

Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019

Explanatory notes for SL 2019 No. 250

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 2019

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 2019* is to clarify and improve requirements for methane monitoring in underground coal mines. In particular in relation to automatic methane detectors in return airways that intersect with a longwall face, and on each electrically-powered tailgate drive motor on armoured face conveyors.

The Act establishes a legislative framework with the objectives of protecting the safety and health of persons at coal mines and persons who may be affected by coal mining operations; requiring that the risk of injury or illness to any person resulting from coal mining operations be at an acceptable level; and 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 workers to risks at coal mines.

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

Compliance audits by the Coal Mines Inspectorate within the Department of Natural Resources, Mines and Energy (DNRME) and analysis of real time gas monitoring data from underground coal mines have shown there is a need to update and clarify some sections of the Regulation. In particular to ensure that dangerous explosive levels of methane are not accumulating in the longwall tailgate return roadway, during operation of the longwall equipment at the longwall face.

Improved methane monitoring in longwall return airways is required. 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.

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 and coal mine workers must be withdrawn from the mine, or the part of the mine that is dangerous. Such an event is a high potential incident and the site senior executive must notify an inspector from Coal Mines Inspectorate, as soon as practicable after becoming aware of the incident. Methane is explosive between 5 per cent and 15 per cent.

Compliance audits at underground coal mines show that some mines have not been consistently reporting incidents of methane exceeding 2.5 per cent. In response, the Coal Mines Inspectorate has issued directives to require underground coal mines to appropriately place methane detectors that will stop the longwall machinery operating, should methane concentrations increase to unacceptable levels in the longwall tailgate return roadways.

Underground coal mines issued with directives have implemented additional risk controls by placing an additional automatic methane detector in the longwall tailgate return airway within 400 metres of the longwall face. At this location, the additional detector can alarm and trip in response to specified higher methane levels in the longwall tailgate return airway.

The underground coal mines have improved the effectiveness of their methane monitoring systems in this way either voluntarily, or in response to directives. The Regulation does not prescribe methane monitoring at this specific location or at some other relevant locations. Other locations for methane monitors are specified under the Regulation.

To reduce risk, the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* amends the Regulation to clarify and confirm minimum methane monitoring requirements at additional relevant locations in underground coal mines, and to require signposting of additional explosion risk zone

(ERZ) boundaries. The amendments also include record keeping of methane monitoring and methane incidents, tripping of electrical supplies to machines, and consequential amendments about actions to be taken if a methane detector activates or is non-operational.

The amendments support the effective control of methane levels at safe levels, at relevant 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 2019* achieves the policy objective of clarifying and improving requirements for methane monitoring in underground coal mines. The amendments confirm and improve requirements for the placement of automatic methane detectors in return airways and on armoured face conveyors, and the requirements for detectors in intake airways.

Under new section 243A of the Regulation, underground coal mines will be required to have at least one automatic methane detector in a return airway in a ventilation split if the return airway intersects with a longwall face. The automatic methane detector must be located within 400 metres of the intersection with the longwall face. The detector must also activate a visible alarm when the general body concentration of methane exceeds the percentage stated in the mine's principal hazard management plan (based upon the circumstances of the risk of methane at a particular mine), and trip the electricity to the armoured face conveyor and the longwall shearer cutters when the concentration exceeds 2 per cent.

Locating the automatic methane detector at this distance is intended to ensure that the impacts of dust and moisture laden air closer to the longwall face machines will not be impacting on the reliability of the sensor, in reading the concentration of methane resulting from the mixing of methane from the cutting goaf second workings and methane in the return airway. Modelling of methane monitoring data indicates that if the general body concentration of methane is reaching 2.5 per cent or above in the return airway, then the general body concentration adjacent to the tailgate end of the longwall face would probably be reaching 4.5 per cent or higher. The lower explosive level of methane is 5 per cent by volume.

Return airways are usually an ERZ0 but may in some circumstances be an ERZ1, for example, when maintenance rather than production is occurring. Under new section 243B of the Regulation, at least one methane detector must also be located in a return airway, if 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 another ERZ1 and the ERZ1, in a return airway. These detectors must automatically activate a visible alarm at each machine access, leading into the ERZ0 or ERZ1 when the general body concentration of methane detected in the return air exceeds 1 per cent, to warn of the differing methane concentrations, if a machine can physically pass through a boundary between different ERZs.

The new requirements in new sections 243A and 243B of the Regulation are in addition to requirements for return airways under section 243 of the Regulation.

Requirements for methane detectors in each intake airway at the interface between two ERZ1s have been included in section 242 of the Regulation to provide a visible warning alarm against inadvertent access through the double doors between two ERZ1s (for example from the main intake airway or travel road into a conveyor road or production district). For this reason, there is automatic activation of a visible alarm when the general body concentration of methane detected at the interface exceeds 1 per cent, but there is no automatic tripping of the electricity supply at any higher level. This requirement provides a visual alert about methane levels.

