



MINE SAFETY INSPECTORATE

INVESTIGATION INFORMATION RELEASE

High potential incident

Incident date 6 June 2015

Event Open cut highwall failure adjacent to a public road

Location Moolarben Coal Operations – Open Cut, adjacent to Ulan-Wollar Road, Mudgee

At a glance

Regular open cut mining operations were being undertaken on the morning of 6 June, 2015 when a section of the highwall adjacent to a public road failed. There was nobody in the immediate area at the time of the slump.



Figure 1: Northern highwall adjacent to Ulan-Wollar Road showing the failure and barricading after the incident. Photographs taken by Moolarben Coal Operations.

The mine

Moolarben Coal Operations - Open Cut is operated by Moolarben Coal Pty Ltd. The mine is a large open cut operation located 45km north east of Mudgee NSW. It is owned by Moolarben Coal Mines Pty Ltd, Sojitz Moolarben Resources Pty Ltd and Kores Australia Moolarben Coal Pty Ltd..

The incident

The highwall failure occurred at 7.50 am. Nobody was injured although the failure was observed by a project supervisor (a qualified open cut examiner) who was conducting a pump inspection about 250 metres away. The area was not barricaded or isolated and there was no restriction of entry to the area.

The failure was about 160 m wide and approximately 55 m high. The highwall edge before the failure was 40 m from a public road and 12 m after the failure.

Actions post incident

The site emergency response team established road blocks on the public road as a precautionary measure immediately after the incident and local authorities were contacted.

Mine geotechnical inspections and assessments were conducted and strategies for remedial work developed.

Remedial work to stabilise the failed area and adjacent areas began, following risk management processes, and these have been completed. This included:

- fencing to secure the area in consultation with the local council
- buttressing of the immediate slip area
- backfilling of the area
- increased monitoring including continuous radar scanning of the area.

The road

The road adjacent to the mine is the Ulan-Wollar Road that runs from the Ulan Road to the village of Wollar. It is the responsibility of the Mid-West Regional Council.

On the morning of 6 June 2015, council engineers took charge of the road. The emergency road closure was made an official road closure. The council constructed a bypass road for public traffic while the mine backfilled the pit. At the completion of the backfilling the council reopened the road.

The council reported that no damage to the public road was observed either before or after the incident.

Contributing factors

A palaeochannel infill sequence of materials had been exposed during recent mining operations. It included materials that had not been identified in geological modelling. A palaeochannel is a remnant of an inactive river or stream that has been filled or buried by younger sediment.

This palaeochannel was locally deeper than previously exposed and comprised of differing lower level sediments. The increased thickness of the channel consisted of relatively loose silty sands and weaker clays which were at the base of the palaeochannel infill at the top of the coal seam. The

upper 25 m of materials were stiffer and stronger and it is believed these have caused overstressing of the clays and infill sands. Undrained pore pressure is believed to have triggered localised liquefaction and lubricated the fissures within the clays.

Figure 2: Northern highwall failure remedial works 15 June 2015.



Figure 3: Northern highwall failure remedial works 18 September 2015.



Figure 4: Northern highwall failure remedial works on 18 September 2015 showing failed area almost backfilled.



Figure 5: Northern highwall failure remedial works at 5 October 2015 showing failed area backfill completed.



The investigation

The Department of Industry, Division of Resources & Energy, Mine Safety was informed of the incident at 8.35 am on 6 June 2015. The mine also informed the local police command, Mid-Western Regional Council, Department of Planning and Environment, the Environmental Protection Agency and the Division of Resources & Energy Sustainability Unit. The mine also informed Wilpinjong Coal Mine, which is the major user of the road.

A Mine Safety inspector attended the site to review the site safety status after the incident. The inspector reviewed the road closure and discussed remediation plans for the area. Geotechnical analysis of the failure began over the weekend and a remediation plan was accepted by Mine Safety for the buttressing and support of the failed area. This remediation plan required a major change to the mining plan in order to move material in a three stage program to completely backfill the area as a priority.

A notice was placed on the mine requiring real time monitoring of the area to give an early warning of movement. All the stages of remediation were overseen by Mine Safety inspectors.

Safety observations

The mine had previously recognised potential for instability in the northern highwall. The wall design reflected this, with a change from the normal 75 degrees to 45 degrees for the palaeochannel areas, as required by the mine's Slope Stability Management Plan. The mine had implemented routine measurements of the sidewall crest and periodic face scanning for 12 months before the failure. Groundwater monitoring was undertaken as well as increased inspections by the mine's geotechnical consultant.

The change in the area of the last strip was identified during excavation and the mine organised an inspection by their geotechnical consultant. He identified an additional control of a 25 m coal buttress to be left in situ in front of the deepest areas of paleo channel material. This was put in place on 29 May 2015.

This additional control provided for increased separation for mining equipment, however it was not sufficient to prevent the failure of the highwall.

Improved monitoring of the area from 29 May 2015 would not have prevented the failure but may have assisted in ensuring that no people could have been put at risk, by isolating the area and controlling the adjacent public road. It is unlikely that monitoring would have provided for adequate warning to allow for backfilling in the area in a safe and timely manner.

The failure to detect the localised change in the palaeochannel at exploration meant that no adjustment to the wall design, or change to the mining sequence, was possible and the failure of the highwall was unable to be prevented during the mining process.

The future mine plan was reviewed and future intersections with palaeo channels were identified. A geotechnical review of mining in those areas will be completed before mining takes place. This may include more infill drilling and increased material strength testing in those areas.

About this information release

The Department of Industry as the WHS regulator for mining has issued this information to draw attention to the occurrence of a serious incident in the mining industry. The investigation may be ongoing. Further information may be published as it becomes available.

The information contained in this publication is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Department of Industry, Division of Resources & Energy, Mine Safety or the user's independent adviser.

For information about health and safety regulation on mine sites contact a mines inspector at one of our local offices:
www.resourcesandenergy.nsw.gov.au/miners-and-explorers/safety-and-health/mine-safety-offices

Issued by

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Appointed pursuant to Work Health & Safety (Mines) Act 2013