

Portable Gas Monitors

Understanding Response Times

INCIDENT

There have been two incidents at NSW underground mines where mining officials have been exposed to potentially dangerous environments due to the delay in response times of hand-held gas monitors.

CIRCUMSTANCES

One incident occurred when an Undermanager was carrying out an inspection of a pillar panel return. He felt dizzy from an oxygen deficient atmosphere. It is believed that he entered the oxygen deficient atmosphere at a quicker rate than his gas monitor could react.

The second incident occurred when two deputies were inspecting a face road after the release of a large amount of methane. They progressed past the point where their monitors showed 1% methane intending to determine where 2% methane was present. Their gas monitor was on continuous alarm from the methane and they were focussed on the methane levels. They retreated to a safe location when the monitors showed 2% methane. Upon checking the peak readings they found the oxygen "peaks" on the gas monitors were 7.5% and 8.4%.

The methane readings may also have been depressed by the low oxygen environment. It is expected that the oxygen levels on the monitors were not representative of the atmosphere in the breathing zones of the deputies as at those levels unconsciousness would be experienced in a very short time.

INVESTIGATION

The investigation revealed that a monitor at one of the collieries had a 6 second response time for 1% methane, and a 29 second response time for 2% methane. Australian Standards allow a response time (i.e. the time taken for the sensor to reach 90% of the test gas concentration) of 30 seconds for methane (AS/NZS 60079.29.1*) and 60 seconds for toxic gas and oxygen sensors (AS/NZS 4641**).

Even at a relatively slow pace it is possible to walk at 1 metre per second. This gives a person the ability to proceed into a rapidly deteriorating environment without recognising the hazards.

The normal alarm system on gas monitors has only one alarm and this cannot be reset under certain conditions. When a mining official is proceeding into a changing environment, with the alarm sounding, and is focusing on one gas level there is the risk that they will not identify a change in another of the gases being analysed and therefore not take the appropriate actions.

RECOMMENDATIONS

Operations

- Identify the response times for each gas for all types of gas monitors in use at the mine
- Train all personnel, who are issued with gas monitors, in the response times for each gas analysed by each gas monitor they may carry.
- Determine a protocol for mining officials to use when carrying out an inspection after the first alarm has initiated. The protocol should take into account response times and the environmental conditions that may be encountered

Manufacturers/Suppliers

- Provide information to users on response times for each gas through the full range of operations of each gas monitor
- Review designs of gas monitors to minimise response times
- Review alarm system of gas monitors to provide, where practical, distinct alarms for each gas analysed.

**AS/NZS 60079.29.1 – Explosive atmospheres – Gas detectors – Performance requirements of detectors for flammable gases*

*** AS/NZS 4641 - Electrical apparatus for detection of oxygen and other gases and vapours at toxic levels - General requirements and test methods*

NOTE: Please ensure all relevant people in your organisation receive a copy of this Safety Alert, and are informed of its content and recommendations. This Safety Alert should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Signed



Rob Regan
DIRECTOR
MINE SAFETY OPERATIONS BRANCH
INDUSTRY & INVESTMENT NSW

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