Investigation information release

Date: April 2023

LHD operator exposed to methane and carbon dioxide gas within unventilated section of underground roadway

Incident date: 13 March 2023

Event: The operator of a load haul dumper (LHD) drove into an unventilated section of underground roadway with an atmospheric accumulation of methane and carbon dioxide gas.

Location: Narrabri Mine

Overview

A worker was driving a LHD in an underground roadway on 13 March 2023 when the onboard automatic methane monitoring system shut the machine down. The monitoring system on the LHD was set to shut the LHD down when the atmospheric concentration of methane gas reached 1.25%. A concentration of 2.5% methane and 3% carbon dioxide was detected by the operator's personal gas monitor at the time. The LHD operator contacted the mine's control room and a deputy, notifying the gas exceedance. The mine then demarcated the area, degassed the roadway and investigated the incident.

No injuries were sustained because of the incident, however the potential maximum methane and carbon dioxide concentrations present in the roadway at the time the LHD entered, created a significant risk of methane ignition, or of the worker being overcome in the oxygen-depleted atmosphere.

The mine

Narrabri mine is an underground coal mine 17 kilometres south-east of Narrabri in the Gunnedah basin of NSW. Narrabri Coal Operations Pty Limited is the nominated mine operator of the mine.

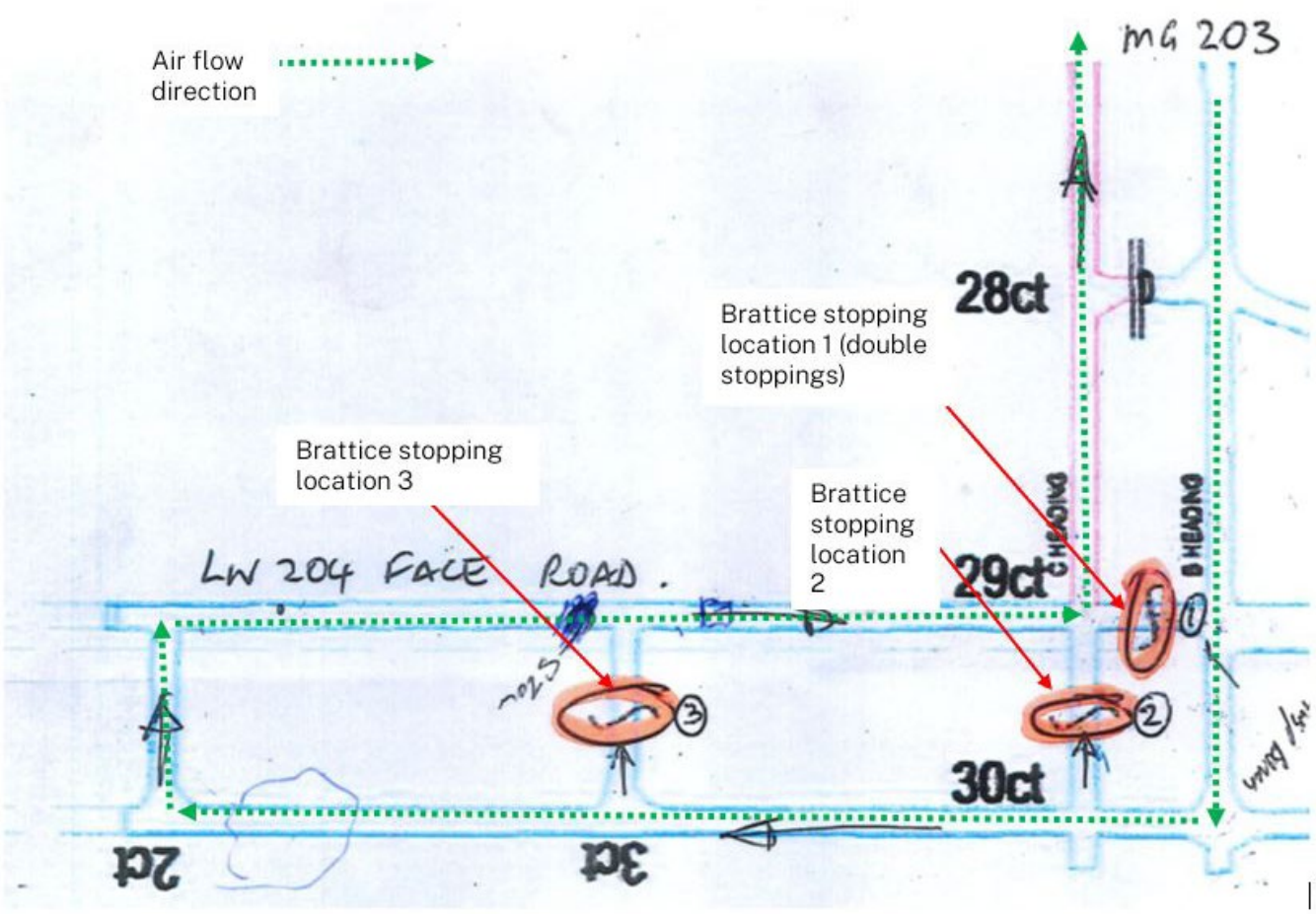
The incident

Initial inquiries by the NSW Resources Regulator revealed that the incident occurred within an underground roadway at the mine identified as the Longwall 204 Install Face. The roadway was within a district frequently accessed by workers and diesel-operated mobile plant and equipment.

To ensure the install face was adequately ventilated, the mine relied on a series of brattice stoppings used to direct and circulate airflow in a circuit as shown in figure 1 below.

About 6:30am on 13 March 2023, dayshift crews commenced work at the mine. During the shift, a contractor work crew was installing secondary support along the install face. To undertake the task, the work crew was required to take down and reinstate the brattice stoppings to transport mobile plant and equipment into and out of the area.

Figure 1 - Longwall 204 install face ventilation circuit.



Dayshift

