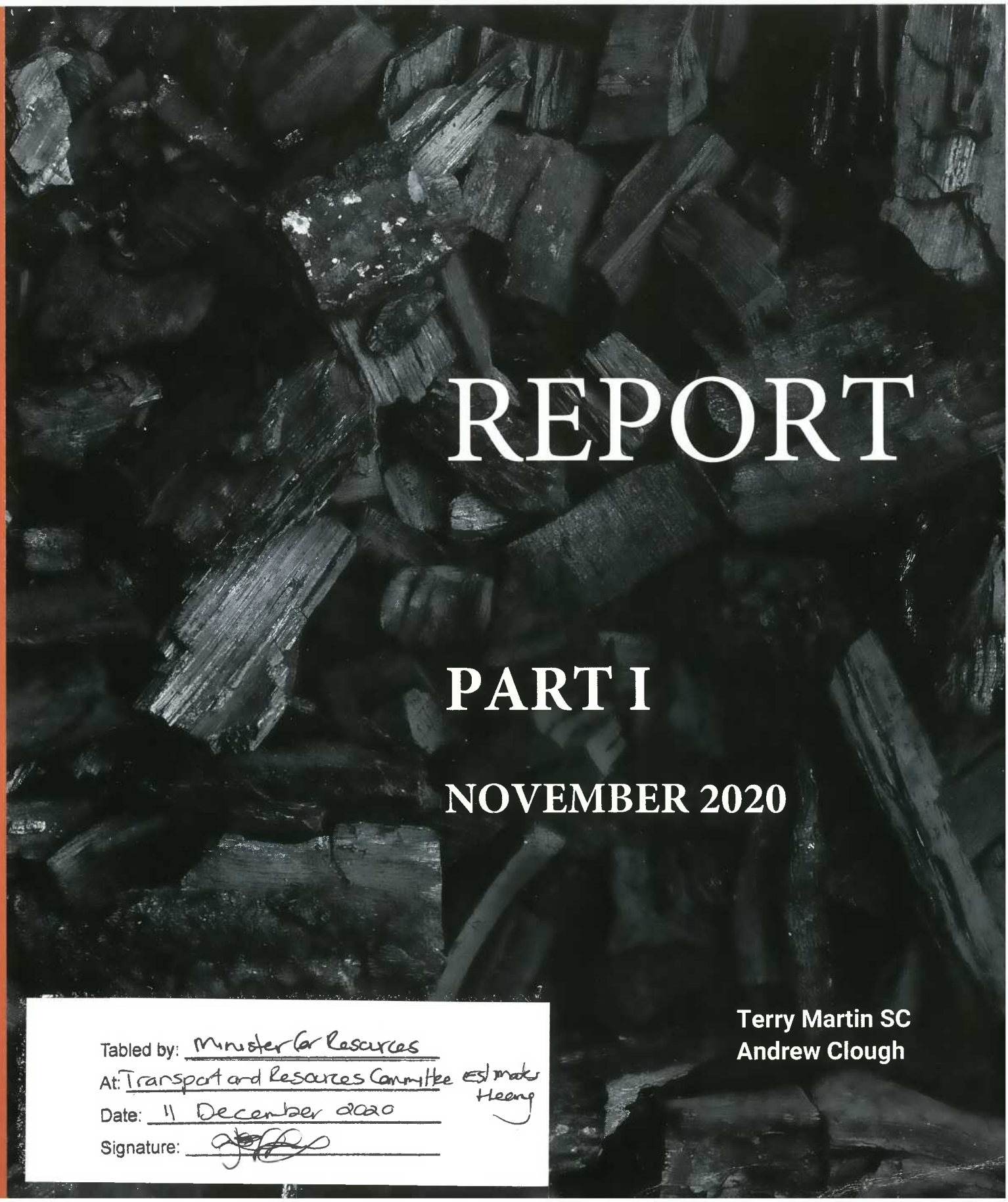
QUEENSLAND COAL MINING BOARD OF INQUIRY



REPORT

PART I

NOVEMBER 2020

Terry Martin SC
Andrew Clough

Acknowledgement of Country

We acknowledge the Aboriginal peoples and Torres Strait Islander peoples as the Traditional Owners and Custodians of this Country. We recognise and honour their ancient cultures, and their connection to land, sea and community. We pay our respects to them, their cultures, and to their Elders, past, present and emerging.

30 November 2020

The Honourable Scott Stewart MP
Minister for Natural Resources
Level 31, 1 William Street
BRISBANE QLD 4000

Dear Minister,

This Board of Inquiry was established (*Establishment of a Board of Inquiry Notice (No 01) 2020*), to inquire into a serious accident that occurred at the Anglo American Grosvenor mine on 6 May 2020 and various high potential incidents involving longwall related exceedances of methane, that occurred in the Queensland coal mining industry between 1 July 2019 and 5 May 2020, and to provide a Report of its findings.

The provision of a complete Report by the originally scheduled date of 30 November 2020 being unachievable, as explained in the Foreword, the Board now presents Part I of its Report.

Yours faithfully,

Terry Martin SC

Chairperson and Board Member

Queensland Coal Mining
Board of Inquiry

Andrew Clough

Board Member

Queensland Coal Mining
Board of Inquiry

Foreword

The Board's final report was to be provided to the Minister by 30 November 2020.

For reasons already expressed in the Board's Interim Report[1] and media releases, and again referred to in the Introduction in this document, there has been delay in inquiring into the matters concerning the Grosvenor mine. Consequently, the Board is now required to provide a report to the Minister by 31 May 2021.

Nonetheless, to ensure that relevant findings and recommendations are provided as soon as possible, the Board decided to provide the report in two parts. This document is Part I of the Report, dealing with most matters the subject of inquiry to date, and it was provided to the Minister by 30 November 2020. Completion of chapters on labour hire and the roles of the Site Safety and Health Representatives and Industry Safety and Health Representatives has been deferred pending evidence concerning the Grosvenor mine. Part II will deal with the outstanding matters and it will be provided to the Minister by 31 May 2021.

When the Board listed public hearings into the incidents at Grosvenor mine, many potential witnesses legitimately claimed privilege against self-incrimination. Under the *Coal Mining Safety and Health Act 1999* (Qld) (the Act) as presently framed, the Board does not have power to compel a witness to provide all relevant evidence to the Inquiry. Clearly enough, this seriously comprises the capacity of the Board to inquire into the nature and cause of the serious accident and the probable causes of the methane exceedances at Grosvenor mine. The absence of this power will also likely limit the effectiveness of future Boards of Inquiry.

Consequently, the Board wrote to the Minister requesting that the Act be amended so that, whilst a witness' right to claim privilege to self-incrimination is maintained, the Board also has the power to compel the witness to provide all relevant evidence in public to the Inquiry. In requesting that amendment, the Board is conscious that suitable safeguards would need to be enacted so as to afford protection against the future use of that evidence in relation to the witness.

In this part of the report, many of the recommendations are directed to the Regulator. Implementation of these recommendations would significantly increase its workload. It is necessary for the Regulator to be supplied with appropriate resources both to perform its work and to engage in a program of continuous improvement. It needs to be able to keep pace with the technological advancements in the coal mining industry sufficiently to provide effective oversight and regulation.

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[1] Queensland Coal Mining Board of Inquiry, *Interim Report*, dated 31 August 2020 <https://coalminesinquiry.qld.gov.au/wp-content/uploads/2020/09/Interim-Report-v1.1-20200831-FINAL_Redacted.pdf>.

The Board draws particular attention to the Inspectorate's difficulty in recruiting and retaining well-qualified inspectors. It has been recognised for years[2] that this problem is attributable to the level of remuneration. Compared with salaries being paid in the industry, inspectorate salaries are markedly inadequate.

A properly resourced Regulator, comprised of well-qualified personnel, is fundamental to safety in the coal mining industry.

It must finally be time to 'transform the Inspectorate into an employer of choice – an organisation that professionals in the mining industry, and in the safety and health industry, compete to be involved in'.[3]

The Brady Review[4] found that in the wake of tragedy there is likely to be increased action, vigilance and priority given to safety, but that over time that vigilance gradually decreases, and the industry begins to 'drift into failure'. With a view to preventing this drift into failure over the long term, Dr Brady recommended[5] that the mining industry as a whole should adopt the principles of High Reliability Organisational theory. This report (Chapter 6) seeks to build on that concept by advocating for critical control management as a risk management process focusing on identifying and managing the controls that are critical to the prevention of catastrophic events. It suggests a pathway for the effective implementation of critical control management as a means of moving the industry towards adoption of High Reliability Organisational theory.

This report contains substantive recommendations for the improvement of safety in Queensland coal mines. Of course, the implementation of recommendations takes time. It is hoped that, in the interests of safety, accepted recommendations will be acted upon without delay.

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[2] Queensland Ombudsman, *The Regulation of Mine Safety in Queensland: A review of the Queensland Mines Inspectorate* (2008); ACIL Tasman, New Horizon Consulting Pty Ltd, Shaw Idea Pty Ltd, *Final Report on the Queensland Mines Inspectorate Review* (2005): OCH.508.001.0001.
[3] OCH.508.001.0001, .0004.
[4] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* (2019) Queensland Department of Natural Resources, Mines and Energy, page 66.
[5] Ibid. Recommendation 6.

Table of Contents

Summary of findings and recommendations

Context will disclose that some findings and recommendations in the report will apply only to underground coal mines, but others will apply to coal mines generally.

Chapter 2 – Methane in coal mines

Findings

Finding 1

Mining at an increased depth, where higher volumes of methane are present, and increased production rates, are both features of modern longwall mining. They present complex challenges for the management of methane in underground coal mines. Notwithstanding that complexity, with the available technology, methane exceedances are not an inevitable feature of longwall mining.

Finding 2

The prescribed limits on methane concentrations under the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation) are less conservative by comparison with New South Wales and some international jurisdictions.

Finding 3

Reportable methane exceedances have genuine potential to cause permanent disabling injury or loss of life. Incident classifications at site and corporate level should recognise that potential.

Finding 4

Whilst the operational practices and management systems in existence at each of Oaky North, Moranbah North and Grasstree mines, and the corporate levels above them, were generally adequate and effective to achieve compliance with the relevant safety laws and standards in respect of methane exceedances, several points should be made:

a. the potential consequence of the methane exceedances was not properly identified at any of the mines, in that there was a failure to recognise that each had the *potential* to result in an outcome with a level 4 or 5 consequence rating;[6]

[6] Anglo American classifies an incident as level 4 when there is a 'single fatality or permanent disability' and level 5 when there are 'multiple fatalities or numerous permanent disabilities': AAMC.001.004.1472, .1482–.1483. Glencore classifies an incident as level 4 when there is a 'single incident resulting in less than 5 fatalities, or fewer than 5 cases of "permanent damage injury" or disease that results in a permanent disability' and level 5 when there are 'multiple fatalities (being 5 or more fatalities in a single incident) or multiple cases (5 or more) of "permanent damage injury" or disease that results in permanent disability': OCH.507.001.0151, .0172.

b. neither Anglo American's nor Glencore's incident classification system aligns with the definition of a high potential incident (HPI) in the *Coal Mining Safety and Health Act 1999* (Qld) (the Act);

c. Anglo's use of a classification system that included so-called 'DNRM HPIs'[7] created a sub-class of HPI that may have a tendency to diminish the perception of the seriousness of the events;

d. during the period under inquiry the documented standards and procedures in place at Anglo did not require notification of the exceedances to the Anglo American Metallurgical Coal Pty Ltd (AAMC) Chief Executive Officer (CEO);[8]

e. whilst in practice repeat HPIs (including methane exceedances) may be the subject of special attention by AAMC and Glencore Coal Assets Australia Pty Ltd (GCAA), the documented standards and procedures provided to the Inquiry do not expressly require escalation in terms of investigation and notification; and

f. the shortcomings listed in a. to e. above are particularly concerning given the prominent role of methane explosions in numerous underground coal mine accidents and disasters in this State and elsewhere.

Finding 5

It is impossible to conclude that a methane exceedance would never occur, but underground coal mining should be able to be conducted such that a methane exceedance is a rarity, and repeat occurrences are entirely unacceptable.

Finding 6

Ventilation and gas drainage are critical controls for methane management. Reportable methane exceedances ought to be treated as indicators that there may have been a failure of these controls.

Recommendations

Recommendation 1

Mine operators and parent companies regard, and action, a reportable methane exceedance as having a potential consequence of level 4 or 5 under corporate incident classification criteria.

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[7] A reference to HPIs under the legislation, 'DNRM' (the Department of Natural Resources and Mines, later the Department of Natural Resources, Mines and Energy, 'DNRME') being the regulator until 1 July 2020. The current regulator is Resources Safety and Health Queensland.

[8] The Board has been informed by way of submissions received from Anglo on 31 October 2020 in response to a draft chapter that since the commencement of the Board's inquiry the Heads of Operations, all General Managers, and Head of Legal Australia now receive a daily email recording all Departmental (DNRM/DNRME) HPIs which have occurred over the previous seven day period.

Recommendation 2

Mine operators and parent companies escalate the treatment of repeat high potential incidents of a similar nature and ensure a more rigorous investigation than for a single high potential incident. Reporting and investigation standards and procedures formally reflect this requirement.

Chapter 3 – The role of the Inspectorate

Findings

Finding 7

It would be beneficial to the industry for there to be a greater number of inspectors who hold a First Class Certificate of Competency.

Finding 8

The Inspectorate continually struggles to attract and retain inspectors, in large part because of the lower levels of remuneration for inspectors compared with positions in the industry.

Finding 9

The Inspectorate has a considerable workload, including receiving a high volume of HPI notifications, of which methane exceedances are an important proportion.[9]

Finding 10

The Inspectorate has a proper appreciation of the significance of methane HPIs in underground coal mines.

Finding 11

The Inspectorate has embraced the recommendation of the Brady Review that it play a key role in collating, analysing, identifying and proactively disseminating the lessons learned from the data it collects from the industry.

Finding 12

There have been some inefficiencies in the past in the Inspectorate's management of HPIs, particularly in the areas of information processing and management.

[9] On the data presented, methane exceedances in underground coal mines occur at the rate of approximately 100 per year: RSH.002.278.0001, .0008.

Finding 13

A program of meaningful improvement is underway involving significant steps, including:

a. streamlining the processing of actioning HPIs, by:

   i. ensuring each HPI is triaged and referred to an appropriately qualified inspector;

   ii. enhancing the use of Lotus Notes[10] (until it is replaced) to record the management of HPIs; and

   iii. requiring inspectors to record the closing out of HPIs;

b. enhancing the functionality of Lotus Notes so that an alert is raised in the case of repeat incidents and trends;

c. establishing a Central Assessment Unit for processing;

d. replacing the incident reporting function of Lotus Notes with upgraded software, with the new program accessible by the industry and Industry Safety and Health Representatives (ISHRs); and

e. establishing a Serious Accident Investigation Unit.

Finding 14

The Regulator has rightly moved away from LTIFR as a measure of safety performance and adopted the serious accident frequency rate as a measure of safety in the industry. It should regard the HPI frequency rate as being capable of providing information about reporting culture and the effectiveness of safety and health management systems at mines.

Finding 15

Critical controls associated with principal hazard management plans should be monitored and reported on by the Inspectorate. Such monitoring and reporting on critical controls would include those associated with the gas principal hazard management plan.

Recommendations

Recommendation 3

Resources Safety and Health Queensland (RSHQ), in consultation with the Public Service Commission, undertakes a review of remuneration for inspectors:

a. to ensure that such remuneration is structured to attract and retain suitably qualified and experienced persons for such positions; and

[10] Lotus Notes is a desktop application that organises and displays databases on a user's local workstation. The physical database files can be stored either on the workstation itself or on a server.

b. to provide a financial incentive for inspectors to study to obtain a First Class Certificate of Competency.

Recommendation 4

RSHQ continues to implement the three stage process for improvement in efficiency in the management of HPIs.

Recommendation 5

RSHQ continues to monitor and report the Serious Accident Frequency Rate and the HPI Frequency Rate.

Recommendation 6

RSHQ audits and reports on the proper identification and effective implementation of critical controls associated with the management of principal hazards. In particular, RSHQ focuses on the auditing of critical controls associated with the gas principal hazard management plan.

Chapter 4 – High Potential Incidents (HPIs)

Findings – the mines

Oaky North

Finding 16

The HPI was caused by the shearer cutting into a blockside stub, which affected ventilation flow at that point, allowing the goaf stream to move forward onto the face.

Finding 17

The incident was unexpected. Whilst the location of the stub was known in advance, there had been two prior instances of mining through a blockside stub on the same longwall block without causing an exceedance.

Finding 18

The event resulted from the failure to install a brattice curtain. The event was not indicative of a failure of the overall ventilation system.

Finding 19

Once the incident occurred, it was appropriately managed by a number of measures:

a. the Explosion Risk Zone (ERZ) controller attended promptly and commenced appropriate rectification to reduce the methane level within a short time;

b. the Ventilation Officer (VO) circulated relevant data to the Site Senior Executive (SSE), Underground Mine Manager (UMM) and others by email; and

c. the UMM, who was absent at the time, returned to the mine to assess the situation and implement further controls.

Finding 20

Subsequently, engineering controls, as well as altered procedures, were put in place to prevent a recurrence. The mine backfilled the stubs before mining through them.

Finding 21

Glencore did not classify the methane exceedance as a High Potential Risk Incident (HPRI) for investigation purposes.

Finding 22

The investigation and subsequent corrective actions are a good example of learning from the experience of an HPI and putting in place controls to prevent recurrence.

Moranbah North

Finding 23

The cause of the HPI was floor heave and floor breaks, allowing methane to be released from the Goonyella Middle Lower seam (GML), which was only 0.2–0.3 metres below the mined area.

Finding 24

An event of that kind had not previously been experienced on longwall 604 (LW 604).

Finding 25

Contributing factors were insufficient pre-drainage of the GML, and that the most proximate gas drainage borehole was in standby mode at the time.

Finding 26

The issue was immediately managed by redirection of ventilation using brattice sails to dilute the methane.

Finding 27

On the evidence of the Control Room Operator's (CRO) email,[11] which noted gas concentration as 'TG off scale', this methane exceedance may have risen to a point within the explosive range in the tailgate area.

Finding 28

Moranbah North management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

[11] Paragraph 4.27.

Finding 29

The gas drainage critical control failed as a result of the inadequate drainage of the GML. This incident was not indicated on the Learning from Incidents (LFI) report as a failure of a critical control.

Finding 30

With a view to minimising risk of recurrence, engineering controls were adopted:

a. for LW 604, by increasing goaf drainage through drilling additional drainage holes from the surface, to maintain 50 metre spacing; and

b. for future longwall blocks, by revising the underground in seam (UIS) strategy to ensure adequate drainage of the GML.

Finding 31

The investigation and subsequent corrective actions are a good example of learning from the experience of an HPI and putting in place engineering controls to prevent recurrence.

Grasstree HPI # 1

Finding 32

The cause of the exceedance was goaf drainage plant failure, due to a burst radiator hose on a compressor, at a time when the goaf drainage system was operating at full capacity.

Finding 33

It was plainly unacceptable from a safety and production perspective for the goaf drainage system, fundamental to safe mining, to fail for want of a radiator hose.

Finding 34

The corrective measures to increase goaf drainage capacity were effective in preventing further recurrences.

Finding 35

Grasstree management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

Finding 36

The gas drainage critical control failed as a result of the plant failure when the goaf drainage system was operating at full capacity. This incident was not indicated on the LFI report as a failure of a critical control.[12]

[12] AAMC.001.001.0675, .0679.

Finding 37

The investigation and subsequent corrective actions are a good example of learning from the experience of an HPI and putting in place engineering controls to prevent recurrence.

Grasstree HPI # 2

Finding 38

The cause of this HPI was as follows. A ventilation stopping was left in place in an inbye cut-through that connected the C heading to the goaf. The stopping prevented methane from being drawn from the goaf into the C heading. Instead, the methane reported to the tailgate area of the longwall face and was drawn down the A heading. This resulted in a methane exceedance in the tailgate area adjacent to the longwall face.

Finding 39

The immediate remedy was to run a brattice wing to enable additional air to be pushed up the tailgate roadway.

Finding 40

Subsequent to this incident, the permanent stoppings in the inbye cut-through were replaced with brattices on retreat, so that the intended ventilation circuit was achieved.

Finding 41

Grasstree management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

Finding 42

The ventilation critical control failed because the designed ventilation arrangement for clearing gas from the tailgate was not implemented. This incident was not indicated on the LFI report as a failure of a critical control.[13]

Grasstree HPI # 3

Finding 43

The HPI was caused by the shearer cutting into a blockside stub which affected ventilation flow in that area. This event, coupled with a goaf fall, allowed the goaf gases to be pushed over the tailgate drive sensor.

Finding 44

The immediate action taken was to run a brattice wing into the drill stub to direct the air up the tailgate roadway.

[13] AAMC.001.001.0810, .0814.

Finding 45

The standardised ventilation arrangement should have been in place before commencing cutting into the stub. However, once cutting into the stub commenced, it was a legitimate choice to continue advancing the face to control ground conditions.

Finding 46

The event resulted from the failure to install a brattice curtain. The event was not indicative of a failure of the overall ventilation system.