Requirements for automatic methane detectors located at the intersection between the longwall face and return airway have been clarified by changing the location from a place, at the intersection, to placement on each electrically-powered tailgate drive motor on an armoured face conveyor through new section 234A of the Regulation.

This change reflects general, current practice, as it is not practical due to the movement of the longwall machines, to have an automatic methane detector specifically located at the intersection between the longwall face and return roadway. The amendment also confirms that an automatic methane detector must be fitted to each electrically-powered tailgate drive motor on an armoured face conveyor.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* closes a gap in the Regulation, by also requiring signposting of a double door boundary between a NERZ and an ERZ0, and between two ERZ1s in an intake airway. This will assist in ensuring all workers are aware of these hazardous areas, and preventing mistaken entries into these areas with vehicles.

The amendment of section 244 of the Regulation requires an automatic methane detector at the intersection between the longwall face and an intake airway to activate a visible alarm when the general body concentration of methane detected at the intersection exceeds 1 per cent, as well as trip the electricity supply to the longwall equipment if the general body concentration of methane exceeds 2 per cent.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* also includes consequential amendments about actions to be taken if a methane detector activates or is non-operational; amendments clarifying ventilation system including controlled ventilation requirements; and record keeping requirements for seven years for methane monitoring, methane incidents, and tripping of electrical supplies to machines.

The amendments clarifying ventilation system requirements in section 343 of the Regulation, confirm that the ventilation officer must ensure a record is made of the results of monitoring the ventilation system for atmospheric contaminants and gases, and that the record is kept for seven years after it is made. The ventilation officer must also ensure a record is made of the day, time and duration of a methane event (when the general body concentration of methane exceeds 2.5 per cent), and the part of the

mine where the methane event happened. The record must be kept for seven years after the methane event happened.

Section 344 of the Regulation is amended to clarify that controlled ventilation is not required in a place that is a cut-through connected to a roadway that has controlled ventilation, if control measures other than controlled ventilation, have been implemented to minimise the layering and accumulation of noxious and flammable gas, within acceptable limits.

Controlled ventilation is also not required in a place where controlled ventilation has failed, and that is being inspected under section 307 of the Regulation to re-establish controlled ventilation. Controlled ventilation is required in each working place, whether that place be an ERZ1 or an ERZ0.

Section 345 of the Regulation is amended to clarify that the only parts of an underground mine exempted from ventilation requirements under sections 343 and 344 of the Regulation are: (a) a part sealed off from the rest of the mine workings by a type B, C, or D seal; (b) a goaf area; and (c) a place where persons are using self-contained breathing apparatus to carry out work other than normal work, unless the work is associated with a routine operation in outburst prone conditions.

The definition of automatic methane detector is amended to make clear that the concentration level of methane may be set at different levels for activating a visible alarm, compared to tripping electricity. Methane concentration exceeding a particular level is referred to in the definition, so that the use of the word “exceeds” is consistent with the wording in substantive provisions referring to automatic methane detectors.

Whilst many of the underground coal mines have already improved methane monitoring either voluntarily or following compliance action through directives by the Coal Mines Inspectorate, transitional periods are provided for the underground coal mines to transition to the additional requirements.

Consistency with policy objectives of authorising law

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* is consistent with 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 in return airways and through other risk controls such as additional signposting of ERZ boundaries.

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* improves the management of risks to safety by ensuring methane detectors are located at necessary places to effectively detect, warn of the presence of hazardous levels of methane, and if necessary trip the electricity supply.

Inconsistency with policy objectives of other legislation

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* is consistent with the policy approach to methane monitoring in other safety and health legislation applying to underground coal mining.

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

There are no significant administrative or other costs associated with implementing the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019*.

Whilst underground coal mines may have to install additional automatic methane detectors, underground coal mines are already required to use numerous automatic methane detectors at different locations and on particular plant (for example, on machinery including a longwall shearer, and a mobile bolting machine). The minimal cost of additional automatic methane detectors, and additional signposting, fulfil safety and health obligations requiring effective controls of principal hazards.

Under higher level safety and health obligations, underground coal mines should already have sufficient automatic methane detectors at all appropriate locations to ensure risk remains at an acceptable level.

The safety and health of coal mine workers should not be jeopardised. Available and relatively inexpensive technology should be used appropriately to control risks to safety and health. Automatic methane detectors control the risk of a catastrophic methane gas explosion that could cause coal mine workers to lose their lives and coal resources to be lost. Whilst 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 disaster.

Consistency with fundamental legislative principles

The *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* 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, the Mine Managers Association of Australia, site senior executives of underground coal mines and the Coal Mining Safety and Health Advisory Committee were consulted.

The amendments were finalised through consultation with these external stakeholders, and reflect their 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 lead to significant adverse impacts and advised that further regulatory impact analysis under the guidelines is not required.