

Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020

Explanatory notes for SL 2020 No. 118

made under the

Coal Mining Safety and Health Act 1999

General Outline

Short title

Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020

Authorising law

Section 282 of the *Coal Mining Safety and Health Act 1999* (the Act)

Policy objectives and the reasons for them

The objective of the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* is to clarify and improve requirements for methane monitoring, and ventilation systems in underground coal mines.

The amendments clarify or refine requirements that commenced on 6 January 2020, through the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019*; and make additional provisions to improve the risk management of methane.

The Act establishes a legislative framework with the objectives of: (a) protecting the safety and health of persons at coal mines and persons who may be affected by coal mining operations; (b) requiring that the risk of injury or illness to any person resulting from coal mining operations be at an acceptable level; and (c) providing a way of monitoring the effectiveness and administration of provisions relating to safety and health under the Act.

The *Coal Mining Safety and Health Regulation 2017* (the Regulation) supports the operation of the Act by prescribing ways of protecting the safety and health of persons at coal mines; and achieving an acceptable level of risk in particular circumstances that expose coal mine workers to risks at coal mines.

The Regulation specifies where methane detectors must be located and how methane concentrations in underground coal mines must be monitored and managed to ensure operations are at an acceptable level of risk.

Under the Act and the Regulation, if methane concentration is equal to or greater than 2.5 per cent, then the underground coal mine or part of the mine is dangerous. Coal mine workers must be withdrawn from the mine, or the part of the mine that is dangerous. The regulation also requires that, in prescribed locations and at prescribed methane concentrations, electricity to machinery must be isolated. Methane is explosive between 5 per cent and 15 per cent.

The amendments under the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* followed a program of gas management audits conducted by the Queensland Mines Inspectorate prior to 2018 and subsequent engagement with industry about the results of that audit program.

Further analysis of real time gas monitoring data from underground coal mines, by the Queensland Mines Inspectorate showed the need to update and clarify some sections of the Regulation. In particular, the amendments were intended to ensure that dangerous explosive levels of methane are not accumulating at the longwall tailgate, as measured in the longwall return roadway, during operation of the longwall equipment at the tailgate of the longwall face. Instances of inconsistent controls in respect of methane levels, particularly in longwall return airways, had been identified in the audits of underground longwall mines.

Audit outcomes showed that improved methane monitoring in longwall return airways is required to manage risk. As Queensland's underground coal mines have become deeper and production rates have increased over recent years, the concentration of methane detected in longwall return airways has been increasing in the majority of underground coal mines.

Although the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* addressed most of the relevant concerns, further refinement to methane monitoring requirements to further improve risk management practice is necessary.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* amends the Regulation to clarify, and improve minimum methane monitoring, and ventilation system risk management requirements at underground coal mines.

Some of the requirements for methane detectors are amended to be more specific based upon the location of the significant risks being monitored. Requirements are amended to be more specific for automatic methane detectors interlocked with armoured face conveyors and the longwall shearer and in longwall return airways that

intersect with a longwall face. The requirements relating to controlled ventilation are clarified, and places where it may be appropriate to use alternative risk controls to controlled ventilation are broadened.

Some of the amendments through the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* closed gaps in the Regulation where there were particular explosion risk zone (ERZ) interfaces in intake or return airways, but no requirement for visible alarms for vehicle access through boundaries. Following further consultation with industry, and review of methane monitoring data, some of the requirements for additional methane detectors that activate visible alarms are reversed or narrowed, based upon whether there is a significant risk of methane concentration exceedances at the particular interfaces. Additional methane detectors to provide visible alarms where vehicles may access are still to be located in longwall return airways, where the highest risk primarily exists.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* improves requirements to secure parts of underground coal mines where the general body concentration of methane is known to be, or likely to be, greater than 2 per cent (ERZ0) to prevent inadvertent or unauthorised access. It also corrects some recently identified technical errors relating to the required content of standard operating procedures (SOPs). The SOPs are for taking action in relation to particular methane detectors, in certain circumstances, including activation, failure in service, testing or relocation. An additional SOP is also included to apply in the rare event of a roof fall preventing immediate access to the mandatory automatic methane detector in the longwall return airway, for its repair or replacement.

The amendments also include consequential amendments to remove references to the term “abandoned workings” in any sections of the Regulation. The term “abandoned workings” was removed from places exempted from controlled ventilation and other ventilation system requirements through the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019*.

The amendments clarify and improve the effective control of methane concentrations at safe levels, at relevant significant risk locations, to improve risk management and protection for underground coal mine workers.

Achievement of policy objectives

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* achieves the policy objective of clarifying and improving requirements for methane monitoring and ventilation systems in underground coal mines.

The amendments refine the specific requirements for the placement of automatic methane detectors on armoured face conveyors and in longwall return airways. Under the current section 234A of the Regulation, the automatic methane detectors on an armoured face conveyor (AFC), respond to methane levels at the AFC tailgate drive motors. When the general body concentration of methane exceeds 2 per cent, section

234A(2)(b) of the Regulation provides that the detectors must automatically trip the electricity supply to the AFC and to all parts of the longwall shearer.