Finding 47

Grasstree management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

Grasstree HPIs # 4 – # 11

Finding 48

The eight HPIs at Grasstree involving the 0m (zero metre) TG Sensor could be viewed as a category. The Board accepts a number of propositions advanced by Mr Gavin Taylor[14] concerning them:

a. although there was more than one contributing factor, they were essentially of a recurring theme;[15]

b. given the chosen position of the sensor, there was a high likelihood of its detecting localised layering of methane;[16] and

c. a consistent and uniform system of shield advance should have been developed as a means of addressing repeated HPIs.[17]

Finding 49

As to proposition b., irrespective of whether it was general body concentration or layering, section 344 of the Regulation requires that the ventilation system must provide for minimising, within acceptable limits, layering of flammable gas. No doubt this requirement exists because ignition of a methane layer may provide a pathway for a flame to propagate to a larger adjacent explosive concentration of methane, in this case, the goaf.

Finding 50

As to proposition c., a uniform system of shield advance was in fact developed, however, it took some substantial time for it to be implemented.

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[14] Consultant; retired mine official and former Chief Inspector of Coal Mines.
[15] TGA.001.001.0001, .0011.
[16] TGA.001.001.0001, .0013 –.0014.
[17] TGA.001.001.0001, .0014.

Finding 51

There was unacceptable delay in mine management successfully communicating to workers the proper sequence of shield advance. This in turn contributed to the delay in addressing the exceedances.

Finding 52

Grasstree management did not classify any of these eight methane exceedances as an Anglo HPI for internal reporting purposes.

Inspectorate's response to HPIs

Finding 53

In accordance with the system at the time, the cluster of high potential incidents that occurred at Grasstree, involving the 0m TG sensor, was distributed amongst several inspectors rather than managed as a group. The proposed central assessment unit[18] can be expected to ensure a systematic response to such a scenario in future.

Finding 54

As discussed in the chapter dealing with the role of the Inspectorate,[19] improvements in HPI management have either already been made, or are shortly to be made, by the Inspectorate. At the time of the occurrence of the HPIs in this chapter, the Inspectorate's systems for management of HPIs needed improvement. Nonetheless, the Inspectorate's statutory function was performed, and there was no adverse consequence for safety from the manner of investigation with respect to the HPIs at these three mines.

General findings and recommendations for this chapter

Finding 55

Each HPI was investigated by the mine concerned.

Finding 56

The probable causes for the HPIs were as found by those investigations.

Finding 57

The HPIs were reported to the Inspectorate and safety representatives as required.

Finding 58

The Inspectorate investigated each HPI as required.

Finding 59

Ventilation and gas drainage are critical controls for methane management.

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[18] NPE.001.001.0001, .0008–.0009.
[19] Chapter 3.

Finding 60

In respect of the HPIs in this chapter, the combined controls of ventilation and gas drainage did not deliver the desired outcome in terms of keeping methane concentration below prescribed levels.

Finding 61

None of the HPIs in this chapter was viewed by the mines' investigation teams as involving a failure of a critical control.

Finding 62

In relation to the first exceedance at Grasstree, no spare capacity beyond the prediction of peak demand had been factored into the gas drainage plan. This was a likely contributing factor in the exceedance.

Finding 63

None of the HPIs in this chapter was classified by the mine operator or relevant parent company as an HPI (in Anglo's case) or a HPRI (in Glencore's case) for internal investigation and reporting. Anglo classified these as DNRM/DNRME HPIs.

Finding 64

In Anglo's case, there was no formal, documented process by which methane exceedances under the legislation were notified as soon as possible to the most senior executives of the parent companies.

Finding 65

The SSE at Grasstree and UMMs from all three mines gave evidence, as did VOs from Grasstree and Oaky North. Each witness presented as experienced, knowledgeable and competent, with genuinely expressed commitment to safe mining.

Recommendations

Recommendation 7

Mine operators and parent companies classify all methane exceedances at or above 2.5% concentration in the general body as HPIs for internal incident reporting purposes.

Recommendation 8

Mine operators and parent companies treat such methane exceedances as indicating that a critical control may have failed, and undertake an investigation into the performance of the relevant critical control to determine if that is so.

Recommendation 9

Mine operators and parent companies ensure that such methane exceedances are formally notified as soon as possible to senior executives of the parent company.

Recommendation 10

Mine operators and parent companies ensure adequate spare capacity in goaf drainage systems, above the predicted maximum methane emissions.

Chapter 5 – Training and competencies

Findings

Finding 66

There would be benefit to the industry if the Queensland Mines Rescue Service (QMRS) was able to provide self-escape training for all underground coal mine workers, as well as generic inductions, site-specific inductions and refresher training.

Finding 67

It would be beneficial to safety for the training scheme required by section 82(3) of the Regulation to cover the provisions of the Act and Regulation, including the safety and health obligations imposed by Part 3 of the Act.[20]

Finding 68

The person appointed to have control and management of an underground coal mine must hold a First Class Certificate of Competency.

Finding 69

It is unsatisfactory that a person appointed to have control and management of an underground coal mine in the UMM's absence holds less than a Second Class Certificate of Competency.

Finding 70

An SSE for an underground coal mine ought to hold a First Class Certificate of Competency.

Finding 71

A person appointed to act as the SSE during an SSE's absence of more than 14 days ought to hold a First or Second Class Certificate of Competency.

Finding 72

An SSE ought to be required to hold the RIIWHS601E[21] competency (Establish and maintain the WHS management system).

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[20] Section 82(3) requires that a person be trained about certain matters to the extent the matters are relevant to the duties of that person.
[21] This supersedes and is equivalent to RIIWHS601D.

Finding 73

Implementation of legislative requirements giving effect to these findings would need to be transitional to avoid disruption to mining sites.

Recommendations

Recommendation 11

The industry and the QMRS consult to determine whether it is viable for the QMRS to provide self-escape training for all underground coal mine workers, as well as generic inductions, site-specific inductions and refresher training.

Recommendation 12

RSHQ takes steps to amend the Regulation to provide that the training scheme required by section 82(3) must cover the provisions of the Act and Regulation, including the safety and health obligations imposed by Part 3 of the Act.

Recommendation 13

RSHQ takes steps to amend the Act to require that the person left in charge of an underground coal mine in the absence of the UMM must hold either a First or Second Class Certificate of Competency.

Recommendation 14

RSHQ takes steps to amend the Act to require that an SSE for an underground coal mine must be the holder of a First Class Certificate of Competency.

Recommendation 15

RSHQ takes steps to amend the Act to require that a person appointed to act as the SSE for an underground coal mine, during an SSE's absence of more than 14 days, must be the holder of a First or Second Class Certificate of Competency.

Recommendation 16

The Coal Mining Safety and Health Advisory Committee (CMSHAC) includes the RIIWHS601E competency (Establish and maintain the WHS management system) as a competency required to be held by an SSE.

Chapter 6 – Corporate governance

Findings

Finding 74

If a parent company of an operator company holds obligations under section 39 of the Act, officers of the parent company would have the obligation under section 47A of the Act to exercise due diligence to ensure that the parent company complied with its obligations under section 39. The legislation should be cast in terms that remove any doubt that this is so.

Finding 75

Reliance on lag indicators to the exclusion of lead indicators to measure safety performance is not an attribute of a High Reliability Organisation (HRO) and is likely to obscure an organisation's catastrophic risk level.

Finding 76

Safety management systems should recognise that the causative factors resulting in fatalities and catastrophic incidents are different from those that result in less significant injuries. An appropriate focus on catastrophic risk requires consideration of process safety strategies.

Finding 77

Lead indicators prompt the implementation of proactive actions designed to prevent future incidents. As such, they are important measures for the implementation of process safety strategies to prevent fatalities and catastrophic events.

Finding 78

The effective implementation of Critical Control Management (CCM) will move the industry towards adopting the principles of HRO theory, the desirability of which was recognised in the Brady Review and by Mr Mark Stone, Chief Executive of RSHQ, in his evidence.

Finding 79

Consistently with the recommendations in the 2016 ACARP Report, education and training will be required to support the effective implementation of critical control management.[22]

Finding 80

The industry should give lead safety indicators greater weight than lag safety indicators in the determination of executive bonuses.

Recommendations

Recommendation 17

RSHQ takes advice as required and, if necessary, takes steps to amend the Act to clearly reflect that a parent company holds obligations under section 39.

Recommendation 18

The industry adopts strategies and performance measures to address process safety and personal safety separately.

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[22] Hassall, M. & Joy, J., *Effective and Efficient Implementation of Critical Control Management in the Australian Coal Mining Industry by 2020* (2016) Project No. C24006 Report, Australian Coal Association Research Program (2016 ACARP Report).

Recommendation 19

RSHQ takes steps to amend the Act and Regulation to require a coal mine to develop a set of critical controls with performance criteria which must be incorporated into Principal Hazard Management Plans (PHMPs), and which require:

a. the SSE to notify the Regulator in the event of a failure of the critical control to meet its performance criteria;

b. the SSE to monitor the effectiveness of the critical controls, and report the results to the mine operator, on a monthly basis; and

c. coal mine operators to audit critical controls as part of the audit prescribed by section 41(1)(f) of the Act.

Recommendation 20

RSHQ, in consultation with the industry, advise the Minister on proposed content for a recognised standard for the implementation of critical control management, based on the International Council on Mining and Metals (ICMM) Good Practice Guide and ICMM Implementation Guideline.[23]

Recommendation 21

RSHQ audits the effectiveness and implementation of critical controls associated with a mine's PHMPs at regular intervals, and publishes the results of these audits in its Annual Safety Performance and Health Report.

Recommendation 22

The CMSHAC works with registered training organisations to include CCM in the standard risk management training packages (particularly RIIRIS601E).[24]

Recommendation 23

The industry gives lead safety indicators greater weight than lag safety indicators when measuring safety performance.

Recommendation 24

The industry gives lead safety indicators greater weight than lag safety indicators in the determination of executive bonuses.

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[23] International Council on Mining & Metals (ICMM), *Health and Safety Critical Control Management – Good Practice Guide* (2015) <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>; ICMM, *Critical Control Management – Implementation Guideline* (2015) <http://www.icmm.com/website/publications/pdfs/health-and-safety/9722.pdf>.

[24] This training package was formerly known, and referred to in the 2016 ACARP Report, as 'G3'.

Chapter 7 – Industrial Manslaughter

Findings

Finding 81

As the explanatory notes to the *Mineral and Energy Resources and Other Legislation Amendment Bill 2020* (Qld)[25] suggest, the intention of Parliament in extending industrial manslaughter provisions to the Act was to strengthen the safety culture in coal mining and to ensure consistency in how deaths of workers on work sites are treated.

Finding 82

If the Board's interpretation of the definition of employer is correct, the amendments to the Act may not reflect Parliament's intention as to who should be liable to prosecution under Part 3A of the Act.

Recommendation

Recommendation 25:

RSHQ takes advice as required, and if necessary, takes steps to amend Part 3A of the Act so that it reflects Parliament's intention with regard to:

a. strengthening the safety culture in coal mining and ensuring consistency in how deaths of workers on work sites are treated; and

b. who should be liable to prosecution.

[25] Explanatory Notes, Mineral and Energy Resources and Other Legislation Amendment Bill 2020 (Qld).

Chapter 1 - Introduction

Background to the Inquiry

1.1 Shortly before 3pm on 6 May 2020, an ignition of methane occurred at the longwall 104 (LW 104) face at the Anglo American[26] Grosvenor mine (Grosvenor). The mine is located at Moranbah in Central Queensland's Bowen Basin region. Five miners suffered extensive burns to their upper bodies and airways. They were taken to hospital in a serious condition. The mine was evacuated, and to date the Coal Mines Inspectorate (the Inspectorate) has not permitted re-entry to the underground workings of the mine.

1.2 Under section 202(1) of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act), the Minister may establish a Board of Inquiry about a serious accident or high potential incident (HPI) by gazette notice. On 11 May 2020, the Minister for Natural Resources, Mines and Energy, the Honourable Dr Anthony Lynham MP, announced the government's intention to establish a Board of Inquiry to conduct public hearings, call witnesses and make broad inquiries, findings and recommendations following this incident.[27]

The Terms of Reference

1.3 The Board was established on 22 May 2020 by the *Establishment of a Board of Inquiry Notice (No 1) 2020*. The Terms of Reference (**Appendix 1**) were specified in the gazette notice. In summary, the Terms of Reference require the Board to:

a. inquire into the serious accident of 6 May 2020, and determine its nature and cause and any material contributing factors;

b. inquire into 40 HPIs involving methane exceedances occurring in and around the longwall at four mines between 1 July 2019 and 5 May 2020;

c. assess and determine whether operational practices and management systems in existence at the mines or at corporate levels above them were adequate to achieve compliance with relevant safety laws and standards; and

d. make recommendations for improving safety and health practices and procedures and for mitigating against the risk of similar incidents in the future.

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[26] The corporate structures of Anglo American plc (Anglo) and the Anglo group of companies are explained later in this chapter at paragraphs 1.27–1.39.
[27] Media statement by The Honourable Dr Anthony Lynham, the Minister for Natural Resources, Mines and Energy, 11 May 2020 <https://statements.qld.gov.au/statements/89809>.

1.4 As outlined above, the serious accident that the Board is required to inquire into occurred at the Grosvenor mine operated by Anglo Coal (Grosvenor Management) Pty Ltd.

1.5 The 40 HPIs referred to in the Terms of Reference occurred at four coal mines as follows:

a. Grosvenor mine – 27 HPIs;

b. Grasstree mine (Grasstree), operated by Anglo Coal (Capcoal Management) Pty Ltd – 11 HPIs;

c. Moranbah North mine (Moranbah North), operated by Anglo Coal (Moranbah North Management) Pty Ltd – 1 HPI; and

d. Oaky North mine (Oaky North) operated by Oaky Creek Holdings Pty Ltd – 1 HPI.

Constitution of the Board of Inquiry

1.6 The Board was constituted by retired District Court Judge Terry Martin SC (Chairperson), and Professor Andrew Hopkins AO. On 23 June 2020, former Chief Inspector of Coal Mines, Mr Andrew Clough, replaced Professor Hopkins as a Board member.

Course of the Inquiry

1.7 The Board's ability to inquire into and determine the nature and cause of the serious accident has been necessarily delayed.

1.8 By the time the Board was established, the Inspectorate's investigation into the serious accident was underway. For this purpose, the Inspectorate had engaged, or was in the process of engaging, experts in relevant fields. It was neither practical nor possible for the Board to conduct a parallel investigation.

1.9 In response to information sought by the Board, the Chief Inspector of Coal Mines, by letter dated 6 July 2020, informed the Board that he expected expert reports in relation to the investigation of the serious accident to be available by late August.

1.10 The Board took the view that, logically, public hearings concerning the serious accident at Grosvenor should also deal with the 27 methane exceedances at that mine. They occurred at both LW 103 and LW 104. The Board considered that it was necessary to review those exceedances before the serious accident, to investigate whether a trend emerges, and if so, to determine whether or not the exceedances presaged the serious accident.

1.11 Pending the conclusion of the Inspectorate's investigation and the availability of the experts' reports, the Board could not further progress the inquiry in relation to the serious accident. This consequently affected inquiry into the Grosvenor HPIs.

1.12 In the circumstances, the Board commenced public hearings on 4 August 2020 in relation to the Terms of Reference, excluding inquiring into the nature and cause of the serious accident and the probable causes of the exceedances at Grosvenor. Evidence was heard over 13 sitting days. The first tranche of public hearings concluded on 21 August 2020.

1.13 The Terms of Reference required the Board to provide to the Minister a report about its findings and recommendations by 30 November 2020. With that requirement in mind, on 21 August 2020, notwithstanding that at that time the Board had not received any reports in relation to the serious accident, the Board set down public hearings into the serious accident and methane exceedances at Grosvenor, to commence on 15 September 2020.

1.14 It was intended to firstly inquire into the 27 methane exceedances at Grosvenor. It was anticipated that by the conclusion of those investigations, the Inquiry would be in a position to call expert evidence into the serious accident. However, two issues emerged.

1.15 Firstly, on 24 August 2020, Counsel Assisting forwarded to the solicitors for Anglo a list of potential witnesses for the hearings into the serious accident and methane exceedances at Grosvenor. In late August, the Board was advised of the prospect of claims of privilege against self-incrimination by many of the witnesses. The Board then wrote to the Minister requesting an amendment of the Act so that suitable safeguards would be enacted to afford protection against the future use of evidence provided in public to the Inquiry.

1.16 Secondly, it became apparent that the main body of expert evidence relating to the serious accident would not be available to the Board until later in the year.

1.17 In light of these events, the Minister granted an extension of the Inquiry until 31 May 2021.[28]

1.18 Accordingly, the Board decided that it would not hear evidence about the HPIs and serious accident at Grosvenor until the conclusion of the Inspectorate's investigation and a decision by the Work Health and Safety Prosecutor about criminal prosecutions, if any, arising from those events.

1.19 With the acquiescence of the Minister, the Board decided to provide the Report in two parts to ensure that the findings and recommendations arising out of the Board's work to date would be provided to the Minister as soon as possible.

1.20 On 7 October 2020, the Board, Counsel Assisting and Inquiry team members travelled to Moranbah where inspections were conducted by the Board and Counsel

[28] *Amendment of Establishment of a Board of Inquiry Notice (No 02) 2020* in Queensland, *Government Gazette: Extraordinary,* No. 11, 17 September 2020, Volume 385, page 45.

Assisting of the surface infrastructure at Grosvenor and the underground workings at Moranbah North. Inquiry team members inspected the workings at Oaky North.

1.21 The Board is grateful to those mines for facilitating the visits and generously accommodating the disruption to work that was occasioned by them.

Industry overview

1.22 The first discovery of coal in Queensland, and the establishment of Queensland's first coal mine 16 years later, are noted in the article, *Brief History of the Coal Mining Industry in Queensland*:[29]

> *The first reported discovery of coal in what is now the State of Queensland was made by Captain Logan of the Moreton Bay Settlement at Limestone near Ipswich on 8th June 1827.*
>
> *From that date nothing further is to be found in contemporary records until 1843 when it is recorded that John Williams opened the first mine in Queensland in that year on the south bank of the Brisbane River above Goodna.*

1.23 The same article notes that:[30]

> *The earliest record of production of coal in the State is in 1860 when 12,327 tons were reported as being won from the Ipswich field.*

1.24 Mining has since become Queensland's most valuable industry, ahead of construction and tourism.[31] Currently, there are 63 active coal mines in Queensland. Of these, 12 are underground mines and the remainder are open-cut. The industry supports approximately 37,290 coal mine workers. Approximately 50% are employees and 50% are contractors and labour hire workers.[32]

1.25 A recent Queensland Treasury publication, *A Study of Long-Term Global Demand* (September 2020), comments that '[c]oal has historically formed a major component of the State's mining industry'.[33] It gives the following overview of the value of the mining industry to Queensland's economy:[34]

- *Mining accounted for $47.9 billion of economic output in Queensland in 2018-19, with the majority of this activity attributed to coal mining. Coal mining also supports activity in other sectors of the economy through the*

[29] Dunne, E.F., *Brief History of the Coal Mining Industry in Queensland,* Journal of the Royal Historical Society of Queensland volume 4 issue 3: pages 313-339, at 320-321.
[30] Ibid. page 319.
[31] Queensland Government, 'About the Queensland economy' (Web Page, October 2020) <https://www.treasury.qld.gov.au/queenslands-economy/about-the-queensland-economy/>.
[32] SMA.001.001.0001.
[33] Queensland Treasury, '*A Study of Long-Term Global Coal Demand*' (Report, September 2020) <https://www.treasury.qld.gov.au/resource/a-study-of-long-term-global-coal-demand/>, page 2.
[34] Ibid. page 3.

flow on demand for inputs and other goods and services, particularly in regions in which coal mining is based.

- *Queensland produced 251.2 million tonnes (Mt) of saleable coal in 2018-19, comprising around 62% metallurgical coal and 38% thermal coal. Close to 90% of Queensland coal is exported overseas, with the State's key export markets for both metallurgical coal and thermal coal including China, India, Japan and Korea.*

1.26 In 2018-2019, coal accounted for 64% of the value of Queensland's mining exports.[35]

The relevant companies

1.27 Each of the mines' operating companies fits within a larger corporate structure that includes a parent company and other related entities.

The Anglo group of companies

1.28 The ultimate parent company in the Anglo Group of companies is Anglo American plc[36] (Anglo). Anglo is a global mining company with operations in several countries including Australia. It produces a variety of commodities under various divisions, one of which is 'Bulk Commodities and Other Materials'. The Anglo American Metallurgical Coal business (MetCoal) sits in this division.[37]

1.29 Mr Seamus French is the Chief Executive Officer (CEO) of Bulk Commodities and Other Minerals. He reports to Mr Mark Cutifani, the CEO of Anglo.

1.30 Since April 2018, Mr Tyler Mitchelson has been the Chief Executive Officer (CEO) of Anglo American Metallurgical Coal Pty Ltd (AAMC), which is based in Brisbane.[38]

1.31 During the period under inquiry, officers reporting to Mr Mitchelson included, but were not limited to:

a. Head of Technical, Mr Luca Rocchi;

b. Head of Human Resources, Mr Warwick Jones;

c. Acting Head of Safety and Health, Mr Chris Gately;

d. Head of Underground Operations, Mr Glen Britton;[39] and

e. Head of Finance and Business, Mr Adriaan Esterhuizen.

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[35] Ibid. page 4.
[36] The definition of plc is 'public liability company'.
[37] AAMC.100.002.0001.
[38] MTY.001.002.0001, .0004.
[39] The Board understands that Mr Britton recently retired.

1.32 Each of Grosvenor, Grasstree and Moranbah North is managed by a General Manager who reports to the Head of Underground Operations.

1.33 The General Manager of each of these mines also holds the statutory position of Site Senior Executive (SSE). During the period under inquiry, those SSEs were:

a. Mr Trent Griffiths (Grosvenor);

b. Mr Damien Wynn (Grasstree); and

c. Mr Paul Stephan (Moranbah North).

