10. Despite the good relationship between BGM and Workplace Standards Tasmania (WST) there were many rock falls in 2005-2006 that were not reported to WST. These were not rock falls that were required to be reported by virtue of s47 of the Workplace Health and Safety Act 1995. (The Act)
11. Even if the rock falls had been reported to WST because of the lack of resources then in place, I cannot conclude that any action more effective than those already undertaken by BGM would have flowed therefrom. Furthermore, even if WST had issued a notice pursuant to s38 of the Act, their concerns probably would have been alleviated by the consultants' reports referred to below.
12. 12 On 9th and 26th October 2005, there were substantial falls of ground on the 915 and 925 Levels. The fall on 26th October 2005 followed a seismic event of 2.1ML which was, to that date, the largest ever recorded at BGM These rock falls exceeded the length of ground support then in place. This event originated in the A shear to the west of the Reef Offset Zone.
13. BGM immediately ceased mining operations, notified WST, and called in a series of consultants to advise as to how these areas could be safely mined.

14. None of the consultants consulted mine workers which may have made them more aware of the miners' concerns in relation to increasing levels of rock falls. The consultants were typically on site for 2 day stints but were well aware, as were mine management, of the increase in levels of seismic activity.
15. No formal written risk assessment was undertaken prior to, during or after the consultative process. Such an approach may have highlighted the fact that no account seemed to have been taken of the possibility of the (previously thought to be benign) C-HW Shear becoming seismically active.
16. All the consultants noted that the mine would experience an increase in seismic activity, including significant events, and recommendations were made to;
 - (a) Alter the mining method in an attempt to mitigate the risk of major seismic events
 - (b) Enhance the levels of ground support to cope with increase seismic activity
 - (c) Alter the future mine design to increase pillar thicknesses from 7m to 10m in unworked areas.

However, much of the consultants' concerns seemed to be directed to the area west of the Reef Offset Zone which was known to be seismically active, and the recommended ground support installed should have been able to cope with events originating in this area.

Most recommendations were immediately adopted by BGM but the pillar thicknesses on the 915 and 925 Levels (which were part of the 940 mining block) were already in place.

No consultants suggested that the 915 and 925 Levels should not be mined 20 Despite BGM being under administration, I could find no evidence of inappropriate financial pressures upon the management of BGM.

Because of the location and magnitude of the event, I am unable to conclude that the falls of ground of 25th April 2006 would not have occurred if;

- (a) The mine design had allowed for 10m pillars beyond the 880m Level
- (b) Ground support had been installed to greater depths and
- (c) There had been a better system of communication and consultation at BGM
- (d) All rockfalls (rather than only those required to be reported) had been reported to WST.
- (e) WST had been resourced to the levels recommended in this report.

22 If BGM had in place a ground support system that was designed to withstand seismic events of a magnitude in excess of those previously recorded, there would have been a less chance of the ground support at the 925mL failing. However, since it is not possible to design a support to prevent all damage from seismicity of magnitudes of the order of $ML < 2.5$ and because of the proximity of the falls of ground to the "near centre" of the seismic event, I consider it unlikely that falls of ground could have been prevented.

23 To ensure a safer way forward for mining operations at BGM and generally in Tasmania, I make several recommendations in the body of my report, including;

- (a) installation of geotechnically engineered ground support systems, designed to contain events well in excess of magnitudes that have already been recorded or expected by appropriate modelling
- (b) that areas of high seismic risk at BGM such as the seismically active

Western Stopes be mined remotely.

- (c) An enhancement of the resources of WST most of which appear to have already been undertaken,
- (d) An adoption in Tasmania of a case for safety regime to ensure independent scrutiny of risk assessment, mine design and mining methods in Tasmanian mines
- (f) An improvement in the communication and consultative processes at BGM and the mining industry generally
- (g) The Workplace Health and Safety Act 1995 be amended to make all rock falls in mines reportable.