Following further analysis and consultation with industry stakeholders, it is considered there is no need to trip the electricity supply to the longwall shearer as a whole, as the ignition source and risk, in relation to the longwall shearer would be at the longwall shearer cutters.

Section 234A(2)(b) of the Regulation is amended to instead trip the electricity supply to the armoured face conveyer and the longwall shearer cutters when the concentration exceeds 2 per cent.

Section 243A of the Regulation is further refined to more precisely specify the location of the automatic methane detector. It must be located in the longwall return airway, and within 150m outbye of the corner of the tailgate block side rib line and the longwall coal face, where it can monitor the general body concentration of methane, in the longwall return airway, from the longwall face, and the goaf. This amendment is to provide more specific guidance, to ensure the automatic methane detector is placed in a location where it effectively monitors the goaf stream from the cutting zone in the return air.

The term “longwall return airway” is added to the dictionary and replaces current drafting, to reflect terminology commonly used and understood by coal mine workers.

Based upon consultation with industry stakeholders, section 243A of the Regulation is also amended to broaden the tripping requirements in the circumstances under section 243A of the Regulation, to also include tripping the electricity supply to the equipment located in the longwall return airway, rather than just the AFC and longwall shearer cutters.

The requirement for methane detectors at some prescribed ERZ locations under sections 242 and 243B of the Regulation are reversed or narrowed.

Section 242 of the Regulation is amended to remove requirements for additional detectors and visible alarms at interfaces between two parts of an underground mine where the general body concentration of methane is known to, or is likely to, range from 0.5 per cent to 2 per cent (ERZ1).

Section 243B of the Regulation is revised to only require methane detectors to activate visible alarms, in longwall return airways, where a machine can physically pass through a boundary between:

- a negligible explosion risk zone (NERZ) and the ERZ0; or
- an ERZ1 and the ERZ0; or
- a NERZ and the ERZ1; or
- an ERZ1 and another ERZ1.

Based upon a review of relevant risk, the additional methane detectors need only be located in a longwall return airway, rather than more broadly in all return airways.

Section 243B(3) of the Regulation is amended to clarify and specify that the visible alarm automatically activated by the detector must be on the intake side of the double door interface between an intake (where a vehicle accesses a door) and a longwall return airway.

The amendment of section 250 corrects recently identified technical errors. Section 250 provides for SOPs for taking action in relation to particular automatic methane detectors or methane detectors, in particular circumstances including activation, failure in service, testing or being relocated.

Section 250(1)(a) of the Regulation covers an underground coal mine having a SOP for taking action, when an automatic methane detector fitted to a machine, vehicle or plant mentioned in particular listed sections activate.

The amendment of section 250 of the Regulation also clarifies that the SOP content requirements for the particular methane detectors are mandatory.

New section 250A of the Regulation addresses a possible rare circumstance (raised by industry stakeholders) which could affect an automatic methane detector required under section 243A(2), if it is not possible to replace or repair the detector and/or its cable immediately due to a roof fall, and there is no access from either of the sides of the detector.

If this rare scenario occurs, the automatic methane detector must be replaced or repaired, as soon as practicable. The armoured face conveyor and the longwall shearer may be operated only to clear the roof fall or recover the cable subject to the conditions specified.

The ERZ controller must use a portable methane detector to continuously monitor the general body concentration of methane in the area of the roof fall. The general body concentration of methane in the area of the roof fall must be less than 1.25 per cent; and the general body concentration of methane at the longwall face and in the longwall return airway must be less than 2 per cent.

The amendment of section 287 of the Regulation confirms that a part of an underground mine being sealed is an ERZ0, in relation to type of explosion risk zone. The part becomes an ERZ0 when the part is no longer ventilated, if it has previously continued to be ventilated, for example, to continue to recover equipment.

New section 290A of the Regulation requires a relevant ERZ0 is secured, to prevent unauthorised or inadvertent access by a pedestrian, or a vehicle. The relevant ERZ0 could, for example, be secured by chains and locks, together with warning signs. A relevant ERZ0 means an ERZ0 other than an ERZ0 at the edge of a goaf area in active workings.

The amendment of section 324 of the Regulation is intended to confirm that section 324(a) refers to both normal work, and/or normal travel. The definition of normal travel is added to the section because it only applies in that section. It was previously the same definition in the dictionary, when it was referred to in more than one section.

Controlled ventilation requirements under section 344(1)(b) of the Regulation provide a way to meet the requirements of section 344(1)(a), but there may be other ways to manage the risks.

Section 344 of the Regulation is amended to clarify that controlled ventilation is not required in a heading or roadway, if control measures other than controlled ventilation, have been implemented for minimising the layering and accumulation of noxious and flammable gas, within acceptable limits.