1.34 Each of Mr Griffiths, Mr Wynn and Mr Stephan was also a director of the operating company of their respective mines.[40]

The Glencore group of companies

1.35 The ultimate holding company in the Glencore group of companies is Glencore plc (Glencore). Oaky Creek Holdings Pty Ltd is a wholly owned subsidiary of Glencore.[41]

1.36 Glencore is a global natural resource company operating in over 35 countries. It is organised into a number of commodity divisions. Its Australian coal business is managed by Glencore Coal Assets Australia Pty Ltd (GCAA).[42]

1.37 Mr Ian Cribb is the Chief Operating Officer of GCAA.

1.38 Officers reporting to Mr Cribb include the Director of Underground Operations, Mr Darren Nicholls, who has oversight of Oaky North, amongst other GCAA underground operations.[43]

1.39 Oaky North is managed by a General Manager, Mr Matthew Way, who reports to Mr Nicholls. Unlike at the Anglo mines, Mr Way is not also the SSE at Oaky North. At the time of the HPI at Oaky North, the SSE was Mr Bradley Watson. Mr Watson was not a director of the mine's operating company.

Coal Mining Safety and Health Act and Regulation – Overview

History

1.40 Amongst the first mining safety legislation in Australia was the *Coal Fields Regulation Act of 1862*, introduced in New South Wales on 20 December 1862. This Act prescribed 13 years as the minimum age for working underground. It contained

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[40] Australian Securities and Investment Commissions (ASIC) Current Company Extract, Name: Anglo Coal (Grosvenor Management) Pty Ltd, ACN: 153 794 122; ASIC Current Company Extract, Anglo Coal (Capcoal Management) Pty Limited, ACN: 010 037 564; ASIC Current Company Extract, Name: Anglo Coal (Moranbah North Management) Pty Limited, ACN: 069 603 587.
[41] OCH.507.002.0001, .0002.
[42] OCH.507.002.0001, .0002.
[43] OCH.507.002.0001, .0013.

other general safety provisions for access to mines, ventilation, machinery management and the practice of mining. Many of the safety provisions contained in this legislation appear to have been developed in response to the Hartley Colliery disaster in England, in particular the rules which specified the requirements for access to the mine and the need for two distinct access shafts for miners working underground.

1.41 The *Mines Regulation Act* was enacted in Queensland in 1910. After the Mount Mulligan disaster of 1921 in which 75 boys and men were killed, a Royal Commission was conducted. A significant consequence of the Royal Commission was the introduction of the *Coal Mining Act 1925* (Qld) which remained in force until 2001.[44]

1.42 Following a series of coal mine disasters in the 1980s and early 1990s in Australia, a trend away from a prescriptive to a risk-based legislative framework gathered significant momentum. In Queensland, two mine safety Acts built on the risk-based approach were introduced in 1999; one for coal mines and one for metalliferous mines.[45]

Development of the current legislation

1.43 In its report on the accident at Moura (No 2) underground mine on 7 August 1994, in which 11 workers lost their lives, the Warden's Inquiry said:[46]

> *The Inquiry recognises the need for and supports a revision of the existing Coal Mining Act and the regulations pertaining thereto. It further accepts that the revision needs to be a major one inculcating, as appears to be intended, fundamentally different philosophies and approaches in both its formulation and implementation.*

[44] The Mining Acts, 1898 to 1967 <https://media.sclqld.org.au/documents/digitisation/v13_pp15-98_Mining-Part%202_Mining%20Acts,%201898%20to%201967.pdf>.
[45] Clough, A., *Mining Legislation – The Queensland Perspective* (2015), University of Wollongong, page 24; The Acts introduced in 1999 were the *Coal Mining Safety and Health Act 1999* (Qld) and the *Mining and Quarrying Safety and Health Act 1999* (Qld).
[46] Windridge, F., *Report on Accident at Moura No 2 underground Mine on Sunday 7 August 1994*, Report of the Warden's Inquiry, page 74 <https://www.publications.qld.gov.au/dataset/moura-mining-disaster-inquiry-reports/resource/a8e96409-52a3-4075-b4a6-b1224ecc8e63>.

1.44 The *Coal Mining Safety and Health Act 1999* (Qld) (the Act) was the product of an extensive tripartite process involving government, the industry and the unions in the years after the Moura (No 2) accident.[47] In contrast to the *Coal Mining Act 1925* (Qld), the legislative model of the Act is risk-based. When giving an overview of the legislative model, CEO[48] of the Regulator, Resources Safety and Health Queensland (RSHQ), Mr Mark Stone, explained the rationale for risk-based legislation:[49]

> …
>
> *9. The legislature made a conscious decision to move away from prescriptive mining legislation to risk-based legislation, in recognition of the fact that modern safety management focuses on creating a concept of 'on-site ownership' of safety and health issues. Mining companies have specialist expertise in the local conditions of their own mine and are in the best position to manage risk to ensure that it remains at all times at an acceptable level. This approach is in keeping with the recommendation in the Moura No 2 Inquiry that duty of care principles should be included in coal mining legislation, and has been recognised as 'best practice' in the Royal Commission into the Pike River Coal Mine Tragedy.*
>
> …
>
> *11. Central to the framework of the risk based legislation is the control and management of risk. A key requirement of the legislation is that mining operations must be carried out so that the level of risk is at an* acceptable level. *This means that risk must be within acceptable limits, and as low as reasonably achievable.*
>
> *12. The Act is supported by the Coal Mining Safety and Health Regulation 2017 (Qld) (Regulation). The Act and Regulation is supplemented by recognised standards which state ways to achieve an acceptable level of risk, and guidance notes which are issued to assist operators meet their safety and health obligations.*

[47] SMA.001.001.0001, .0003.
[48] Mr Stone was the Acting CEO of RSHQ from 1 July 2020 until 27 August 2020, at which time he was appointed permanently to the role. Throughout this report he will be referred to as the CEO.
[49] SMA.001.001.0001, .0002–.0003.

1.45 Notwithstanding the risk-based focus of the Act, international practice accepts the need for prescription in certain areas, including, relevantly for the Inquiry, setting the upper limits of permissible methane concentrations in mine airways. The United Nations publication '*Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines*' (the United Nations Best Practice Guidance) states:[50]

> *Prescriptive regulations should be used sparingly, as they can stifle innovation... They are justified by physical imperatives such as the explosive range of flammable mine gases in air. All coal mining countries set upper limits of permissible methane or flammable gas concentrations that should not be exceeded in mine airways.*

1.46 The legislative regime in Queensland with regards to the permissible levels of methane concentrations in underground coal mines is considered in Chapter 2.

[50] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, page 34. The United Nations Best Practice Guidance is produced by the UN Economic Commission for Europe (UNECE) and is drafted by a technical experts panel comprising globally renowned experts in underground ventilation and methane drainage at coal mines. It contains a broad set of principles intended to provide guidance on the design and implementation of safe, effective methane capture and control in underground coal mines, with the aim of encouraging safer mining practices to reduce fatalities, injuries and property losses associated with methane.

Chapter 2 - Methane in coal mines

Introduction

2.1 Methane-rich gases occur naturally in coal seams and generally contain between 80% and 95% methane. Cutting into the coal seam releases those gases. Methane is potentially explosive when found at concentrations between about 5% and 15% in air.[51]

2.2 Since underground coal mining began, methane explosions have resulted in many multiple fatality events in Australia and elsewhere. A list of such events that have occurred in Australia and New Zealand in the last fifty years is contained in the *Principal Hazard Management Plan (PHMP) for Explosions* at Grosvenor mine (Grosvenor):[52]

Mine	Date	Outcome
Blakefield South	2011	Nil killed (55 men at risk) - Gas explosion and fire
Pike River	2010	29 men killed – Gas explosion
Moura No.2	1994	11 men died - Spontaneous Combustion resulting in Gas Explosion, and Secondary Explosion 2 days later
Moura No.4	1986	12 men died – Gas explosion
Appin	1979	14 men died – Gas explosion
Kianaga (Moura)	1975	13 men died – Spontaneous Combustion resulting in gas explosion
Box Flat (Ipswich)	1972	17 men died – Small fire started by Spontaneous Combustion developed into a major fire, resulting in an explosion

Figure 1: An extract from the Grosvenor PHMP for Explosions

2.3 The United Nations Best Practice Guidance recognises that '[t]he presence of methane in coal mines presents a serious safety concern that needs to be managed professionally and effectively'.[53]

[51] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, pages 31-32; see also RSH.002.415.0001, .0003.
[52] AGM.002.001.0385, .0387.
[53] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, page 25.

The role of ventilation and gas drainage

2.4 Witnesses who gave evidence to the Inquiry recognised that ventilation and gas drainage were each 'critical controls' in the management of methane.[54]

2.5 In their work *Ventilation and Gas Management – Underground Coal Mines*,[55] Robertson and Self emphasised the importance of the planning and designing of ventilation and gas drainage systems:

a. *ventilation and gas drainage are fundamental services that are critical to support safe and cost effective mining and therefore must be designed so as to deliver reliable outcomes;*[56] and

b. *gas drainage planning must interact effectively with ventilation planning to ensure that risks associated with gas hazards are controlled effectively and efficiently.*[57]

2.6 The same authors also said:[58]

> *The basic objective of an underground ventilation system is to provide airflows in sufficient quantity and quality to dilute contaminants to safe concentrations in all parts of the facility where personnel are required to work or travel. For coal mines, the dilution focus is on controlling levels of gases, dust and heat.*

2.7 However, a balance must be struck with ventilation flow. As Mr Gavin Taylor[59] explained in a statement to the Inquiry, it is necessary to ensure that ventilation flow is not so great as to cause coal dust to remain in suspension, nor to flush methane gas from the goaf. Mr Taylor said:[60]

> *Effective ventilation is primarily driven by pressure, that pressure being produced by the main ventilation fan/s or auxiliary fans either underground or on the surface. Balance of the pressures developed is essential to ensure the pressure gradient across the face is high enough to cause ventilation flow but not high enough to have velocities so high to cause whatever dust is generated by the coal being cut to be maintained in suspension (usually kept below 4 metres/second) or causing the gasses in the goaf to move out of the goaf primarily at the tail gate end of the face.*

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[54] Chief Inspector Newman: TRA.500.001.0001, .0052, line 39–41; RIOM Smith: TRA.500.001.0001, .0090, line 25–33; Mr Schiefelbein: TRA.500.002.0001, .0081, line 16–18.
[55] Robertson, R. & Self, A., *Ventilation and Gas Management - Underground Coal Mines* (2019), Project No. C25001 Report, Australian Coal Association Research Program.
[56] Ibid. page 8.
[57] Ibid. page 31.
[58] Ibid. page 12 (reference omitted).
[59] Consultant, retired mine official and former Chief Inspector of Coal Mines, Queensland.
[60] TGA.001.001.0001, .0003.

2.8 There are two principal types of gas drainage:[61]

a. *pre-drainage systems, where some of the gas in coal seams is drained ahead of mining; and*

b. *post-drainage systems, where some of the gas that has been liberated by mining is captured before it is entrained in ventilation streams.*

2.9 The basic objective of the gas pre-drainage system is to extract seam gas from the mine at high concentrations to reduce the burden on ventilation. Mr Peter Newman, Chief Inspector of Coal Mines, said that pre-drainage 'brings down the in situ gas content to a level that the ventilation system is then able to dilute…in the workings'.[62]

2.10 The greater the methane content of the seam, the greater the hazard to be controlled. However, the seam being mined is not the only source of methane. Mr Taylor said:[63]

> *[I]t is not only the mined seam that is of concern it is also the SGE (Specific Gas Emission), the gas in the upper and lower seams along with other potential gas reservoirs and the influence they will or can have once the roof starts to fall or goaf and the floor starts to heave as a consequence of mining stresses.*

2.11 Furthermore, Robertson and Self argue that gas drainage systems should be designed with spare capacity:[64]

> *The performance of both pre-drainage and post-drainage systems is variable, hence the drainage design should include spare capacity and/or a contingency plan, should target drainage rates are not be* [sic] *achieved. Continuous monitoring of drainage performance is essential.*

2.12 Effective gas drainage does not only relate to mine safety. There is an economic imperative for mine operators to establish highly effective systems:[65]

> *There is a strong business case for installing and operating high-efficiency methane gas drainage systems. Successful methane control is a key factor in achieving profitability of gassy underground coal mines.*

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[61] Robertson, R. & Self, A., *Ventilation and Gas Management - Underground Coal Mines* (2019), Project No. C25001 Report, Australian Coal Association Research Program, page 13.
[62] TRA.500.001.0001, .0052, line 43–47.
[63] TGA.001.001.0001, .0002.
[64] Robertson, R. & Self, A., *Ventilation and Gas Management - Underground Coal Mines* (2019), Project No. C25001 Report, Australian Coal Association Research Program, page 40.
[65] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, page 21. The acronym "GHG" in this quote stands for Greenhouse gases.

Based on experiences in coal mines worldwide, investment in "good practice" gas drainage systems results in less downtime from gas emission problems, safer mining environments, and the opportunity to utilise more coal mine methane and reduce GHG emissions.

Production rates and mining at depth

2.13 Two major factors were identified in evidence as presenting ongoing challenges to methane gas management, namely mining at increased depth and increased production rates resulting from significant advances in technology.

2.14 The international experience is that '[m]odern, high-production coal mines encounter increasingly high gas flows as their coal extraction rates increase, panel sizes expand and as they work deeper into potentially higher-gas content coal seams…'.[66]

2.15 Chief Inspector Newman explained:[67]

So, in general, the deeper the mine, the coal seam is, the higher the gas content, and the higher the production rate, the higher the volume of methane that is released into the mine environment.

2.16 Chief Inspector Newman was asked further about the difficulties presented by production rates and mining at depth:[68]

Q. Do those two things, then, in combination increase the difficulty of achieving the standards required by the ventilation system?

A. They do, without sufficient both pre and post drainage and sufficient lead times for drainage of the methane from the coal seam prior to production commencing.

Q. Would you expect with the application of proper skill and experience and research into those issues that the standards of the ventilation system can nonetheless be met?

A. Yes, and there are experts in that field within Australia that model those environments and provide both density and lead times of that drilling program and drainage program for mining to commence at the predicted levels that a particular mine's business plan may have.

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[66] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, page 37.
[67] TRA.500.001.0001, .0056, line 38–41
[68] TRA.500.001.0001, .0056, line 43–.0057, line 10.

2.17 With respect to mining at depth in the Bowen Basin, Mr Taylor said:[69]

> *Generally speaking gas management in the coal seams of the Bowen Basin are* [sic] *unremarkable above the 200 metre level. As coal seams become deeper, below the 200 metre depth, gas contents of the seams gradually increase to some of the highest inherent contents in the country.*

2.18 The guideline publication issued by the Inspectorate, *Methane management in underground coal mines: Best Practice and Recommendations* (the Inspectorate's Best Practice Report) observed:[70]

> *As Queensland underground coal mines have become deeper and longwall production rates have increased, mines are struggling to control the percentage of methane (CH4) in the longwall return roadways tailgate.*

2.19 Likewise, the Department of Natural Resources, Mines and Energy (DNRME) *2018-2019 Queensland Mines and Quarries Safety Performance and Health Report* commented on the need for mines to be more vigilant in these circumstances:[71]

> *As Queensland's underground coal mines have become deeper over recent years, and longwall production rates have increased, coal mines must be more vigilant in controlling the concentration of methane in the longwall return roadways.*

2.20 Based on his experience, Mr Kelvin Schiefelbein, Underground Mine Manager (UMM) at Grasstree, also described depth of mining and increased production rates as being amongst the major changes to underground mining over his career:[72]

> *Q. There has been reference already to a couple of factors, one being the depth of mining and the other being increased production rates. Are they two major features over the timeframe --*
>
> *A. Yes, they are two major ones, yes. Production has increased dramatically, depth of mining, and of course gas, which comes with the depth of mining, has increased as well.*

2.21 These contributors to the concentrations of methane in coal mines must be managed to operate the mine productively, safely and in compliance with legal requirements. This is acknowledged in the United Nations Best Practice Guidance:[73]

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[69] TGA.001.001.0001, .0002.
[70] RSH.002.415.0001, .0003.
[71] RSH.002.416.0001, .0013.
[72] TRA.500.002.0001, .0077, line 38–45.
[73] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, page 69.

In modern coal mines, a sustained, high level of coal production is necessary to obtain an acceptable financial return from investment. Increasing coal extraction rates often results in higher rates of methane emissions. Planned coal production should not be limited by an inability to prevent gas concentrations in the mine from exceeding statutory safe limits, nor compromised by uncontrolled gas related incidents. Infringement of gas safety standards can lead to fines or to explosions that endanger human life.

Prescribed methane concentration

2.22 Section 343 of the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation) provides:

> ***343 Ventilation system must provide for general body concentrations for particular contaminants and gases***
>
> *(1) The ventilation officer for an underground mine must ensure the mine's ventilation system is designed, implemented and monitored to ensure the atmosphere in each part of the mine has a general body concentration that is—*
>
> *…*
>
> *(c) for methane—not more than 2.5%;*
>
> *…*

2.23 The effect of section 343 of the Regulation is to provide that the methane concentration permitted in a part of a mine required to be ventilated under section 344(1)(b) be not more than 2.5%. The only exception is that provided for in section 344(2) of the Regulation, namely:

> *[W]hen there is a sudden, temporary increase in the general body concentration of methane to more than 2.5% and the ventilation system is capable of quickly reducing the methane concentration to not more than 2.5%.*

2.24 The mine's ventilation system is required to meet that standard at all times. In his evidence, Chief Inspector Newman was asked about the regulatory standard:[74]

> *Q. Does it follow that the ventilation system must at least endeavour to meet that standard on all kinds of scenarios that might present themselves by way of gas management in the conduct of underground coal mining?*
>
> *A. That's correct.*
>
> *Q. It's a non-negotiable standard, essentially, is it not?*

[74] TRA.500.001.0001, .0052, line 4–12.

A. It's by legislation and, as such, yes.

2.25 The Board observes that the prescribed limits of methane concentration specified in the Queensland Regulation are less conservative by comparison with New South Wales and some international jurisdictions.

2.26 The following table is reproduced from the United Nations Best Practice Guidance.[75] It lists the maximum concentration below which working is permitted in return airways. It identifies 2% for Australia, which is the applicable standard in New South Wales. All jurisdictions listed prescribe a lower concentration of methane than that applicable in Queensland:

Limiting flammable methane concentration [%]	Australia	China	Germany	Indiah	South Africa	United Kingdom	USA	Factors of safetya
Maximum below which working is permitted in general	1.25	1.0	1.0	1.25	1.4	1.25	1.0	3.6 – 5.0
Maximum below which working is permitted in return airways	2.0[b]	1.5[g]	1.5	0.75	1.4	2.0[b]	2.0[b]	2.5 – 6.7
Minimum permitted for utilisation	na[e]	na[i]	25	na[f]	na[f]	40	25[c]	1.7 – 2.7
Minimum for underground pipeline transport	na[e]	na	22	na[f]	na[f]	na[e]	na[d]	1.5

(a) Factors of safety indicate the range of multiples below the lower explosive limit of 5% or above the upper explosive limit of 15% methane in air;
(b) If no electricity;
(c) The United States handles methane degasification in the ventilation plan, there are no codes or regulations;
(d) Not considered a problem as lower concentration goaf gases are generally drained at surface wells;
(e) Determined by local risk assessment;
(f) Few or no applications so not addressed;
(g) 2.5% for a non travelling return;
(h) In India, methane standards are specified in Indian Coal Mine Regulation 1957, which is based on Mines Act 1952;
(i) Ministry of Environmental Protection of People's Republic of China & Central Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China: Emission Standard of Coalbed Methane/Coal Mine Gas (GB 21522-2008) requires that drained methane of 30% or higher is utilised but under certain conditions lower concentrations can also be used.

Figure 2: Regulatory and advised flammable methane concentration limits

[75] United Nations Economic Commission for Europe, *Best Practice Guidance for Effective Methane Drainage and Use in Coal Mines* (2016), ECE Energy Series No. 47 ECE/ENERGY/105, page 35.

A methane high potential incident under the legislation

2.27 The term 'high potential incident' (HPI) is defined in section 17 of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act):

> **17 Meaning of high potential incident**
>
> *A* **high potential incident** *at a coal mine is an event, or a series of events, that causes or has the potential to cause a significant adverse effect on the safety or health of a person.*

2.28 In the case of methane exceedances, various sections of the Act and Regulation combine to prescribe that a general body concentration of methane of at least 2.5% is an HPI.[76]

2.29 Section 273 of the Act provides:

> ***273 Withdrawal of persons in case of danger***
>
> *(1) If a coal mine is dangerous, all persons exposed to the danger must withdraw to a place of safety.*

2.30 Section 366 of the Regulation deems a mine to be dangerous in a particular circumstance:

> ***366 Withdrawal of persons in case of danger***
>
> *(1) For section 273 of the Act, a part of an underground mine required to be ventilated under section 344(1)(b) that has a general body concentration of methane of at least 2.5% is taken to be dangerous.*

2.31 Section 344(1)(b) sets out the places that are required to be ventilated. At the time of the HPIs being examined by the Inquiry, that section required 'controlled ventilation' in, relevantly, 'each place used by a person for normal work or normal travel', which for practical purposes includes roadways and the working face. Thus, if such a place has a 'general body concentration of methane of at least 2.5%', it is deemed to be dangerous by section 366(1).