About 8:30am, the dayshift deputy undertook a statutory inspection of the install face, observing that the double brattice stoppings between B and C headings at the 29 cut through (location 1 in figure 1) had been taken down. It was unclear how long the stoppings were not in place.

The deputy obtained gas concentration readings of the area that did not identify high levels of methane or other noxious gases. However, the deputy did not obtain a ventilation quantity reading to verify there was sufficient volume of airflow across the install face. The deputy also did not verify that the stopping at location 2 was in place and left the area without ensuring that the double brattice stoppings at location 1 were reinstated.

During dayshift no further statutory inspections were conducted at the install face to monitor the airflow volume or obtain gas concentration readings, even though contractors were working in the area to install strata support.

By around 12pm the contractor work crew had finished installing the strata support. The workers recalled that, after relocating the plant and equipment out of the area, they reinstated the stoppings at locations 1 and 2 depicted in figure 1.

Nightshift

About 9:15pm, the nightshift and afternoon shift deputies attended the install face and completed an inspection of the area. The deputies identified that the double stoppings at location 1 were not in place. The nightshift deputy reinstated one of the stoppings (closest to B heading) and obtained gas concentration readings at the area which did not identify high levels of methane or other noxious

gases. As part of the inspection the deputy did not record an airflow volume reading and did not verify that the stopping at location 2 was in place.

Around this time, the nightshift deputy made inquiries with a nearby LHD operator and fitters about who had taken the stoppings down but was unable to the identify the worker or workers who did so. The deputy reminded the workers of the requirement to reinstate the stoppings once they had passed through the area.

Both deputies left the install face shortly after to continue their inspections.

The detection of gases

About 10pm, the LHD operator returned to the install face to transport a load stowage from the area to the surface. The LHD operator removed the single brattice stopping that was in place at location 1 and entered the install face.

The LHD operator drove about 70 metres along the roadway before the loaders automatic shutdown function activated due to the detection of methane gas concentration above 1.25%.