The amendments intend to ensure that underground coal mines are safely managing the contaminants and gases mentioned in section 343(1) of the Regulation, in all relevant places other than those places exempted under section 345.

If controlled ventilation cannot be achieved in particular headings or roadways and circumstances require alternative controls, alternative control measures must be used to achieve the requirements of sections 343(1) and 344(1) of the Regulation.

Section 344(1)(d) of the Regulation is amended to require monitoring and recording of the concentration of atmospheric contaminants in each place mentioned in subsection (3)(b) where there may be alternative control measures to controlled ventilation, and not only in each place mentioned in subsection (1)(b).

Section 343 of the Regulation sets out requirements for general body concentrations of gases and contaminants, and section 344 sets out requirements for controlled ventilation or other controls to prevent layering and accumulation of noxious and flammable gases. Section 345 of the Regulation lists the parts of an underground coal mine that are exempted from the requirements of sections 343 and 344.

New subsection (d) in section 345 of the Regulation confirms that there is an exemption from sections 343 and 345, for “an area of the mine in the process of being sealed”. The exemption applies because during the process of sealing it is not possible to have controlled ventilation due to the inertisation process removing oxygen.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* removed the previous exemption from sections 343 and 344 of the Regulation, for “abandoned workings”.

The amendments of sections 61, 223, 282, 346, and 362 are consequential amendments that remove remaining references in the Regulation, to “abandoned workings”.

The amendments have particular transitional periods, to transition to the amended or additional requirements based on the level of risk being addressed by the respective amendments; whether the majority of underground coal mines already comply with the requirements; and the practical changes required.

There is a one month transitional period for the amended requirements related to the highest risks, including the automatic methane detector monitoring methane levels in

the longwall return airway, and due to it being practical for underground mines to implement within the one month period.

Amendments clarifying other amendments from the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* with existing transitional periods to 6 October 2020, have transitional periods synchronised to 6 October 2020, to provide sufficient time for new requirements to be implemented.

Amendments related to removing the risk of abandoned workings from underground coal mines, under both the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* and *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* have a one year transitional period from 3 July 2020, as some underground coal mines will need to seal these parts. The practicalities of the sealing process may require up to one year to complete.

Consistency with policy objectives of authorising law

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* is consistent with the policy objectives of the Act, to protect the safety and health of persons at coal mines, and to ensure the risk of injury or illness to any person from coal mining operations is at an acceptable level. It does this by requiring more effective monitoring of methane and through other risk controls.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* supports the management of risks to the safety of coal mine workers by ensuring methane detectors are located at appropriate places where risks are significant to effectively detect, warn of the presence of hazardous levels of methane, and if necessary trip the electricity supply. It also includes amendments to improve the risk management of methane, in certain specific circumstances.

Inconsistency with policy objectives of other legislation

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* is consistent with the policy approach to methane monitoring in safety and health legislation applying to underground coal mining in other jurisdictions.

Although the New South Wales *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* does not identify ERZs in the same way the Queensland Regulation does, it requires the monitoring and control of methane levels and the identification of hazardous zones, to ensure workers are aware of these locations and that control measures are implemented. The New South Wales regulation requires visible signals and the cutting of electricity supply if methane levels go above certain levels in hazardous zones, and that machinery used at the face is equipped with continuous methane monitors.

Benefits and costs of implementation

Under higher level coal mining safety and health obligations, underground coal mines are required to have effective methane monitoring and ventilation systems, at all appropriate locations to ensure risk to coal mine workers remains at an acceptable level. Coal mining safety and health obligations require the effective control of principal hazards in underground coal mines.

The safety and health of coal mine workers should not be jeopardised. Available technology should be used appropriately to effectively control risks to safety and health.

The effective placement of automatic methane detectors forms part of the controls necessary for the risk of a catastrophic methane gas explosion that could result in multiple fatalities or serious injuries.

While automatic methane detectors may alarm and trip the electricity supply and shut down production, the detectors do this when it is dangerous to keep operating due to methane levels, and can avert an underground coal mining explosion and loss of life or serious injury.

Consistency with fundamental legislative principles

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2020* has been drafted to be consistent with fundamental legislative principles, as defined in section 4 of the *Legislative Standards Act 1992*.

Consultation

The Construction, Forestry, Maritime, Mining and Energy Union, the Queensland Resources Council, Site Senior Executives of underground coal mines, Australian Mine Managers Association, Ventilation Officers, and the Coal Mining Safety and Health Advisory Committee were consulted.

The amendments were finalised through detailed consultation with these external stakeholders, and reflect their acceptable feedback relevant to the amendments.

The Office of Best Practice Regulation within the Queensland Productivity Commission was consulted about whether further regulatory impact analysis was required under the *Queensland Guide to Better Regulation* (guidelines). The Office of Best Practice Regulation considered that the proposed amendments are unlikely to result in significant adverse impacts and advised that further regulatory impact analysis under the guidelines is not required.