2.32 Under section 198(2)(b) of the Act, the occurrence of 'a high potential incident at a coal mine of a type prescribed under a regulation' triggers reporting requirements by the mine's Site Senior Executive (SSE) to the Inspectorate.

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[76] The limit under the Regulation prescribed in section 343 is 'not more than' 2.5%.

2.33 Relevantly to the HPIs at Oaky North, Moranbah North and Grasstree, Schedule 1C of the Regulation prescribes certain types of HPIs for section 198(2)(b), including:

> *5 an unplanned event causing the withdrawal of a person from the mine or part of the mine.*
>
> *…*
>
> *10 one of the following incidents that endangers the safety or health of a person—*
>
> *…*
>
> *(b) a ventilation failure causing a dangerous accumulation of methane or other gas;*
>
> *…*

2.34 By virtue of section 366(1) of the Regulation, a 'dangerous accumulation of methane' for Schedule 1C is a general body concentration of methane of at least 2.5%.

2.35 The concept of 'general body concentration' of at least 2.5% methane is significant, since it is the operative criterion deeming a mine or part of a mine to be dangerous, and activates the requirement that 'all persons exposed to the danger must withdraw to a place of safety'. The definition in the Dictionary (Schedule 9 of the Regulation) is as follows:

> ***general body concentration**, for a gas or an atmospheric contaminant in an underground mine or part of an underground mine, means the concentration of the gas or contaminant measured at a representative location in the mine or part.*

Whether methane HPIs are inevitable

2.36 Section 344 of the Regulation (as in force at the time) required, amongst other things, that the Ventilation Officer ensure 'controlled ventilation' at 'each place used by a person for normal work or normal travel'. Having regard to section 343, that requirement means, in the case of methane, that the general body concentration not exceed 2.5%. As previously noted, the only exception to that general requirement is the scenario of a 'sudden, temporary increase' provided for by section 344(2).

2.37 Having regard to the rigid requirements of sections 343 and 344 of the Regulation, and to the history of recurrence of HPIs in underground coal mines, various witnesses were asked whether those sections set an aspirational standard for management of methane that was not achievable in practice.

2.38 Chief Inspector Newman responded that consistently meeting the standard of the Regulation was 'definitely reasonably achievable'.[77] He was further of the view that methane exceedances were not an inevitable part of coal mining.[78] Regional Inspector of Mines (RIOM), Mr Stephen Smith, was of the same view.[79]

2.39 This view was also shared by Mr Schiefelbein, who said:[80]

> *No, they* [methane exceedances] *are not inevitable. If the system is working effectively, it* [sic] *won't occur...*

2.40 Mr Michael Lerch, the UMM at Moranbah North, said that the regulatory standards could be met 'with the advances in technology and gas drainage techniques [and] the learnings we get from each incident...'.[81] As to whether methane exceedances were an inevitable part of underground mining, he said:[82]

> *I don't like to take that view. I would rather take the view that we can reach a place where we won't be getting exceedances. I know with the technology and automation that is coming into the industry nowadays, I think we're on track to making the industry a lot safer than it was previously.*

2.41 Mr Michael Downs, UMM at Oaky North, agreed generally but added a caveat:[83]

> *Experience would indicate that that* [consistent compliance with sections 343 and 344] *should be possible, but the caveats in these instances are the increasing difficulty of the mining conditions which we are faced with, and particularly the thing that comes to mind is the presence of gas in associated seams to the main horizon that's being mined.*

2.42 The exception to this broad consensus was Mr Taylor. His view was that the 2.5% limit set by the Regulation was 'aspirational' and 'pie in the sky'. He said:[84]

> *The 2.5 per cent is aspirational and it has been demonstrated - you can have the best gas management system, ventilation system in the world, there could be a time when all the cherries line up, your gas hole's gone offline, there's an overhang in the waste, and there is a sudden fall within the barometer, you may well exceed that 2.5 per cent, with the best will in the world. So to turn around and say that you're always going to achieve that I think is, yes, pie in the sky.*

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[77] TRA.500.001.0001, .0053, line 12
[78] TRA.500.001.0001, .0053, line 35.
[79] TRA.500.001.0001, .0089, line 38-44.
[80] TRA.500.002.0001, .0082, line 12.
[81] TRA.500.004.0001, .0130, line 39-47.
[82] TRA.500.004.0001, .0131, line 11-16.
[83] TRA.500.005.0001, .0020, line 1-6.
[84] TRA.500.011.0001, .0118 line 47 to TRA.500.011.0001, .0119, line 8.

2.43 Mr Taylor nonetheless advocated an approach through the industry that compliance with legislation should be taken by all concerned to be 'non-negotiable'.[85] He also accepted that the occasions when 'all the cherries line up' should be a rarity.[86]

2.44 Broad acceptance by senior inspectors and mine managers that methane HPIs should not be regarded as inevitable is encouraging. In his report on the Appin Colliery explosion in 1979 that resulted in the death of 14 coal mine workers, his Honour Judge Goran QC warned of the dangers of complacency in treating methane gas problems as inevitable.[87] His Honour said:

> *Deputies at Appin appear to allow substantial quantities of methane gas to collect in standing places, upon the basis that there is no danger if there is no apparent source of ignition and no great problem if they do not have to stop mining. The management regards methane gas problems of this kind as inevitable under the conditions which exist at Appin. This in itself is a dangerous attitude, leads to complacency and usually is in breach of the Act. The attitude must be changed.*

The potential involved in a methane exceedance HPI

2.45 The potential for harm in a methane exceedance HPI arises in part from the following:

a. the combined systems of ventilation and gas drainage have failed to keep methane concentrations below the prescribed limits. Those critical systems have been ineffective in controlling methane concentrations, and as such it is impossible to know to what levels those concentrations may rise;[88] and

b. even though coal mines generally design their systems so that power to the face is 'tripped' (turned off) at the 2% concentration required by the Regulation[89] or lower, it is not possible to guarantee the absence of all ignition sources.[90]

2.46 Other features add to the potential for harm. When completing cutting into the tailgate, the shearer cutting drum extends beyond the face into the tailgate roadway. This is an area where methane concentrations may be higher than those recorded on sensors situated in the usual positions on the shearer and the tailgate drive. The

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[85] TRA.500.011.0001, .0113, line 44 to TRA.500.011.0001, .0114, line 10.
[86] TRA.500.012.0001, .0011, line 42-44.
[87] Goran, A.J., *Report following an inquiry into an explosion at Appin Colliery on 24th July 1979* (1980), New South Wales Department of Mineral Resources and Development, page 169.
[88] TRA.500.009.0001, .0010, line 44-47; TRA.500.009.0001, .0013, line 19-22; TRA.500.011.0001, .0121, line 36-39.
[89] Regulation section 234.
[90] TRA.500.011.0001, .0124, line 40 to .0125, line 7; see also Chief Inspector Newman, TRA.500.001.0001, .0054, line 1-7.

location of the highest risk of ignition is in the longwall tailgate when the shearer is cutting in this area.[91]

2.47 The Inspectorate's Best Practice Report prefaces a number of modelling illustrations by reminding that:[92]

> *On numerous occasions around the world methane has ignited when the shearer has been cutting into the tailgate. This occurred in the 2010 Upper Big Branch mining disaster resulting in a methane and coal dust explosion which killed 29 coal mine workers.*

2.48 The investigation into the Upper Big Branch explosion found that the most likely source of ignition was friction caused by the shearer cutting sandstone in the roof or the floor of the tailgate.[93] Thus, the likely source of ignition was not at the tailgate armoured face conveyor (AFC) drives, where methane sensors are located in Queensland underground coal mines, but in the adjacent tailgate roadway.

2.49 Another example of a tailgate drive sensor providing a methane reading that was not representative of an adjacent explosive concentration occurred at Moranbah North on 17 January 2015. An ignition of methane occurred around the longwall 101 (LW 101) tailgate sprocket within the AFC, even though only 0.2% methane had been detected at the tailgate drive sensor, located only metres away.[94]

2.50 The Inspectorate's Best Practice Report uses modelling to demonstrate how the ventilation flow around the shearer, as it enters the tailgate, can result in methane concentrations much higher than will be detected on sensors further outbye in the tailgate roadway. This is a result of the obstruction to the ventilation caused by the shearer deflecting some of the airflow behind the shields and flushing methane from the edge of the goaf.

2.51 Various scenarios are illustrated in the Inspectorate's Best Practice Report, showing that the methane concentration in the tailgate roadway adjacent to the shearer drum can be almost twice the concentration measured on the outbye tailgate roadway sensor, and over ten times the concentration measured at the tailgate AFC drive and on the main shearer body.[95] This is shown in the following illustration:[96]

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[91] RSH.002.415.0001, .0013.
[92] RSH.002.415.0001, .0010.
[93] Page, N.G., et al., *Report of Investigation: Fatal Underground Mine Explosion April 5, 2010 Upper Big Branch Mine-South, Performance Coal Company Montcoal, Raleigh County, West Virginia, ID No. 46-08436* (2011), United States Department of Labor, Mine Safety and Health Administration, Coal Mine Safety and Health, pages 109–110.
[94] RSH.002.415.0001, .0013; RSH.997.075.0001.
[95] RSH.002.415.0001, .0010–.0013.
[96] RSH.002.415.0001, .0012.

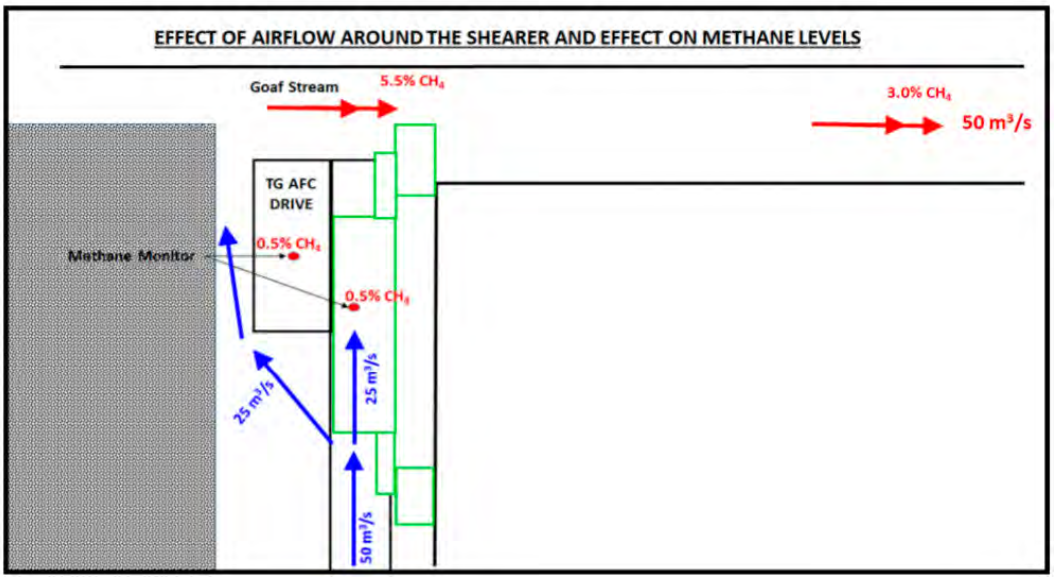

Figure 3: Longwall tailgate ventilation arrangement 3.0% methane in TG

2.52 There is an additional feature which can be explained by reference to Figure 3 above. A rapidly rising methane event may result in an explosive mixture in the tailgate. As appears from Figure 3, the mixture will be carried in the ventilation flow to the outbye tailgate sensor and diluted in the process, resulting in a concentration of (say) 3% at that location. In that event, the outbye tailgate sensor will trip power to the face. However, there will be a time lag between when the explosive concentration of methane leaves the goaf and when it first reaches the outbye tailgate sensor in diluted concentration. During this time lag, there may be an explosive concentration in the tailgate roadway where the shearer drum is cutting and which has not yet been detected on the outbye tailgate sensor. This concentration will also not have been detected on the TG AFC drive sensor because that sensor will be sitting in a fresh air ventilation flow, as appears from Figure 3.

2.53 The Inspectorate's Best Practice Report also observes that the concentration of methane in the tailgate roadway adjacent to the shearer is not likely to be evenly distributed but rather will have areas of higher and lower concentration.[97]

2.54 Furthermore, any consideration of potential harm from a methane HPI should recognise that the gas concentrations reported by diffusion type gas detectors (as used in New South Wales and Queensland mines)[98] are not instantaneous. There is a time lag associated with the methane sensor's measurement of the actual gas concentration, and consequently, a delay in tripping power.

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[97] RSH.002.415.0001, .0012.
[98] Methane sensors are an example of this type of gas detector.

2.55 A description of the lag times, referred to as t(50) and t(90) values, is provided in a safety alert distributed by the New South Wales Mine Regulator:[99]

> *To achieve registration, a methane detector must comply with the requirements of Australian Standard AS/NZS 60079.29.1. This standard requires the time for a sensor to reach 50% of the test gas concentration (t(50)) of no greater than 10 seconds and the time for the sensor to reach 90% of the test gas concentration (t(90)) of no greater than 30 seconds.*

2.56 The safety alert includes the following table illustrating the potential time lag associated with the sensor's measurement when methane moves from 0% into higher concentrations:[100]

Methane concentration	t(50)		t(90)	
	Reading	Time	Reading	Time
5.0%	2.5%	<10 secs	4.5%	<30 secs
2.5%	1.25%	<10 secs	2.25%	<30 secs
1.25%	0.63%	<10 secs	1.13%	<30 secs

Figure 4: Potential time lag for methane sensors

2.57 According to Figure 4, it could take up to ten seconds for a methane sensor to read 50% of actual methane concentration, and up to thirty seconds to read 90% of actual concentration.

2.58 The result is that in a scenario of rapidly rising methane concentration, the sensors may not react fast enough to disconnect power before an explosive gas mixture accumulates around energised electrical components. If that were to occur, the only layer of protection remaining would be the flame proof design and construction of the electric motors, and the intrinsically safe power design and construction of the other electrical components.[101]

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[99] New South Wales Department of Planning and Environment, Resources Regulator *Safety Alert SA17-10 September 2017: Response times of gas detectors* (published 13 September 2017), page 1. <www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0003/736581/SA17-10-Response-times-of-gas-detectors.pdf>.

[100] Ibid.

[101] Flameproof means that the electrical components are contained within a robust protective enclosure that, in the event of the electrical components causing an ignition of flammable gas, contains the ignition within the enclosure. Intrinsically safe means equipment designed and constructed so that the amount of electrical energy within the equipment is unable to, in any circumstance, generate sufficient heat or sparks to ignite a flammable gas.

2.59 In that part of his statement addressing the exceedances at Grasstree and Moranbah North, Mr Taylor ventured the opinion that there was '[n]ever any real danger to persons'.[102] That was a view that could only have been reached in hindsight based on the actual consequence of the incidents, and in particular, that secondary risk mitigation measures (tripping of power and withdrawal of workers) had been effective. So much is clear from the following acknowledgement in his evidence:[103]

> *Q. Would we be right to conclude that what you are saying there is really a commentary that the secondary systems were effective so that the inherent potential risk of an HPI was not realised on this occasion?*
>
> *A. Yes.*

2.60 Mr Taylor acknowledged that in giving his opinion about 'real danger' he was not seeking to minimise the potential risks involved in a methane HPI:[104]

> *Q. The second part of what I was putting to you was that what you are saying there is not intended to detract from or even comment on the inherent risk, or the potential risk, to use the more correct word, inherent in a methane HPI?*
>
> *A. Definitely not.*
>
> *Q. You are not addressing that subject at all?*
>
> *A. Definitely not.*

2.61 In the following exchange from his evidence, he further accepted that the correct focus for an HPI involving a methane exceedance must be on the potential risks involved:[105]

> *Q. You know the definition of "high potential incident", I take it?*
>
> *A. Yes, I do.*
>
> *Q. The critical component of the expression is the potential that the incident has?*
>
> *A. Yes.*
>
> *Q. It's not a matter of looking back after the event and saying, look, putting all the circumstances together, that didn't turn out too bad or too dangerous; it's really what potential goes with the methane exceedance?*
>
> *A. Correct.*

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[102] TGA.001.001.0001, .0015.
[103] TRA.500.012.0001, .0007, line 4–8.
[104] TRA.500.012.001, .0008, line 13–21; TRA.500.012.0001, .0009, line 15–23.
[105] TRA.500.011.0001, .0121, line 4–16.

2.62 In the Board's view, the industry should not risk developing a complacent attitude to HPIs by making an assessment, in hindsight, of an incident's actual consequence and allowing that assessment to distract attention from the potential involved.

2.63 Each methane exceedance should be recognised for the 'high potential' safety risk involved. Hindsight bias should be avoided. The potential consequence of such an incident should be assessed based on the reasonable worst case, revealed by the following:

- a methane exceedance is indicative of the ineffectiveness of ventilation and gas drainage to control methane concentrations to the required level;
- when methane concentrations rise above the performance criteria of the ventilation and gas drainage system, the combined systems can no longer be considered to be in control;
- it is not possible to know how rapidly or to what level the methane concentration will rise;
- power is tripped only after a sensor detects methane at a pre-determined level, and after a number of seconds' delay associated with the sensor response time;
- by the time the power is tripped, the methane exceedance may already have occurred, and indeed, may have been in existence for a number of seconds;
- whilst tripping power eliminates some sources of ignition, there are other potential ignition sources including, but not limited to, static electricity, rock falls, and heat from mechanical friction; and
- the sensor is measuring at a particular location that may or may not be reflective of the concentration of methane at other locations where ignition sources may exist.

2.64 It follows that whenever there is a reportable methane exceedance there is the potential for methane to reach the explosive range and for an ignition source to be present, resulting in the reasonable worst case of permanent disabling injury or loss of life. It is only after the risk has passed that one can say that it was a near miss. Every time such an event occurs, its true potential should be recognised.

2.65 The potential risks involved in methane exceedances are such as to require that each HPI in that category should be recognised as an incident with the potential to cause permanent disabling injury or loss of life.

2.66 Classification of such HPIs in this way will result in the incident being investigated by mines at the highest level. This could only enhance safety at mines. Glencore and Anglo have pointed out that the particular HPIs the subject of inquiry to date were satisfactorily investigated. Nonetheless, in the Board's view, there could be no downside to an industry-wide requirement that methane exceedance HPIs be subject to the most rigorous investigation.

The treatment of methane exceedances at Grasstree, Moranbah North and Oaky North

2.67 The Board heard evidence about the way in which methane exceedance HPIs are treated by Anglo and Glencore in terms of classification, investigation and reporting.

The Anglo mines

2.68 Grasstree, Moranbah North and Grosvenor operate under an 'Incident Reporting Standard'[106] issued by the parent company, AAMC. It 'defines the requirements for classifying, reporting, investigating, and sharing S&SD[107] incidents at Anglo American's Metallurgical Coal (MetCoal) Business Unit'.[108]

2.69 Incidents and actions are recorded using the incident reporting function of Enablon,[109] a software solution that, amongst other things, allows organisations to track and manage environment, safety and health incidents and responses to them. The object is to standardise the incident reporting process.[110]

2.70 The *Incident Reporting Standard* requires the reporting and recording of 'incidents', defined as:[111]

> *An Unwanted Event which instantaneously or over the course of time harms or otherwise negatively impact people, the environment, company assets (i.e., plant, property, or equipment) and / or the company's reputation. It is an unwanted event which leads or may lead to the actualisation of risk.*

2.71 An 'unwanted event' is defined as:[112]

> *A description of a situation where the hazard has or could possibly be released in an unplanned way, including a description of the consequences.*

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[106] AAMC.001.004.0002.
[107] Safety and Sustainable Development.
[108] AAMC.001.004.0002, .0005.
[109] AAMC.001.004.0002, .0006.
[110] AAMC.001.004.0002, .0005.
[111] AAMC.001.004.0002, .0014.
[112] AAMC.001.004.0002, .0015.

2.72 All incidents are to be entered into Enablon within 48 hours, and an investigation must then occur within 30 days of the occurrence.[113] Investigation and reporting follows the Learning from Incidents (LFI) process, the object of which is described as follows:[114]

> *The LFI process ensures that SHE[115] incidents are reported, recorded, analysed, investigated and causes are identified, risk profiles are updated, learnings are shared, and corrective and improvement actions are implemented across our business.*

2.73 The process steps for dealing with an incident are:[116]

Figure 5: MetCoal Learning from Incidents 5 Step Process

2.74 Consistently with Step 1, amongst the exhibits tendered to the Inquiry in relation to the HPIs at Anglo mines, there are, typically, an Initial Incident Report (IIR) and written statements from coal mine workers who witnessed the incident. Each HPI was investigated in accordance with these procedures. For each HPI, the Inquiry has been provided with the LFI report, which offers analysis of causes, and identifies corrective action. Any consequential corrective tasks are entered into Enablon so that performance can be monitored, including by persons within the senior leadership team at site and corporate level, including the CEO. The Board has been provided with copies of the Enablon task entries.

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[113] AAMC.001.004.0002, .0006.
[114] AAMC.001.004.0002, .0009.
[115] Safety, Health and Environment.
[116] AAMC.001.004.0002, .0010.

2.75 HPIs at Grasstree and Moranbah North were the subject of evidence in the first tranche of hearings.[117] The process of LFI investigation and reporting, as described in evidence, was essentially the same at both mines. The investigations were conducted at site level. The LFI team was constituted according to the expertise required to evaluate the incident. It gathered evidence, analysed causes, and considered corrective action.