The LHD operator also observed that his personal gas monitor's alarm had activated and detected concentrations of 2.5% methane and 3% carbon dioxide.

The response

The LHD operator exited the vehicle and attempted to improve the roadway's ventilation by reinstating the double brattice stoppings at location 1. The LHD operator then contacted the surface control room and deputy, notifying them of the plant trip and gas exceedance.

Once notified, an undermanager and deputy demarcated the area, degassed the roadway and undertook a walkthrough of the area to investigate the gas exceedance. During the walkthrough it was identified that the brattice stopping at location 2 was not in place. It is unclear how long the stopping had been taken down.

The initial inquiries

The NSW Resources Regulator's initial inquires have indicated that:

- the removal and subsequent failure to reinstate the stoppings, redirected and restricted the circulation of airflow away from sections of the install face which, over time, likely resulted in the accumulation of methane and carbon dioxide gas
- statutory inspections undertaken at the install face failed to:
  - verify all stoppings were erected and remained in place in accordance with the mine's ventilation control device plan
  - monitor the volume of airflow in the roadway to verify it was sufficient.
- Leading up to the incident, there were previous ventilation issues at the install face that were not properly investigated by the mine, including:
  - a build-up of methane gas that had not previously been a commonly encountered issue
  - an incident involving the installation of a brattice stopping that restricted the ventilation of the install face and bleeder roadways.

The investigation

The Regulator has commenced an investigation to determine the cause and circumstances of the incident, which will explore, among other things, the:

- systems of work as they relate to the management of ventilation at the mine, including the:
  - inspection and monitoring of atmospheric conditions in underground roadways
  - selection, installation and management of ventilation control devices such as air doors and brattice stoppings
- instruction, training and supervision of the workers involved, and
- adequacy of risk assessments, work instructions and procedures relevant to the incident.

The mine operator and involved contractors are assisting with the investigation. A report will be published when the investigation is concluded.

Safety observations

Mine operators and contractors are reminded of their duty to identify hazards and manage risks to health and safety in accordance with the provisions of the *Work Health and Safety Act 2011* and *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and Regulations.

In particular, operators of underground mines must:

- develop and implement an appropriate ventilation control plan that includes arrangements for inspecting, monitoring, and testing of the mines ventilation system to ensure:
  - ventilation control devices such as stoppings are appropriately installed, verified and maintained in accordance with the mine's ventilation control plan
  - the atmospheric conditions including gas concentrations and airflow volumes are regularly checked, verified, and recorded, to ensure underground areas required to be accessed by workers, plant and equipment are safe to do so
  - identified ventilation issues are appropriately reported to mine managers, recorded on statutory reports, investigated and rectified, with appropriate information communicated to oncoming managers and shift supervisors where necessary
- provide appropriate instruction and supervision to workers to ensure that brattice stoppings and other ventilation control devices required to be removed or altered during shifts, are appropriately reinstated as soon as reasonably practicable, in accordance with the mine's ventilation control plan.

Workers are reminded of their duty to take care for their own health and safety and that of their co-workers. They must also comply as far as they are reasonably able with mines' work instructions, policies and procedures to ensure worker safety and compliance with the *Work Health and Safety Act 2011* and related legislation.

In particular, workers must:

- ensure they comply with mines' ventilation control plan and associated procedures, ensuring that brattice stoppings or other ventilation devices that are required to be removed or altered during shifts are appropriately reinstated as soon as reasonably practicable.

Further information

Please refer to the following guidance materials:

- NSW Resources Regulator TRG Ventilation control plan, Guide for the development of a ventilation control plan for underground mines

- NSW Resources Regulator Compliance priority report underground coal – gas management
- NSW Resources Regulator Safety Alert SA18-04 Workers withdrawn after methane frictional ignition
- NSW Resources Regulator Safety Alert SA16-08 Workers exposed to elevated levels of methane

About this information release

The Regulator has issued this information to draw attention to the occurrence of a serious incident in the mining industry. Further information may be published as it becomes available.

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