2.76 At Moranbah North, as part of the LFI process, a draft report would be presented to a senior leadership team at the mine for discussion and review.[118]

2.77 At Grasstree, the draft report would be considered by several layers of management before going to the SSE for 'final review'.[119] The SSE, Mr Damien Wynn, described his role as follows:[120]

> *Q. In the review of the draft report that you've described, what input do you have in that process of identifying what should be done?*
>
> *A. Absolute input and control over it. So what I'm looking for in that LFI report is, can I pick it up and understand the incident that's occurred? Have the team clearly identified what the root causes of that event were? And do the controls or recommendations that they're suggesting clearly address those root causes or failings in the course of that event? If I'm satisfied with that, then it will obviously get reviewed and signed off. If I'm not, then I'll add further comments or I might even add an action or I might even modify an action.*

2.78 Mr Wynn endorsed the process:[121]

> *It's a very good process, and I must admit that it's something that I haven't - it's unique to Anglo in that respect. It's not something that I've seen outside of Anglo.*

2.79 The Enablon system provides an accountability mechanism for the performance of those measures. Tasks must be closed out by a nominated date.

2.80 The Board observes that the LFI reports tendered in evidence relating to the Grasstree and Moranbah North HPIs reflected a robust and frank assessment of the causes of incidents.

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[117] The 27 HPIs at the Grosvenor mine will be examined in the second tranche of hearings.
[118] TRA.500.004.0001, .0001, .0119 line 27–46; TRA.500.004.0001, .0135 line 17–25.
[119] TRA.500.011.0001, .0030, line 5-11.
[120] TRA.500.011.0001, .0030, line 28-40.
[121] TRA.500.011.0001, .0031, line 31-34.

2.81 Step 2 of the LFI process involves classification of the incident. The *Incident Reporting Standard* uses the classification of 'Significant Incident' and 'High Potential Incident', although it is apparent that the classification criteria do not align with the Queensland legislation definitions of serious accident and HPI.[122]

2.82 An incident is classified according to a five point consequence rating scale described in the *Anglo American Group Risk Matrix*, which is incorporated into the *Learnings from Incidents Group Standard* (the Anglo LFI group standard).[123] The most pertinent parts of the matrix are:[124]

Risk Matrix	Consequence Rating				
Consequence Type	1 - Insignificant	2 - Minor	3 - Moderate	4 - High	5 – Major
Material losses/ damage/ business interruption	<0.01% of annual revenue/ total assets	0.01 – 0.1% of annual revenue/ total assets	0.1 -1% of annual revenue/ total assets	1-5% of annual revenue/ total assets	>5% of annual revenue/ total assets
Harm to People Safety	First aid case	Medical treatment case	Lost-time Injury	Permanent disability or single fatality	Numerous permanent disabilities or multiple fatalities
Harm to People Occupational Health	Hazard exposure with temporary discomfort	Hazard exposure with symptoms requiring medical treatment	Hazard exposure >OEL with reversible health impact & lost-time	Hazard exposure >OEL with irreversible health impact or a single death	Hazard exposure >OEL with irreversible health impact or death of multiple EEs
Environment	Impact last days or less, effects small area (meters), receptors of low significance	Impact lasts weeks or less, effects a reduced land area, no sensitive species/habitats	Impact lasts months, extended area (km), some environmental sensitivity	Impact lasts years, effects sub-basin, impacts sensitive species/habitat	Permanent impact, effects basin/region, impacts highly sensitive species/habitat
Legal & Regulatory	Technical non-compliance, no warning, no regulatory reporting required	Breach of regulation, regulatory reporting / involvement, admin fine	Minor breach of law, regulatory investigation, enforcement action	Breach of law, criminal prosecution, enforcement action, temp license susp.	Sig breach of law, lawsuit, license revoked / substantially modified
Social / Communities	Minor disturbance of culture / social structure	Some impact on local pop, mostly repairable, concerns from single stakeholder	On-going social issue, isolated complaints from community stakeholders	Significant social impact, organized protests threaten operational continuity	Major widespread social impact with operational impact, LTO jeopardized
Reputation	Minor impact, concern from specific individuals	Limited impact, concerns from certain groups/org's	Local impact, local public concern/publicity w/i neighboring communities	Suspected reputational damage, local regionals concern/reaction	Noticeable reputational damage, national / international attention

Figure 6: The Anglo Group Risk Matrix

[122] As defined in sections 16 and 17 of the Act.
[123] AAMC.001.004.0002.
[124] AAMC.001.004.1472, .1482–.1483.

2.83 Under the *Incident Reporting Standard*, a high potential incident is defined as:[125]

> *[A]n incident with an actual consequence rating of "3 – Moderate" or lower but possessing a reasonable worst case potential consequence rating of "4 – High" or higher.*

2.84 Procedural documents at site level also offer definitions of a high potential incident that require a potential consequence rating of 4 or 5, but do not require any reference to the actual consequence of the incident.[126]

2.85 Grosvenor's *Incident Reporting and Investigation Procedure* offers further information to assist with classification:[127]

> *The potential consequences should be considered as the* maximum reasonable consequence *that could arise from the particular incident under consideration.*

2.86 Responsibility for determining the classification of incidents rests with the SSE at site level. This classification is subject to revision by the Head of Safety and Sustainable Development in consultation with the relevant Head of Operations.[128]

2.87 The Board notes that it is apparent that the degree of potential harm to persons required to satisfy levels 4 and 5 of the matrix is at a higher level than that reflected in the definition of high potential incident in section 17 of the Act. The criteria of 'permanent disability' or 'single fatality' to warrant a rating of 4 set a higher and more restrictive standard than the test of 'significant adverse effect on the safety or health of a person' under section 17.[129]

2.88 Even so, in the Board's view, having regard to the associated risks and potential for harm discussed earlier, it is difficult to see how a reportable methane exceedance could fail to warrant at least a level 4 classification under Anglo's risk matrix. Yet none of the incidents that the Board inquired into at Moranbah North or Grasstree was classified as an 'Anglo HPI'.[130]

2.89 CEO of AAMC, Mr Tyler Mitchelson, appeared to struggle somewhat, in the exchange from his evidence set out below, to justify Anglo's classification of methane exceedances:[131]

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[125] AAMC.001.004.0002, .0014.
[126] For example, ACM.006.001.0012, .0016 (Grasstree); AGM.005.001.0499, .0502 (Grosvenor).
[127] AGM.005.001.0499, .0506. Original emphasis.
[128] AAMC.001.004.0002, .0008; It is noted that it is the relevant head of operations who has the final signoff on all HPIs after the investigation has been completed: AAMC.001.004.0002, .0009.
[129] Section 17 is outlined in paragraph 2.27 in this chapter.
[130] TRA.500.009.0001, .0013, line 35–38. An Anglo HPI is a high potential incident as defined in the Incident Reporting Standard.
[131] TRA.500.009.0001, .0012, line 45–.0013, line 17.

Q. So, consistently with what you've just told me, an exceedance above 2.5 per cent methane in an area where people are working or travelling, in terms of the potential outcome, that would be a 4. Do you agree?

A. I think in the context, if you just look at that component alone, potential. But in the context of when we look at an incident, we look at the entire incident. So a methane exceedance of 2.5 per cent, what were the controls and what were the circumstances around the broader incident?

Q. So are you telling me that you look at what actually happened, that is, it didn't go into the explosive range and there was no ignition, so there was no risk?

A. We look at the actual occurrence of the incident, and, as you say, yes, the potential to go above, but that potential takes into the context of the broad - you know, and in this case it's explosion and/or a fire and it looks at the broad risks or the broad controls of the entire incident to what the potential could have occurred.

2.90 Mr Mitchelson's references to looking beyond potential alone, to the 'entire incident', the 'broader incident', and the 'actual occurrence of the incident', suggest a classification based on, or influenced by, the actual consequence of an incident with the benefit of hindsight, rather than the true potential consequence.

2.91 In the material submitted to the Board, the IIR Forms frequently bear a handwritten inscription 'DNRM HPI',[132] to distinguish such incidents from an 'Anglo HPI.' The Incident Reporting Standard does make it clear that local legal reporting requirements are to be complied with, notwithstanding the differing definitions of HPI.[133] However, the practical result is that while incidents are reported to the Inspectorate as required, they are not HPIs according to Anglo's own classification.

2.92 At a corporate level, these DNRM HPIs are treated as lesser incidents than Anglo HPIs as far as investigating, recording and reporting are concerned.

[132] A reference to an HPI under the legislation, 'DNRM' (the Department of Natural Resources and Mines, later the Department of Natural Resources, Mines and Energy, 'DNRME') being the regulator at the time. The current regulator is Resources Safety and Health Queensland.
[133] AAMC.001.004.0002, .0007.

2.93 Level 1, 2, and 3 incidents, including DNRM HPIs, are investigated by the site. By contrast the composition of an investigative team for an Anglo HPI, as described in the Anglo LFI group standard, is as follows:[134]

> ***High Potential Incidents*** *shall be investigated by the Business Unit or Group Function with the involvement of the site.*
>
> *Team members will include a senior manager as the Team Leader who is independent to the work place / section, as well as the technical expert(s) and SHE professional(s) independent from the site as determined by the site's general manager and the Business Unit or Group Function.*

2.94 Anglo HPIs are required to be notified 'to the relevant AA SHE discipline Head or AA SP&E[135] Head within 48 hours'.[136]

2.95 The rigour involved in reporting and reviewing Anglo HPIs, including at divisional CEO level, as a counterpoint to the treatment of DNRM/DNRME HPIs, was described by Mr Mitchelson in his evidence as follows:[137]

> *Q. Can I ask you, please, about the reporting of incidents, particularly HPIs and what I'll call DNRME HPIs. Let's say an Anglo HPI occurs.*
>
> *A. Yes.*
>
> *Q. What's the process?*
>
> *A. If an Anglo HPI occurs, the process right now is generally I will get a call from either Glen Britton, head of underground operations, or Hans Hayes, head of my open-cut operations, or if they're not available, the general managers of the respective site on which it occurs, just notifying me of the incident so I'm aware.*
>
> *Then they go through the standard LFI process that they do at site with the incident investigation. It's reported through the Enablon system, so we track it through there. The Anglo HPI then will go through, once the investigation's completed, a number of different, I guess, review processes and different avenues to highlight the HPIs or review the HPIs.*
>
> *I'll start with on a monthly basis, it would be part of the site's monthly performance review where that would be highlighted there and we would discuss it at that monthly performance review at the site level.*

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[134] AAMC.001.004.1472, .1474.
[135] Social Performance and Engagement.
[136] AAMC.001.004.1472, .1474.
[137] TRA.500.009.0001, .0028, line 7–.0029, line 12.

At the MetCoal level and reporting to the bulks CEO, Seamus French, I would talk about that in the monthly performance review there as well, and we'd review it there.

There's another avenue that happens on a monthly basis within MetCoal, we call it the SITC - significant incident teleconference - where we review all HPIs, HPHs and material safety incidents that particularly are repeats in nature. And on top of that, all HPIs are reviewed on a monthly basis with the bulks, so that's myself and the other CEOs that report to Seamus, and we review each other's HPIs at that point.

Q. What about a DNRME HPI?

A. If it becomes an Anglo HPI, it'll be run through that process. If it's not, it'll be captured through the site processes or, in the case of certainly the gas HPIs, were discussed through our monthly - through our MPR[138] processes and our planning processes, not necessarily - well, not in the safety section but actually recognising we had to do something around gas management.

Q. So if there's a DNRME HPI that is not a Anglo HPI, you don't get a phone call?

A. Not necessarily. If it is a - if it's an LTI, I will probably get a phone call. But if it does not involve an injury, I wouldn't necessarily get a phone call.

2.96 The *Learnings from Incidents Group Standard* also highlights the elevated level of attention given to Anglo HPIs for Step 5 of the LFI process, 'Share and Learn'. It provides:[139]

For High Potential and Significant Incidents:[140]

- *Group SSD or SP&E will develop, approve, and release an Immediate Call To Action, SHE Alert, and Global Call To Action as appropriate;*
- *All SHE Alerts shared by Group S&SD or SP&E for High Potential or Significant Incidents must be appropriately cascaded by Business Units to sites;*
- *Actions will be uploaded against sites for action and close out in Enablon by Group SSD or SP&E, and actions will be tracked and close-out monitored by Group; and*

[138] Monthly Performance Review.
[139] AAMC.001.004.1472, .1476.
[140] A significant incident is defined under the AAMC *Incident Reporting Standard* as: An incident with an actual consequence / ISR rating of level 4 or level 5 on the Anglo Incident Severity Consequence Matrix Table: AAMC.001.004.0002, .0015.

- *Significant Incidents shall be shared with the AA Executive Directors and the AA Board Sustainability Committee by Group S&SD or SP&E.*

2.97 In the Board's view, the failure to classify methane exceedances under the risk matrix according to their true potential consequence is significant. It carries with it a substantial risk that DNRM HPIs are seen by workers and management at the mine, and at corporate level, as a sub-class of high potential incident. This dichotomy between DNRM HPIs and Anglo HPIs creates a risk, over time, of workers, if not management, downplaying the significance of methane exceedances.[141]

2.98 The Board has been advised that, 'going forward, Anglo will deem every methane related DNRME HPI as being an Anglo HPI, whether or not it attracts a potential consequence rating of 4 or greater on the Risk Matrix'.[142]

The Glencore mines

2.99 Ms Kylie Ah Wong, General Manager of Health Safety and Training at Glencore Coal Assets Australia Pty Ltd (GCAA), gave evidence that within Glencore operations[143] the level of investigation and reporting consequent upon an HPI is driven by an assessment of the seriousness of the potential outcome of the event.[144]

[141] See for example the diminution of seriousness in the corporate messaging in AAMC.001.031.0044, .0046 and .0049. See also Mr Wynn in evidence at TRA.500.011.0001, .0044, line 44–.0045, line 33.
[142] Submission received from Anglo on 31 October 2020 in response to a draft chapter.
[143] The Glencore Oaky North mine being the third mine the subject of evidence in the first tranche of hearings.
[144] TRA.500.008.0001, .0033, line 31–35; OCH.507.001.0176, .0181.

2.100 Similarly to the Anglo mines, that assessment is made by reference to a 5 point potential consequence rating in the *Glencore Risk Management Matrix*, ranging from 1 (negligible) to 5 (catastrophic). These ratings are in similar terms to those described in the *Anglo American Group Risk Matrix*. An extract of the *Glencore Risk Management Matrix* describing levels 4 and 5 is set out below:[145]

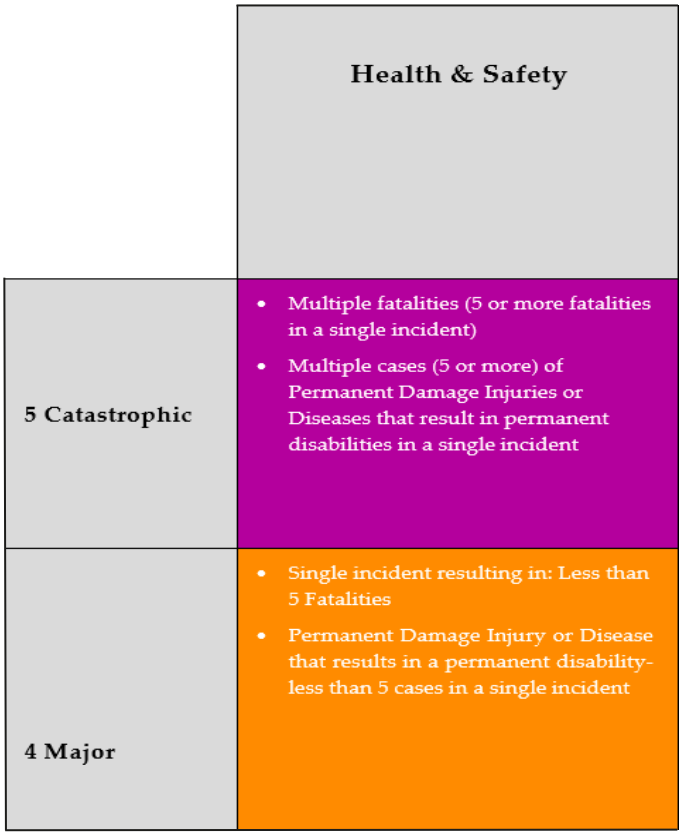

Figure 7: Glencore Coal Assets Australia Risk Management Matrix - Consequence

2.101 As with the Anglo Risk Matrix, these potential consequence ratings do not align with the legislative definition of an HPI.

[145] OCH.507.001.0151, .0172, found in the *Glencore Coal Assets Australia Regional Asset Finance Standard – Risk Management* (the Glencore Risk Management Standard).

2.102 Under the Glencore Risk Management Standard[146] (which incorporates the Risk Management Matrix), a risk is assessed for its 'Potential Maximum Consequence' (PMC). A rating of 4 or 5 would reflect the incident's PMC. The Standard states:[147]

> *PMC is the plausible worst case impact to Glencore Coal Assets Australia and its operations arising from a risk where all active risk controls…are assumed to be ineffective. It does not consider the likelihood of the event occurring. PMC may not be the absolute worst case conceivable.*
>
> *PMC will be identified as the consequence level in the risk being considered taken from the Consequence Criteria provided in* ***Appendix A - Glencore Coal Assets Australia Risk Management Matrix****.*

[146] OCH.507.001.0151. Emphasis in original.
[147] OCH.507.001.0151, 0161.

2.103 For the purpose of arriving at a risk classification, ranging between low, medium and high, the *Risk Management Matrix*, an extract from which is included below, also takes into account the likelihood of the event's PMC.[148]

LIKELIHOOD [of the event occurring with that consequence]

Basis of Rating	E - Rare	D - Unlikely	C - Possible	B - Likely	A – Almost Certain
LIFETIME OR PROJECT OR TRIAL OR FIXED TIME PERIOD OR NEW PROCESS / PLANT / R&D	Unlikely to occur during a lifetime OR Very unlikely to occur OR No known occurrences in broader worldwide industry	Could occur about once during a lifetime OR More likely NOT to occur than to occur OR Has occurred at least once in broader worldwide industry	Could occur more than once during a lifetime OR As likely to occur as not to occur OR Has occurred at least once in the mining / commodities trading industries	May occur about once per year OR More likely to occur than not occur OR Has occurred at least once within Glencore	May occur several times per year OR Expected to occur OR Has occurred several times within Glencore
5 Catastrophic	15 (M)	19 (H)	22 (H)	24 (H)	25 (H)
4 Major	10 (M)	14 (M)	18 (H)	21 (H)	23 (H)
3 Moderate	6 (L)	9 (M)	13 (M)	17 (H)	20 (H)
2 Minor	3 (L)	5 (L)	8 (M)	12 (M)	16 (M)
1 Negligible	1 (L)	2 (L)	4 (L)	7 (M)	11 (M)

Figure 8: Glencore Coal Assets Australia Risk Management Matrix - Likelihood

[148] OCH.507.001.0151, 0172.

2.104 As can be seen from the extract of the *Risk Management Matrix*,[149] a methane exceedance event would be classified as a 'High Risk' (H) event if:

- its PMC was 4 or 5; and
- it was an event that 'has occurred at least once in broader worldwide industry' (D-Unlikely) or 'has occurred at least once in the mining…industries' (C-Possible).

2.105 History is littered with disastrous events involving disabling injury or fatality from methane related incidents in coal mines. It follows that either 'D' or 'C' classifications would apply to elevate the classification of risk from a methane exceedance to High (H). Accordingly, as with Anglo's method of incident classification, the Board finds it difficult to see how a reportable methane exceedance could be classified as anything other than a high potential risk event.

2.106 A methane exceedance HPI which was not classified as a 4 or 5 on the scale would result in an investigation conducted at site level. GCAA's *Regional Asset HSEC (Health, Safety, Environment & Community) Standard 6.0 Incident*[150] (Glencore's Incident Standard) requires that such an HPI be communicated at both site and corporate level, by way of an email distribution list with the title 'GCAA Reportable Incident Notification' which includes, but is not limited to, the following recipients:[151]

a. Chief Operating Officer (COO);
b. Direct reports of the COO;
c. Directors of all companies within the GCAA corporate structure;
d. Senior management of the GCAA corporate group;
e. General managers within the GCAA management structure; and
f. Operations managers at GCAA's sites in Queensland and New South Wales.

2.107 By contrast, incidents classified as either 4 or 5 on the scale would be the subject of a more intensive investigative effort, with a wider distribution of learnings arising from the investigation.[152] Ms Ah Wong described the different levels of internal reporting of the incident, depending on classification:[153]

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[149] OCH.507.001.0151, 0172.
[150] OCH.507.001.0176.
[151] OCH.507.001.0176, .0180.
[152] OCH.505.002.0001, .0005; TRA.500.008.0001, .0015, line 29–31; TRA.500.008.0001, .0034, line 11–36.
[153] TRA.500.008.0001, .0034, line 28–36.

If it was a potential consequence 4 or 5, we've got quite an extensive and wide-cast communication process that supports that, but not for a lower-level incident. That would typically remain at the operation or potentially shared within the - so, for example, with this one,[154] *the underground operations managers have a weekly meeting that's chaired by the director of underground operations. It may have been tabled there for people's information, but that's not a formal arrangement.*

2.108 The contrast in the level of reporting between lesser incidents and those classified as involving high potential risk is apparent from Glencore's Incident Standard. With respect to High Potential Risk Incident reporting, it states:[155]

The reporting process includes reviews and approvals through the management structure including the relevant Director of Operations, relevant GCAA Senior Leadership Team members, and the Glencore Coal Department.

The Operations Manager and the Lead Investigator are to present the Incident Investigation Report - Summary presentation to the GCAA Leadership Team. The relevant Director is to add the presentation to the agenda of the next scheduled GCAA and the Glencore Coal Department HPRI Meeting, immediately following finalisation of the Incident Investigation Report - Summary. Where considered applicable, Mandatory Actions and realistic implementation timeframes are to be identified at the meeting.

2.109 Ms Ah Wong explained that the investigation process for an incident would begin with the line supervisor, and an incident classification would be made at that stage:[156]

In the first instance, the line supervisor is to begin the investigation and collate initial information and evidence. Once the potential consequence of the incident is determined by reference to the risk matrix…an appropriate investigation is facilitated.

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[154] A reference to the methane exceedance at Oaky North on 6 December 2019, the subject of inquiry.
[155] OCH.507.001.0176, .0184.
[156] OCH.507.002.0001, .0006.

2.110 Incident investigations are of three kinds: basic, intermediate, or detailed. These are determined by the risk classification, as appears from the table below:[157]

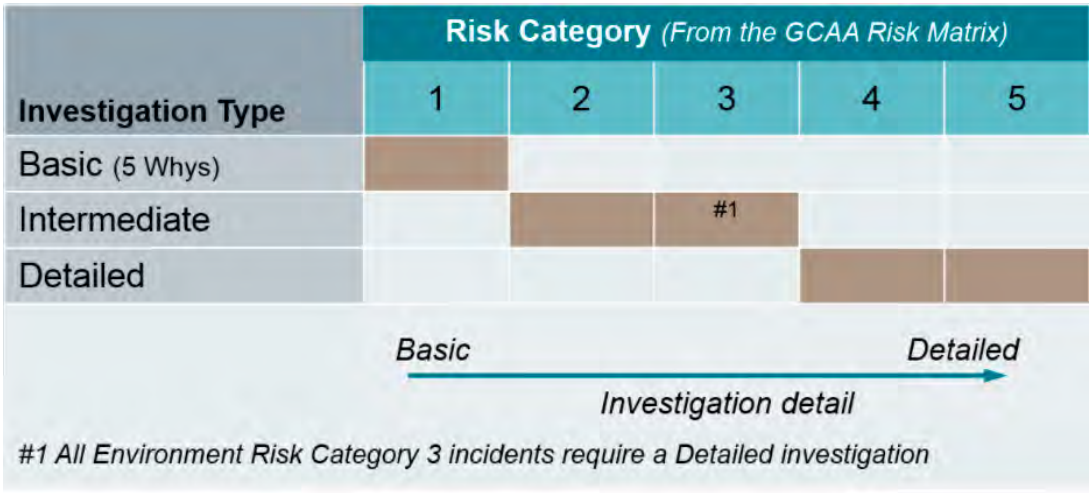

Figure 9: Risk Category from GCAA Risk Matrix

2.111 Detailed investigations use the Incident, Cause, Analysis Method (ICAM), while other investigations utilise the simpler '5 Whys' methodology.[158]

2.112 Incident classification is reviewed at corporate level and revised if necessary, as described in Ms Ah Wong's statutory declaration:[159]

> *Any High Potential Incident (HPI) reported to the Mines Inspectorate triggers an automatic email alert to a GCAA distribution list, of which my team and I are a part. My team conducts an auxiliary review of each HPI, by reference to the same risk matrix contained in the Risk Management Standard that is applied at the time of the first analysis at site level, and will form a view as to whether the HPI was appropriately categorised at site level. Each site undertakes an investigation into every HPI.*

2.113 The circumstances of the single HPI occurring at Oaky North on 6 December 2019 are considered in Chapter 4. The incident was the subject of 'Basic Investigation'[160] conducted on shift by the line supervisor at the time, as appears from the Incident Investigation Report.[161] Upon review by her team, Ms Ah Wong explained that 'no escalation was deemed necessary' because of the following factors:[162]

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[157] OCH.507.001.0176, .0181.
[158] OCH.507.001.0283, .0292 - .0293.
[159] OCH.507.002.0001, .0006.
[160] Subsequently supplemented by the SSE's review, which resulted in additional controls being implemented.
[161] OCH.500.001.0110.
[162] OCH.507.002.0001, .0007.

a. gas levels being below the explosive range;

b. the short duration during which the gas was elevated; and

c. no withdrawal of personnel from the mine was required.

2.114 It appears that the classification is based on the actual methane concentration that occurred and not on the premise that critical controls had failed and methane concentrations could have reached the explosive range. In the Board's view, this is suggestive of an approach that looks to the actual consequence of the incident rather than its true potential under the *Risk Management Matrix*.

Methane exceedances as a measure of critical control effectiveness

2.115 This section explores the concept of ventilation and gas drainage as critical controls to prevent a catastrophic incident such as an underground explosion. This section also suggests that methane exceedances should be viewed as an indicator that these critical controls are not, or may not be, operating effectively. Critical controls are discussed further in Chapter 6.

2.116 The classification of gas drainage as a critical control was explored with several Anglo witnesses during the Inquiry.

2.117 Mr Kelvin Schiefelbein, UMM at Grasstree, agreed that both methane drainage and ventilation could meet the definition of a critical control in terms of controlling the hazard of methane.[163]

2.118 Mr Tim McNally, Operations Manager at Grasstree, was questioned about the LFI report for HPI #1 at Grasstree which occurred as a result of a failure of one of the surface goaf drainage plants. The LFI report did not identify the failure of the goaf drainage plant as a failure of a critical control. Mr McNally agreed that methane drainage is a form of critical control of the hazard of methane, but stated that he believed that methane drainage did not necessarily satisfy Anglo's definition of what constitutes a critical control.[164]

2.119 Mr Mitchelson was asked whether he accepted that goaf drainage was a critical control. He responded that:[165]

It would be - by definition in the new terms not necessarily, but, yes, it can be looked at as a critical control.

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[163] TRA.500.002.0001, .0081, line 16-18 and .0096, line 43–.0097, line 9.
[164] TRA.500.003.0001, .0098, line 5–.0099, line 36.
[165] TRA.500.009.0001, .0044, line 35–39.

2.120 Professor Robin Burgess-Limerick[166] of the University of Queensland conducted bowtie analyses of 517 fatalities that occurred in the United States mining industry over a ten year period between 2005 and 2014 to identify both preventative and mitigating controls.[167] Through the bowtie analyses,[168] methane extraction (drainage) was identified as one of the priority preventative controls for fire or explosion.

2.121 The definition of a critical control in the 2015 International Council on Mining & Metals document *Health and Safety Critical Control Management: Good Practice Guide* (ICMM Good Practice Guide)[169] is:

> *A control that is crucial to preventing the event or mitigating the consequences of the event. The absence or failure of a critical control would significantly increase the risk despite the existence of the other controls. In addition, a control that prevents more than one unwanted event or mitigates more than one consequence, is normally classified as critical.*

[166] Professor Burgess-Limerick is a Professorial Research Fellow at the University of Queensland, Minerals Industry Safety and Health Centre, Sustainable Minerals Institute.
[167] Burgess-Limerick, R., *Bowtie Analysis of Mining Fatalities to Identify Priority Control Technologies* (2016) US National Institute for Occupational Safety and Health.
[168] See paragraph 6.43 in Chapter 6.
[169] International Council on Mining & Metals, *Health and Safety Critical Control Management – Good Practice Guide* (2015), page 5 <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>.

2.122 The ICMM Good Practice Guide also provides a flow chart to help decide if a control is a critical control, which is reproduced below:[170]

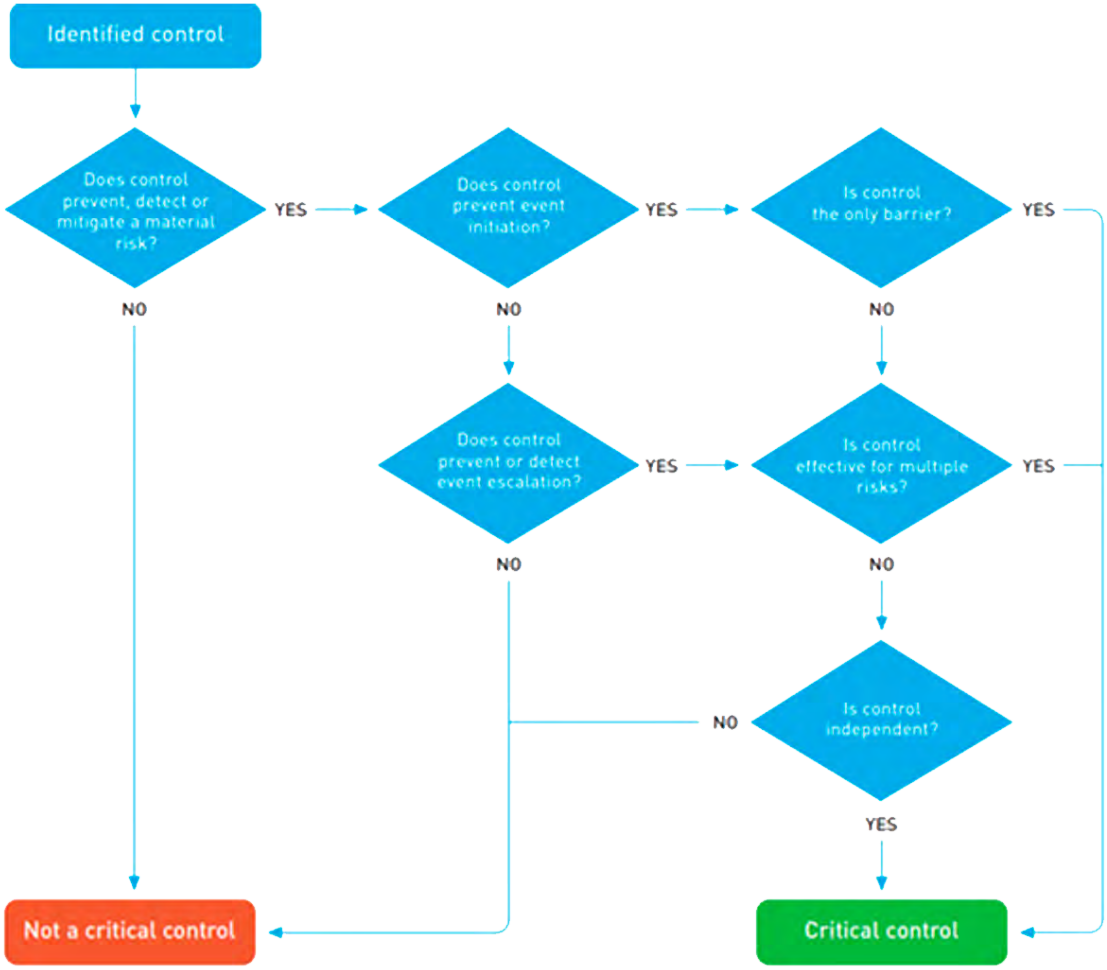

Figure 10: ICMM Good Practice Guide application of the decision tree

2.123 Application of this decision tree to determine if methane drainage is a critical control in the management of the hazard of methane at gassy mines results in the following responses:

[170] International Council on Mining & Metals, *Health and Safety Critical Control Management – Good Practice Guide* (2015) <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>, page 13.

Does control prevent, detect or mitigate a material risk? **Yes**.

Does control prevent event initiation? **Yes. Removal of the methane will prevent a large explosive mixture forming.**

Is control the only barrier? **No. Works in conjunction with ventilation.**

Is control effective for multiple risks? **Potentially. Methane drainage may be required to reduce the risk of outburst.**

Is control independent? **Yes, it operates in isolation.**

2.124 The conclusion is that for the management of the hazard of methane at gassy mines, which include all of the mines the subject of this Inquiry, methane drainage meets the definition of a critical control as per the ICMM Good Practice Guide.

2.125 Moreover, methane exceedances at such mines may be an indication that the gas drainage system and/or the ventilation system have failed to keep methane concentrations below pre-determined limits.

2.126 The purpose of gas drainage, both pre-drainage and post-drainage, is to lower gas emissions into the workings so that the risk of explosive gas mixtures accumulating is minimised, and production can safely continue. The safe operating limits of gas concentration are prescribed in legislation and the gas drainage and ventilation system must ensure gas concentrations are kept below these limits. Pre-drainage and post-drainage constitute an integrated system. Insufficient pre-drainage will necessitate greater post-drainage. Whilst it is possible to measure the impact of pre-drainage prior to the start of mining operations, it will not be possible to measure the effectiveness of the gas drainage system as a whole in achieving the desired result of keeping gas concentrations below the required limits, until mining operations commence.

2.127 In the Board's view, methane exceedances ought to be viewed as an indication of an ineffective critical control and deserve special attention at a corporate level.

Findings and recommendations

Findings

Findings

Finding 1

Mining at an increased depth, where higher volumes of methane are present, and increased production rates, are both features of modern longwall mining. They present complex challenges for the management of methane in underground coal mines. Notwithstanding that complexity, with the available technology, methane exceedances are not an inevitable feature of longwall mining.

Finding 2

The prescribed limits on methane concentrations under the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation) are less conservative by comparison with New South Wales and some international jurisdictions.

Finding 3

Reportable methane exceedances have genuine potential to cause permanent disabling injury or loss of life. Incident classifications at site and corporate level should recognise that potential.

Finding 4

Whilst the operational practices and management systems in existence at each of Oaky North, Moranbah North and Grasstree mines, and the corporate levels above them, were generally adequate and effective to achieve compliance with the relevant safety laws and standards in respect of methane exceedances, several points should be made:

a. the potential consequence of the methane exceedances was not properly identified at any of the mines, in that there was a failure to recognise that each had the *potential* to result in an outcome with a level 4 or 5 consequence rating;[171]

b. neither Anglo American's nor Glencore's incident classification system aligns with the definition of a high potential incident (HPI) in the *Coal Mining Safety and Health Act 1999* (Qld) (the Act);

[171] Anglo classifies an incident as level 4 when there is a 'single fatality or permanent disability' and level 5 when there are 'multiple fatalities or numerous permanent disabilities': AAMC.001.004.1472, .1482–.1483. Glencore classifies an incident as level 4 when there is a 'single incident resulting in less than 5 fatalities, or fewer than 5 cases of "permanent damage injury" or disease that results in a permanent disability' and level 5 when there are 'multiple fatalities (being 5 or more fatalities in a single incident) or multiple cases (5 or more) of "permanent damage injury" or disease that results in permanent disability': OCH.507.001.0151, .0172.

c. Anglo's use of a classification system that included so-called 'DNRM HPIs' created a sub-class of HPI that may have a tendency to diminish the perception of the seriousness of the events;

d. during the period under inquiry the documented standards and procedures in place at Anglo did not require notification of the exceedances to the Anglo American Metallurgical Coal Pty Ltd (AAMC) Chief Executive Officer (CEO);[172]

e. whilst in practice repeat HPIs (including methane exceedances) may be the subject of special attention by AAMC and Glencore Coal Assets Australia Pty Ltd (GCAA), the documented standards and procedures provided to the Inquiry do not expressly require escalation in terms of investigation and notification; and

f. the shortcomings listed in a. to e. above are particularly concerning given the prominent role of methane explosions in numerous underground coal mine accidents and disasters in this State and elsewhere.

Finding 5

It is impossible to conclude that a methane exceedance would never occur, but underground coal mining should be able to be conducted such that a methane exceedance is a rarity, and repeat occurrences are entirely unacceptable.

Finding 6

Ventilation and gas drainage are critical controls for methane management. Reportable methane exceedances ought to be treated as indicators that there may have been a failure of these controls.

Recommendations

Recommendation 1

Mine operators and parent companies regard, and action, a reportable methane exceedance as having a potential consequence of level 4 or 5 under corporate incident classification criteria.

Recommendation 2

Mine operators and parent companies escalate the treatment of repeat high potential incidents of a similar nature and ensure a more rigorous investigation than for a single high potential incident. Reporting and investigation standards and procedures formally reflect this requirement.

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[172] The Board has been informed by way of submissions received from Anglo on 31 October 2020 in response to a draft chapter that since the commencement of the Board's inquiry the Heads of Operations, all General Managers, and Head of Legal Australia now receive a daily email recording all Departmental (DNRM/DNRME) HPIs which have occurred over the previous seven day period.

Chapter 3 - The role of the Inspectorate

Introduction

3.1 Under the *Coal Mining Safety and Health Act 1999* (Qld) (the Act), the Coal Mines Inspectorate (the Inspectorate) has the role of regulation and oversight of safety in Queensland coal mines.

3.2 Section 6(c) of the Act provides that one of the objects of the Act is to provide a way of monitoring the effectiveness and administration of provisions relating to safety and health under this Act and other mining legislation.

3.3 The Act achieves that object, in part, by 'providing for inspectors and other officers to monitor the effectiveness of risk management and control at coal mines, and to take appropriate action to ensure adequate risk management'.[173]

3.4 Section 125 provides for the appointment of inspectors. Pursuant to section 128, inspectors have a range of important functions which include:

- enforcing the Act;
- monitoring safety and health performance at coal mines;
- carrying out inspections and audits;
- investigating serious accidents and high potential incidents (HPIs); and
- investigating complaints about matters relating to safety or health.

3.5 In the first tranche of hearings, the Inquiry heard evidence concerning the HPIs at Oaky North, Moranbah North and Grasstree mines. The Inspectorate's response to those matters is considered in Chapter 4 of this Report.

3.6 This chapter is by no means intended to be a comprehensive review of the Inspectorate, such as that contained in the 2005 *Final Report on the Queensland Mines Inspectorate Review* (the 2005 Report)[174] or the 2008 report of the Queensland Ombudsman*, The Regulation of Mine Safety in Queensland: A Review of the Queensland Mines Inspectorate* (the 2008 Report).[175] The chapter considers the Inspectorate's role, capacity and processes, and how these can be strengthened in the future.

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[173] Act section 7(f).
[174] ACIL Tasman, New Horizon Consulting Pty Ltd, Shaw Idea Pty Ltd, *Final Report on the Queensland Mines Inspectorate Review* (2005): OCH.508.001.0001.
[175] Queensland Ombudsman, *The Regulation of Mine Safety in Queensland: A review of the Queensland Mines Inspectorate* (2008).

The establishment of Resources Safety and Health Queensland

3.7 On 1 July 2020, Resources Safety and Health Queensland (RSHQ) became the Regulator for the resources industry, which includes the coal mining industry.[176]

3.8 However, during the period under inquiry the Regulator was Resources Safety and Health, a division of the Department of Natural Resources, Mines and Energy (DNRME).[177] It was a self-contained division of DNRME which operated pursuant to its own compliance policy and operational and strategic plans.[178] The division was headed by the Executive Director, Mr Mark Stone, who reported to the Director-General.[179]

3.9 Mr Stone said that, during the period under inquiry, the Regulator 'was responsible for ensuring the protection of the safety of workers and communities affected by resources operations...'. [180]

3.10 He said that the Regulator had aimed to do so (with respect to mines) by:[181]

> *…conducting announced and unannounced inspections of mine sites, audits of a mine site's compliance with the Act and Regulation, and conducting investigations into serious accidents, high potential incidents ("HPIs") and complaints.*

3.11 Mr Stone said that the Regulator's strategy and operations were directed at reducing serious harm to zero.[182]

3.12 Mr Stone is now the Chief Executive Officer (CEO) of RSHQ.

3.13 The establishment of 'a truly independent regulatory body, charged with responsibility for ensuring the safety and health of Queensland's mine and resource industry workers' was a key recommendation from the *Black Lung, White Lies* Report.[183] The rationale for the establishment of RSHQ was described in submissions to the Board on behalf of RSHQ as follows:[184]

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[176] *Resources Safety and Health Queensland Act 2020* (Qld); SMA.001.001.0001, .0030.
[177] SMA.001.001.0001, .0009.
[178] SMA.001.001.0001, .0009.
[179] SMA.001.001.0001, .0009.
[180] SMA.001.001.0001, .0011.
[181] SMA.001.001.0001, .0012
[182] SMA.001.001.0001, .0011.
[183] Coal Workers' Pneumoconiosis Select Committee, Parliament of Queensland, Report No. 2 *Black Lung White Lies: Inquiry into the Re-Identification of Coal Workers' Pneumoconiosis in Queensland* (2017), page 6 (Recommendation One).
[184] RSH.999.001.0001, .0005; see also Mr Stone's evidence: SMA.001.001.0001, .0030.

The establishment of RSHQ as a statutory body ensures its regulatory independence. It is not part of, or subject to oversight from, an administering department, such as DNRME. It also better ensures there is no competition or conflict between policy objectives around industry facilitation or promotion on one hand, and regulation and protection of safety and health on the other.

Although it was considered these functions were appropriately separated by the Regulator when it was a division of DNRME, the establishment of RSHQ removes the potential or perception of any conflict or erosion of independence.

3.14 Mr Stone confirmed that the establishment of RSHQ has not changed the statutory functions of the Inspectorate or the way the Inspectorate carries out its responsibilities under the Act or the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation).[185]

The composition and resourcing of the Inspectorate

3.15 The Inspectorate is comprised of the Chief Inspector, Deputy Chief Inspector, two regional inspectors (one based in Mackay and the other in Rockhampton), senior inspectors and inspectors.[186] Their roles are hierarchical in nature.[187]

3.16 Mr Peter Newman is the Chief Inspector of Coal Mines. He was appointed to that role in November 2019. He has a Bachelor of Science – Mining Engineering, with Honours, from Imperial College, London.[188] He also holds a First Class Certificate of Competency.[189] Prior to his appointment as Chief Inspector, he had more than 40 years' experience in underground and open cut mines.[190]

3.17 At the time of the public hearings of this Inquiry in August 2020, the Inspectorate comprised 24 inspectors, although there was funding for 28 positions.[191] Chief Inspector Newman was seeking to fill the remaining positions.[192]

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[185] SMA.001.001.0001, .0030.
[186] SMA.001.001.0001, .0012–.0013.
[187] SMA.001.001.0001, .0012.
[188] NPE.001.001.0001, .0001.–0002.
[189] TRA.500.001.0001, .0050, line 34–39.
[190] NPE.001.001.0001, .0002.
[191] TRA.500.001.0001, 0060, line 3–9.
[192] NPE.001.001.0001, .0002; NPE.001.002.0001.

3.18 The inspectors are drawn from a variety of specialist backgrounds, including mining, mechanical, electrical and occupational health. There are 15 mining inspectors.[193] Other than Chief Inspector Newman, two hold a First Class Certificate of Competency.[194] Five hold a Second Class Certificate of Competency, and three hold Site Senior Executive (SSE) qualifications.[195]

3.19 The Board heard evidence that it is difficult to fill inspector positions because there is a limited pool of people in the industry who hold the desired competencies and who are attracted to the role. This is largely due to disparity of remuneration of inspectors, being (on Chief Inspector Newman's estimate) about 30-40% of what is available in the industry, but also because the positions are regionally located.[196]

3.20 Section 126 of the Act provides that an inspector may be appointed 'only if the chief executive considers the person has appropriate competencies and adequate experience to effectively perform an inspector's functions'. The Act does not prescribe that inspectors hold any particular qualifications or certificates of competency. However, in the ordinary course of duty, inspectors would be expected to engage with mine managers and SSEs on a wide variety of technical subjects and, on occasions, to give directives concerning contentious issues. Unsurprisingly, Chief Inspector Newman considered that a First Class Certificate of Competency was a desirable qualification. He said in evidence:[197]

> *[W]e are looking for inspectors who have, in the first instance, a certificate of competency, and desirable that they have a First Class Certificate of Competency, and they've acted as a mine manager, at the very least, an underground mine manager in the industry. That pool of people is a fairly small pool of people.*

3.21 Chief Inspector Newman elaborated on the recruitment issue in a subsequent statutory declaration as follows:[198]

> *10. In an ideal world, a large proportion of coal mining Inspectors would hold First Class Mine Manager's Certificates of Competency.*
>
> *11. The following factors are the present reality for the Inspectorate:*
>
> *a. There is a very limited pool of persons holding a First Class Mine Manager's Certificate of competency in Queensland;*

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[193] TRA.500.001.0001, .0062 line 41; referred to as 13 inspectors in Chief Inspector Newman's supplementary statutory declaration: NPE.001.002.0001, .0002.
[194] TRA.500.001.0001, .0062 line 47.
[195] NPE.001.002.0001, .0002.
[196] TRA.500.001.0001, .0061, line 6–13; NPE.001.002.0001, .0003.
[197] TRA.500.001.0001, .0060, line 46–.0061, line 4.
[198] NPE.001.002.0001, .0003–.0004.

b. There is an aging demographic of those persons;

c. There are challenges to attracting and retaining those limited persons within the existing remuneration structure, noting that the remuneration of inspectors was at one stage in the order of sixty to eighty percent of industry remuneration, but as a result of pay increases in the private sector is now around thirty to forty percent; and

d. The Inspector roles are generally located in regional centres (whereas many underground mine managers and site senior executives fly in and out from Brisbane).

…

13. As detailed in my evidence to the Board of Inquiry, the Inspectorate does face the challenge of retaining persons with First Class Mine Manager's Certificate of Competency given the above factors. In recent years, three persons holding this qualification returned to Industry given the renumeration [sic] *offered and two retired.*

3.22 Thus, there are presently five fewer inspectors with first class qualifications than in the relatively recent past.

3.23 Chief Inspector Newman confirmed there was also a time lag in finding inspectors, with the timeframe for replacement being typically five to six months.[199] There have been five Chief Inspectors in the last ten years and they have faced the same difficulty with resourcing.[200] This is a concerning turnover rate.

3.24 The Mine Managers Association of Australia (MMAA) submitted that the current level of remuneration for inspectors is well short of that which would be necessary to attract and retain suitably qualified persons. It submitted:[201]

> *Eighty percent, we believe, would be a fair reflection commensurate with industry standards. We fully accept that this level of remuneration is above that set within the Public Service however, this is an accurate reflection of the market forces currently at play in the mining industry and any lesser pay scale will result in a lower quality of candidate unless that individual has a highly developed altruistic view on life.*

[199] TRA.500.001.0001, .0061, line 40–47.
[200] TRA.500.001.0001, .0064, line 15–26.
[201] MMA.001.001.0001, .0003.

3.25 Mr Greg Dalliston, a recently retired Industry Safety and Health Representative (ISHR) with a long history of involvement in training and competencies for the industry, suggested that there should be 'an updated review of the inspectorate, including to consider the issue of competencies and pay for the inspectors'.[202]

3.26 The Construction, Forestry, Manufacturing, Mining and Energy Union (CFMMEU) made submissions concerning inspectors' qualifications and remuneration in the following terms:[203]

> *It is not in the interests of safety for coal mine management personnel to be inspected by inspectors with inferior qualifications. If this requirement means that remuneration has to be increased to attract inspectors with first class certificates this should happen.*
>
> *Higher remuneration will also ensure regulatory capture by coal companies is limited and to prevent the role of inspector being used merely to assist with career opportunities in coal companies.*

3.27 The Board notes that remuneration is not the only barrier to attracting applicants with First Class Certificates. As Chief Inspector Newman said, there is an aging demographic of persons who hold a First Class Certificate of Competency and very few new persons in recent years have acquired that qualification.[204]

3.28 The issues of remuneration and recruitment are by no means new. The 2005 Report noted a problem with recruitment, observing that 'the value of inspectorate salaries relative to salaries currently being paid in industry has deteriorated significantly'.[205] The recruitment strategies recommended then were:[206]

> *Three complementary strategies should be used to attract and retain the best quality staff:*
>
> • ***Compete on salary**—use a two-tiered model for salary packaging, tied to independently established market rates for each position, resulting in 70% relativity.*
>
> • ***Compete on lifestyle**—enhance and promote the non-monetary attractions of the job, such as lifestyle benefits.*

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[202] DGR.001.001.0001, .0012.
[203] CMU.008.008.0001, .0004–.0005.
[204] NPE.001.002.0001, .0003–.0004.
[205] ACIL Tasman, New Horizon Consulting Pty Ltd, Shaw Idea Pty Ltd, *Final Report on the Queensland Mines Inspectorate Review* (2005): OCH.508.001.0001.
[206] OCH.508.001.0001, .0011.

- ***Compete on professional fulfilment***—*transform the inspectorate into an employer of choice—an organisation that professionals in the mining industry, and in the safety and health industry, compete to be involved in.*

3.29 It is reasonable to infer that those strategies have not been successfully implemented.

3.30 The 2008 Report noted that an inspector '…could, without great difficulty, almost double his or her salary by moving to a position with a mine operator'.[207] It also referenced a review of the South African mines inspectorate in 1995[208] which recommended benchmarking inspectors' salaries to a percentage of a mine manager's remuneration, in a similar fashion to the recommendation of the 2005 Report.[209]

3.31 The 2008 Report referred to evidence that 'there are always a significant number of vacancies for inspectors'.[210] The Ombudsman concluded that there was 'no obvious solution to this dilemma', and that government '[could not] be expected to match the rewards available in the mining industry'.[211]

3.32 The Board considers that it would be beneficial to the industry for a greater proportion of inspectors to hold a First Class Certificate of Competency. The Board accepts that there are presently a number of significant barriers to that result being achieved.

3.33 RSHQ submitted that the current cohort of inspectors hold appropriate qualifications and experience to carry out their roles under the Act.[212] Whilst the Board heard evidence that the majority of inspectors hold a First or Second Class Certificate of Competency or an SSE notice, the Board also heard that there has been a relative decline over time in the number of inspectors holding the 'desirable' First Class Certificate.[213] Ongoing recruitment difficulty is unlikely to be improved without revisiting the remuneration available to inspectors.

3.34 One option would be to benchmark salaries paid to Queensland inspectors against those paid to mining inspectors in New South Wales with a view to increasing the potential pool of candidates for vacancies in this State.

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[207] Queensland Ombudsman, *The Regulation of Mine Safety in Queensland: A review of the Queensland Mines Inspectorate* (2008), page 22.
[208] The Leon Commission, *Report of the Commission of Inquiry into Safety and Health in the Mining Industry, Volume 1, Braamfontein* (1995).
[209] OCH.508.001.0001, .0011; see also Queensland Ombudsman, *The Regulation of Mine Safety in Queensland: A review of the Queensland Mines Inspectorate* (2008), page 22.
[210] Queensland Ombudsman, *The Regulation of Mine Safety in Queensland: A review of the Queensland Mines Inspectorate* (2008), page 23.
[211] Ibid. page 24.
[212] RSH.999.001.0001, .0016.
[213] TRA.500.001.0001, .0060, line 46–.0061, line 4.

3.35 Further, it is not difficult to imagine that at least some existing inspectors would be interested in advancement to higher competency through in-house professional development if there were a financial incentive to do so. A hierarchical pay structure would reward those who hold higher certificates of competence. This could be by way of a salary loading for holding a First Class Certificate, and an attraction and retention bonus for such holders.[214]

Inspections and audits

3.36 One of the Inspectorate's functions is to conduct inspections and audits to assess whether risk to persons at coal mines is at an acceptable level.[215]

3.37 Mr Stone considered that conducting inspections and audits to assess the effectiveness of controls in place at mine sites, and to support their improvement, was one of the Inspectorate's core activities.[216] He said that, among other things, the Inspectorate uses the inspection and audit processes to check that critical controls are in place at mines.[217]

3.38 The Board notes that critical control management is a recent concept in the Queensland coal industry and is not defined in the Act. Critical control management is considered in Chapter 6 of this Report.

3.39 The Inspectorate undertakes a target number of announced and unannounced inspections each year. Mr Stone gave evidence that the Inspectorate met its target of conducting between 10% and 20% unannounced inspections in the last two financial years.[218] Chief Inspector Newman gave evidence that, last year, approximately 13% of the inspections were unannounced.[219]

3.40 If, as a result of an inspection, an inspector reasonably believes a risk from coal mining operations may reach an unacceptable level, the inspector may issue a directive to the mine to take certain preventative or corrective actions.[220] An inspector may suspend operations if the inspector believes the risk is already at an unacceptable level.[221]

3.41 Mr Stone stated that if an inspector considers the mine is compliant with its safety and health obligations but nonetheless considers there is room for improvement,

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[214] TRA.500.012.0001, .0061, line 12–18.
[215] Act section 128.
[216] SMA.001.001.0001, 0016.
[217] TRA.500.001.0001, .0046, line 20-24.
[218] TRA.500.001.0001, .0041, line 29–36.
[219] TRA.500.001.0001, .0080, line 45–.0081, line 2.
[220] Act section 166.
[221] Act section 167.

the inspector may issue substandard conditions and practices notices (SCPs) or make recommendations to the mine.[222]

3.42 SCPs are not expressly provided for in the Act. However, the Act prescribes that one of the functions of the Inspectorate is to help persons achieve the Act's purposes by providing advice and information on how those purposes are to be achieved.[223] An SCP may provide that advice. If there is a need to reduce risk to persons to an acceptable level, a directive is the appropriate instrument for the inspector to use.

3.43 Inspections are planned in advance. Such planning involves reviewing any recent HPIs and serious accidents at the mine in order to determine the scope and focus areas of the inspection.[224] Any recent HPIs would typically be discussed in the course of the inspection.[225] Mr Kelvin Schiefelbein, Underground Mine Manager (UMM) at Grasstree, gave evidence that, in his experience, methane management was commonly a focus of discussion during inspections.[226]

3.44 Details of inspections, including the issuing of any directives, SCPs or recommendations, are recorded in a Mine Record Entry (MRE) which is kept on the mine record for each mine.[227]

[222] SMA.001.001.0001, .0017.
[223] Act section 128(d).
[224] TRA.500.007.0001, .0021, line 19–42; SMA.001.001.0001, .0029.
[225] See for example, RSH.002.320.0001.
[226] TRA.500.003.0001, .0014, line 18–24.
[227] SMA.001.001.0001, .0016.

3.45 Details of the number of inspections and audits carried out by the Inspectorate are available from the *Commissioner for Mine Safety and Health Annual performance report*. The most recent report contains the data for 2018-2019:[228]

Mine inspections

Table 1: Mine inspections conducted in 2018–19 (compared to 2016–17 and 2017–18)

	2018–19	2017–18	2016–17
Coal mines	365	390	411
Mineral mines and quarries	962	986	1048
TOTAL	1327	1376	1459

Mine audits

Table 2: Mine audits conducted in 2018–19 (compared to 2016–17 and 2017–18)

	2018–19	2017–18	2016–17
Coal mines	60	42	10
Mineral mines and quarries	7	23	42
TOTAL	67	65	52

Figure 11: Number of inspections and audits carried out by Inspectorate in 2018-2019

The Inspectorate's 2017-2018 industry-wide gas management audit

3.46 From time to time, the Inspectorate undertakes industry-wide audits with respect to a particular issue. One such audit in recent years related, relevantly, to the issue of methane exceedance HPIs in underground coal mines.

3.47 In 2016, the Inspectorate observed that a number of methane exceedances in longwall tailgates, which ought to have been regarded as HPIs, had not been reported to an inspector.

[228] Queensland Government, *Commissioner for Mine Safety and Health Annual performance report 2018–2019* (2019), page 14 <https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0011/1478522/mine-safety-health-annual-report-2018-2019.pdf>.

3.48 Accordingly, on 30 January 2017, the then Chief Inspector issued a letter to all SSEs and UMMs advising that if a roadway in a mine has a general body concentration of methane of or greater than 2.5%, it is taken to be dangerous pursuant to section 366 of the Regulation. The letter required that any such incident be reported to an inspector as an HPI.[229] The letter further advised that the Inspectorate would undertake an audit of the gas management systems at all underground coal mines.[230]

3.49 Gas monitoring data was obtained as part of that audit process. Analysis of the data from the period between 1 July 2016 and 30 June 2018 revealed that there had been 759 instances of methane concentration greater than 2.5% in the general body, of which 633, or over 83%, had not been reported to the Inspectorate.[231]

3.50 In June 2019, as a result of that audit process, the Inspectorate published a report, *Methane Management in Underground Coal Mines: Best Practice and Recommendations* (the Inspectorate's Best Practice Report),[232] which made it 'very clear' that there had been under-reporting of methane exceedances across the industry.[233] The Inspectorate's Best Practice Report acknowledged that certain mines had implemented additional risk controls in response to that finding.[234]

3.51 The Inspectorate's Best Practice Report made recommendations with respect to engineering controls, trigger action response plans, gas monitoring systems, tube bundle systems, real time and portable detectors, and the maintenance of detectors.[235]

3.52 The Inspectorate's Best Practice Report also foreshadowed amendments to the Regulation to require that:[236]

- at least one automatic methane detector be installed within 400 metres of the intersection between the longwall face and the return airway; and
- the detector to trip power to the longwall shear and the armoured face conveyor (AFC) when the methane concentration reaches 2.0%.

3.53 Those requirements were subsequently inserted into the Regulation by section 243A, which came into force on 6 January 2020.

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[229] RSH.002.289.0001.
[230] RSH.002.289.0001.
[231] NPE.001.001.0001, .0003; RSH.002.415.0001; SMA.001.001.0001, .0018.
[232] RSH.002.415.0001.
[233] TRA.500.001.0001, .0025, line 31–35.
[234] TRA.500.001.0001, .0025, line 36–38.
[235] RSH.002.415.0001, .0015–.0016; NPE.001.001.0001, .0003.
[236] TRA.500.001.0001, .0025, line 15–.0026, line 15.

3.54 One of the results of that audit process and the Inspectorate's Best Practice Report was an increase in the number of methane exceedance HPIs reported to the Inspectorate.[237]

Investigations into serious accidents and HPIs

3.55 In addition to conducting inspections and audits, the Inspectorate conducts investigations into serious accidents and HPIs at coal mines.[238] A serious accident is an accident that causes death or causes an injured person to be admitted to hospital as an in-patient for treatment.[239] Investigation of serious accidents, especially those involving fatalities, takes priority over other functions, including investigation of HPIs.[240]

3.56 As an illustration of that priority, Chief Inspector Newman stated that, at the time he commenced his role, the equivalent of ten full time inspectors were involved in investigation of serious accidents.[241] That deployment of resources accounted for more than half the number of available inspectors at the time.[242]

3.57 In 2018-2019, the Inspectorate investigated over 90 serious accidents at coal mines, of which three involved fatalities.[243] At present, approximately 30% of the Inspectorate's resources are dedicated to the investigation of serious accidents and HPIs.[244]

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[237] TRA.500.001.0001, .0058, line 43–.0059, line 43.
[238] Act section 128(h).
[239] Act section 16.
[240] TRA.500.001.0001, .0063, line 6–13.
[241] TRA.500.001.0001, .0063, line 20–28.
[242] TRA.500.001.0001, .0060, line 20–22; clarified at TRA.500.001.0001, .0064, line 1–5.
[243] SMA.001.001.0001, .0019–.0021.
[244] TRA.500.001.0001, .0063, line 15–21.

Volume of HPI notifications

3.58 Historical data shows a considerable volume of HPIs (of all kinds) occurring annually in coal mines in Queensland. The following data is extracted from the Queensland *Mines and Quarries Safety Performance and Health Report* for the 2018-2019 financial year:[245]

	2014–15	2015–16	2016–17	2017–18	2018–19
Total HPIs	1928	1833	1879	2092	2117
Quarries	53	54	71	84	78
Minerals	356	279	273	297	313
Coal	1519	1500	1535	1711	1726
Total million hours worked	98	90	91	103	108

Figure 12: Statistics on HPIs in Queensland mines

3.59 From the extract, it is apparent that in the 2018-2019 financial year, the Inspectorate received 1,726 HPI notifications in relation to coal mines.

3.60 The Inspectorate provided data in respect of the period under inquiry, namely 1 July 2019 to 6 May 2020. This data revealed that there were 1,597 HPIs across all Queensland coal mines with the following distribution:[246]

- Surface coal mines – 1,171 HPIs
- Underground coal mines – 426 HPIs

[245] RSH.002.416.0001, .0033.
[246] RSH.002.278.0001, .0007.

3.61 Of the 426 HPI notifications from underground coal mines, 104 were methane exceedance HPIs. Of those 104, 51 occurred in longwall operations,[247] 34 occurred in development operations, and 19 were described as 'other'.[248]

The Inspectorate's attitude to methane exceedances

3.62 Chief Inspector Newman gave evidence that, in underground coal mining, there are a number of hazards which, if not controlled, can result in a methane concentration of 2.5% rapidly increasing to 5%. Those hazards include failure of ventilation, disturbance to ventilation and goaf falls.[249] As a result, he expressed the view that HPIs are of 'critical importance' and should be given particular attention by the Inspectorate.[250]

3.63 Mr Stone similarly considered it 'very important' that the Inspectorate receives HPI notifications in a timely and accurate manner because the occurrence of HPIs may reveal a systemic issue, and it is the Inspectorate's role to ensure such information is communicated to all mine sites.[251]

3.64 Mr Stone said that inspectors are aware that methane exceedances are 'very significant because they have a very high potential for serious harm'.[252]

The Inspectorate's role in the HPI investigation process

3.65 As has already been noted, the Inspectorate has the function, under section 128 of the Act, of investigating HPIs. It was pointed out in submissions by RSHQ that:

> *the level and detail of investigation that is required will vary depending on the circumstances of the HPI. A notification may be sufficiently serious to require mobilisation of an inspector to the mine, or it may require some other intervention, which can be as simple as asking questions…*[253]

3.66 The purpose to be served by investigation is two-fold:

a. to oversee the immediate safety needs presented by the incident, so as to restore an acceptable level of risk;[254] and

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[247] The Board is unaware why the Terms of Reference identified only 40 out of the 51 longwall methane exceedances for inquiry.
[248] RSH.002.278.0001, .0008.
[249] TRA.500.001.0001, .0052, line 23–31.
[250] TRA.500.001.0001, .0054, line 20–40.
[251] TRA.500.001.0001, .0024, line 31–38.
[252] TRA.500.001.0001, .0011 line 24–26.
[253] RSH.999.001.0001, .0018–.0019. See also TRA.500.001.0001, .0096, line 8–13; TRA.500.001.0001, .0075, line 13–24; TRA.500.002.0001, .0016, line 21–24.
[254] SMA.001.001.0001, .0021.

b. to facilitate the Regulator's 'key role in collating, analysing, identifying and proactively disseminating the lessons learnt from data it collects from the industry'.[255]

3.67 In the normal course, consistently with the legislative reporting requirements, the Inspectorate can expect to receive an initial verbal notice of an HPI. Subsequent notifications, within set time frames, are furnished in Forms 1A and 5A,[256] discussed below.

3.68 Under section 198 of the Act, the SSE for a coal mine must notify an inspector, orally or by notice, about a serious accident, HPI or death as soon as practicable after becoming aware of it.

3.69 In practice, the initial verbal report is generally made to the Inspectorate by the UMM.[257] It can be expected to include relevant details about the incident, and the immediate controls applied by the mine.[258] In the event of a methane exceedance, it enables dialogue from which the inspector makes the important assessment whether the mine understands the causes of an exceedance and whether suitable controls are being implemented to rectify the situation or, alternatively, whether an inspector needs to be deployed to the site.[259] From a safety perspective, the importance of that first dialogue lies in the fact that the Form 1A may not be submitted for a further 48 hours[260] (although in practice it will commonly be provided earlier than that). Regional Inspector of Mines (RIOM), Mr Stephen Smith, described the initial verbal exchange as 'critical'.[261]

3.70 The Form 1A sets out a written description of the incident, and although not required by section 198, it normally includes the mine's understanding of the cause of the incident and the controls it has implemented.[262] The Form 1A process also ensures consistency in the reporting format used across the industry.

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[255] NPE.001.001.0001, at .0005.
[256] Neither form is prescribed by law, and the origin of Form 1A is unclear. However, the Queensland Mining Industry Incident Report Manual explains the use of the Form 5A <https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0005/235382/mining-industry-incident-report-manual.pdf>.
[257] SST.001.002.0001, .0003.
[258] SST.001.002.0001, .0003; TRA.500.001.0001, .0075, line 32–35.
[259] TRA.500.001.0001, .0096, line 8–18.
[260] Act section 198(4).
[261] TRA.500.001.0001, .0095, line 5–8.
[262] TRA.500.004.0001, .0022, line 17–22.

3.71 The Form 1A is usually sent to the inspector managing the HPI notification (normally the inspector to whom the verbal notification was made). Upon receipt of the Form 1A, the relevant details are copied from it into an 'Incident Notification Form' kept on Lotus Notes, the Inspectorate's electronic database.[263]

3.72 Since 2019, the Inspectorate has had a practice of forwarding Incident Notification Forms to all inspectors. HPI notifications received over the weekend are summarised at the weekly inspectors' meetings held each Monday.[264] At the time of the commencement of this Inquiry, this was the primary means by which the inspectors shared information about HPI notifications.[265]

3.73 Section 16 of the Regulation provides that the SSE must give notice of an HPI to the Inspectorate within one month of the incident. The Form 5A is used for this purpose. A subset of HPIs is listed in Schedule 2 of the Regulation for the purpose of section 201 of the Act. The SSE is required to prepare a report about such an HPI that includes recommendations to prevent recurrence, and to forward the report to an inspector within one month of the HPI.[266]

3.74 At the time of the commencement of this Inquiry, the Form 5A details were entered into Lotus Notes by the Inspectorate's administrative team and forwarded to the inspector who received the original notification.[267] That inspector then reviewed the Form 1A and Form 5A to ensure the details on both forms were consistent and that the mine's investigation was adequate.[268]

3.75 As to the role of analysing and disseminating learnings from HPIs, the Regulator has adopted recommendations from the Brady Review[269] emphasising the importance of analysis and dissemination of information, including trends. Mr Stone said in evidence:[270]

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[263] SST.001.002.0001, .0003; TRA.500.001.0001, .0097, line 32–.0098, line 24. Lotus Notes is a desktop application that organises and displays databases on a user's local workstation. The physical database files can be stored either on the workstation itself or on a server.
[264] SST.001.002.0001, .0004.
[265] TRA.500.001.0001, .0094, line 2–18.
[266] Act section 201.
[267] SST.001.002.0001, .0004.
[268] TRA.500.002.0001, .0034 line 28–39.
[269] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* (2019) Queensland Department of Natural Resources, Mines and Energy, page v: Recommendations 7 and 8.
[270] TRA.500.001.0001, .0044, line 33–41.

Dr Brady made a recommendation to us in his fatality review that - made four recommendations to us, and two of those are clearly rooted in better collating, analysing and disseminating information. So at the current time we have, I'd say, four data analyst statisticians, certainly three with qualifications in data analytics and mathematics and stats, and we also have officers in other regional offices who, that is their task, to regularly analyse trend the [sic] *incident data.*

3.76 Mr Stone referred to a variety of online publications intended to inform the industry and obligation holders of risks, and to promote safe practices at coal mines. They include:[271]

a. some investigation reports;

b. searchable safety alerts and bulletins;

c. safety performance and health reports;

d. incident periodicals, highlighting significant incidents; and

e. data on safety performance metrics for individual mines.

Limitations of the Inspectorate's HPI investigation process

3.77 The Inspectorate's workload, and the volume of HPI notifications received as part of that workload, has already been referred to. Clearly, an efficient system, including use of electronic aids, is desirable for the management of HPIs. The evidence at the Inquiry revealed some past inefficiencies in the Inspectorate's management of HPI notifications, particularly in the areas of information processing and management.

3.78 Firstly, an inspector receiving verbal notification of an HPI would typically make some record in a personal notebook or other convenient location. The importance of that initial communication has already been referred to. However, Chief Inspector Newman acknowledged that in the 'majority' of cases, the inspector's note or other record of that dialogue was not entered into the electronic database.[272] Similarly, email dialogue that an inspector might have with a mine consequent upon an HPI might not be recorded in the database.[273] In such instances, the Inspectorate's database record of the communication with the mine about the notification would be incomplete in significant respects.

[271] SMA.001.001.0001, .0024–.0025.
[272] TRA.500.001.0001, .0066, line 18–34.
[273] TRA.500.001.0001, .0067, line 23–34.

3.79 Secondly, under the process in place at the time of the commencement of this Inquiry, HPI notifications were made to whichever inspector happened to be on duty, with no flag or alert necessarily being raised, electronically or otherwise, as to where the incident might fit into the mine's past performance, including its HPI history.[274] Further, MREs that may have been completed in relation to a relevant HPI were not routinely linked to the information contained in the Form 1A or Form 5A notification.[275] This also detracted from the ability of an inspector to efficiently review a series of HPIs as a whole. There was at least an undesirable risk of an incident being treated in isolation without sufficient regard for the context in which it occurred.

3.80 This *ad hoc* record keeping obviously fails to serve the interests of proper information sharing, or transparency of and accountability for the Inspectorate's role in HPI management. It is, however, easily rectified by a more disciplined approach to record keeping.

3.81 In Mr Stone's view, inspectors are able to avoid methane exceedance HPIs getting lost in the 'noise' of the larger number of HPIs by virtue of their experience, and the awareness in the industry generally of the significance of such HPIs.[276]

3.82 Mr Stone gave evidence that while sequential HPI notifications were not necessarily received by the same person, he did not consider that a number of similar incidents could be reported without there being an assimilation of that knowledge within the Inspectorate. In his view, the inspectors' meetings guarded against such an occurrence.[277]

3.83 In any event, Chief Inspector Newman described a welcome recent modification to the Lotus Notes database, to electronically flag a mine's HPI history for the benefit of the inspector receiving a notification. He said:[278]

> *[A]s I have outlined in my affidavit, there is a number of stages associated with the improvement of the reporting of HPIs and serious accidents, and the first part of that in relation to HPIs is happening as we speak, and that is associated with some modifications to the Lotus Notes so that when an HPI is reported, the previous HPIs that have occurred at that site are automatically loaded into the incident notification page, so that when the inspector is entering the information into Lotus Notes, they automatically will have a listing of all the other HPIs that have occurred, irrespective of whether they were notified to that*

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[274] TRA.500.001.0001, .0069, line 11–25.
[275] TRA.500.001.0001, .0103, line 39–47.
[276] TRA.500.001.0001, .0011, line 20–26.
[277] TRA.500.001.0001, .0013, line 2–17.
[278] TRA.500.001.0001, .0069, line 11–25.

inspector or not, on that tab, so they can see whether there has been a pattern of HPIs of a similar nature, or in fact other HPIs that have occurred at that site.

3.84 Thirdly, under the process in place at the time of the commencement of this Inquiry, there was no system for ensuring that an inspector with relevant expertise received the HPI investigation. Rather, if the inspector who received the initial notification did not consider they had the appropriate qualifications to manage the notification, the inspector could refer it to another inspector, or the regional inspector.[279]

3.85 RIOM Smith gave evidence that if a mine reported a series of HPIs, but those reports were received by different inspectors, the Form 5As would be provided to the inspector who originally received that particular HPI notification.[280] It was not the case that one inspector would be assigned to review the series as a whole.[281]

3.86 If a series of HPIs was reported to different inspectors, and involved a repetitive contributing factor, no systematic means existed by which that factor would necessarily be noted. Rather, the system relied on collaborative discussion amongst the inspectors.[282]

3.87 Chief Inspector Newman acknowledged a need for additional tools in the prioritisation of methane exceedance HPIs, including trend analysis, to determine if methane exceedances are sufficiently under control.[283] He accepted that both individual and collective consideration of HPI notifications are necessary.[284]

Improvements to the Inspectorate's processes

3.88 Upon commencing his role in November 2019, Chief Inspector Newman undertook a three-month period of engagement with stakeholders, in particular, the inspectors, CFMMEU, mine operators and his counterpart in New South Wales.[285]

3.89 As a result, he recognised there was a need to review and improve the way HPIs were managed by the Inspectorate.[286]

3.90 Chief Inspector Newman gave evidence that the problem of verbal notifications not being recorded in the database was being addressed by a move towards the use of pro forma books for the recording of verbal notifications, with those notes being converted to PDF and uploaded to the database.[287]

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[279] TRA.500.001.0001, .0093, line 31–40.
[280] TRA.500.002.0001, .0034, line 41–47.
[281] TRA.500.002.0001, .0035, line 12–18.
[282] TRA.500.002.0001, .0037, line 21–31.
[283] NPE.001.001.0001, .0005.
[284] NPE.001.001.0001, .0005.
[285] TRA.500.002.0001, .0016, line 37–47.
[286] TRA.500.002.0001, .0017, line 4–18.
[287] TRA.500.001.0001, .0078, line 32–38.

3.91 In addition, Chief Inspector Newman described a three stage process for improvement in efficiency of the Inspectorate's recording, processing and analysis of HPIs.[288] The enhancements are intended to align with the recommendation from the Brady Review[289] concerning the Inspectorate's 'key role in collating, analysing, identifying, and proactively disseminating the lessons learned from data it collects from the industry'.[290]

3.92 Implementation of stage one has commenced. It involves 'a streamlined process' for actioning each HPI reported to the Inspectorate.[291] Once implemented, management of HPI notifications will involve fuller and more centralised use of Lotus Notes for recording purposes, and greater use of its functionality for analysis and review of HPIs. The process will involve the following:

a. If the inspector who receives the HPI notification has sufficient technical and operational knowledge of the subject matter of the HPI, that inspector will manage the Inspectorate's response.[292] If not, management of that HPI notification will be referred to a 'subject expert' inspector;[293]

b. The details of the notification will be recorded, and a notation will be made of the inspector's consideration of the controls proposed by the mine and either their acceptance or a determination of the immediate actions required to be undertaken by the mine;[294]

c. In respect of each notification, the details from the Form 1A will be entered into Lotus Notes;[295]

d. Where it is determined that the actions contained in the Form 5A are adequate, and there is no trend or repeated HPIs, a file note to that effect will be entered into Lotus Notes;[296]

e. If follow up action is required, a file note in Lotus Notes will detail the actions required.[297] All HPIs requiring follow up investigation will be referred to the Chief Inspector and Deputy Chief Inspector through a weekly investigation log and by email;[298] and

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[288] NPE.001.001.0001, .0006–.0009.
[289] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* (2019) Queensland Department of Natural Resources, Mines and Energy.
[290] NPE.001.001.0001, .0005.
[291] NPE.001.001.0001, .0006.
[292] NPE.001.001.0001, .0006.
[293] NPE.001.001.0001, .0007.
[294] NPE.001.001.0001, .0006.
[295] NPE.001.001.0001, .0006.
[296] NPE.001.001.0001, .0008.
[297] NPE.001.001.0001, .0008.
[298] NPE.001.001.0001, .0008.

f. Prior to conducting an inspection, inspectors will review all HPIs in their specialised discipline (mining, mechanical, electrical, occupational hygiene) that have occurred since their last inspection, as well as previous MREs, and confirm that all the controls outlined in the Form 5A have been implemented.[299] All MREs will include the results of the follow up inspection including any directives issued for controls found not to have been implemented.[300]

3.93 Stage two, to be implemented in the third quarter of the 2020-2021 financial year, will mark a substantial change in the management of HPI notifications by moving to a centralised system. It will involve the establishment of a Central Assessment Unit which will be a single point for the reporting of HPIs.[301] A dedicated team of inspectors with mining, mechanical, and engineering expertise will triage the HPI notifications and report learnings to the industry and the Regulator.[302]

3.94 The concept is similar to the Central Assessment Unit in place in New South Wales, as referred to in a report prepared in that State in 2016, *Regulatory Reform Review, Report for NSW Department of Industry, Mine Safety*.[303] The benefit of gaining a 'holistic view of notified incidents' was discussed in that report in the following way:[304]

> *Prior to the formation of the Central Assessment Unit (CAU), we were advised there was no centralised reporting system for incidents. There were a number of problems with this. The absence of a centralised system did not permit senior personnel to have a complete picture of the notified incidents…As a result, it was difficult to analyse any possible patterns or trends from the incidents based on a full set of data and this made it difficult to take a more strategic view. A more centralised system was needed but, as previously mentioned, it was important to maintain the local inspector's link to a mine.*
>
> …
>
> *Mine Safety has now developed a centralised incident reporting mechanism, the CAU that systematically reviews and classifies the significance of incidents. The establishment of the CAU is an important step forward in gaining a holistic view of notified incidents in NSW.*

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[299] NPE.001.001.0001, .0008.
[300] NPE.001.001.0001, .0008.
[301] NPE.001.001.0001, .0008; TRA.500.002.0017, line 15–18.
[302] NPE.001.001.0001, .0009.
[303] New South Wales Department of Industry, *Mine Safety Regulatory Reform Review: Report for NSW Department of Industry* (2016), pages 11–12: OCH.508.001.0457, .0467–.0468.
[304] Ibid.

3.95 As part of stage two, a new incident reporting and management software system to replace the incident reporting function being performed by Lotus Notes has been included in the budget. Its functionality is under development but, significantly, it is intended to be accessible by the industry and the ISHRs.[305] Mr Stone said:[306]

> *The new database will have increased usability, and will increase RSHQ's capacity to interrogate data and identify trends from serious accidents and HPIs using contemporary data analysis methods and tools.*

3.96 Stage three will commence from the fourth quarter of the 2020-2021 financial year.[307] It will involve the establishment of a Serious Accident Investigation Unit which will operate as a single point of contact for serious accidents and will involve specialised inspectors, and an investigation officer, to investigate all fatalities and specified serious accidents.[308]

Regulatory monitoring and reporting on industry safety performance

3.97 This section considers what measures the Regulator should use for monitoring and reporting on safety performance at underground coal mines in Queensland.

3.98 As noted above, part of an Inspector's function under the Act is to monitor safety and health performance at coal mines.[309]

3.99 Safety performance statistics are made available to the public through the annual *Queensland Mines and Quarries Safety Performance and Health Report*[310] and the *Commissioner for Mine Safety and Health Annual Performance Report*.[311]

3.100 Historically, the performance indicator used by the Regulator was the Lost Time Injury Frequency Rate (LTIFR). In the industry, the LTIFR and the Total Recordable Injury Frequency Rate (TRIFR) are still the most widely used indicators of safety performance.

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[305] TRA.500.001.0001, .0071, line 7–29; NPE.001.002.0001, .0006.
[306] SMA.001.001.0001, .0030.
[307] NPE.001.001.0001, .0009.
[308] NPE.001.001.0001, .0009.
[309] Act section 128(b).
[310] RSH.002.416.0001.
[311] Queensland Government, *Commissioner for Mine Safety and Health Annual Performance Report 2018–2019* (2019) <https://www.publications.qld.gov.au/dataset/commissioner-for-mine-safety-and-health-queensland-mines-inspectorate-annual-performance-report>.

3.101 However, the Regulator no longer favours those indicators and has moved towards a practice of reporting the Serious Accident Frequency Rate as a safety measure. Mr Stone said in evidence:[312]

> *[W]e've made it clear in the public domain and to stakeholders during industry leaders briefings and other communications that we hold little regard for the LTI/LTIFR total recordable, for the simple reason that, as you well know I'm sure, the risk is that serious incidents are diluted by many less-serious incidents, so they don't give - they're not useless, but they're not particularly helpful.*

3.102 The following extracts from the *Commissioner for Mine Health and Safety Annual Performance Report 2018-2019*, which relate to the industry's safety performance over a five year period, illustrate why it is appropriate that the Regulator has moved away from the LTIFR as a measure of safety performance. The following figures depict the Serious Accident Frequency Rate and the LTIFR:[313]

[312] TRA.500.001.0001, .0046 line 10–17.
[313] Queensland Government, *Commissioner for Mine Safety and Health Annual Performance Report 2018–2019* (2019), page 10 <https://www.publications.qld.gov.au/dataset/commissioner-for-mine-safety-and-health-queensland-mines-inspectorate-annual-performance-report>.

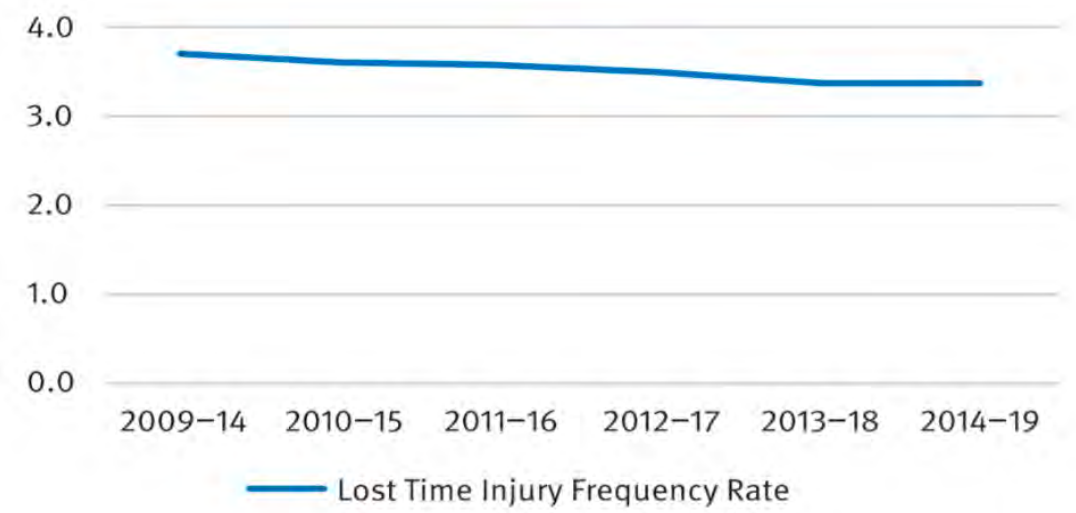

Figure 13: Lost time injury frequency rate for coal mines (lost time injuries per million hours worked) five year rolling average

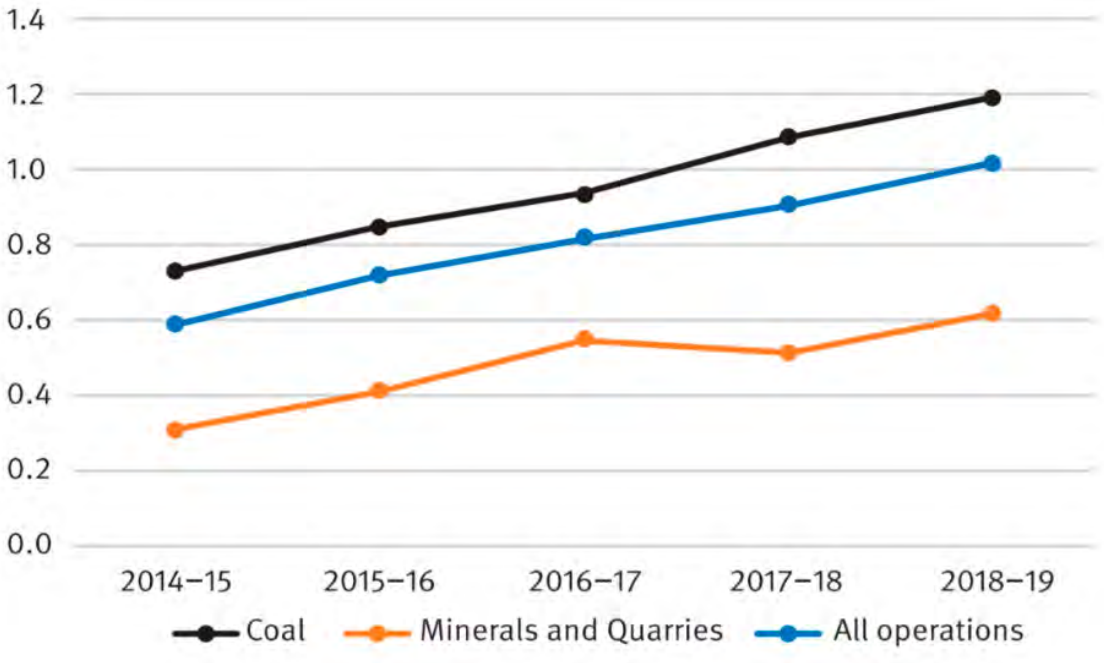

Figure 14: Serious accident frequency rate (serious accidents per million hours worked) 2014–15 to 2018–19

3.103 As can be seen, the extracts show a slight downward trend in the LTIFR but a substantial upward trend in the Serious Accident Frequency Rate. The Serious Accident Frequency Rate graph indicates a deteriorating safety performance across the coal industry but the LTIFR graph, taken by itself, would suggest that there are no emerging issues and that there may even be a slight improvement in safety performance.

3.104 The *Queensland Mines and Quarries Safety Performance and Health Report* for 2018–2019 also reports the Serious Accident Frequency Rate for the industry.[314] The report contains the number of Lost Time Injuries (LTIs) reported over the period but does not report the LTIFR for the same period. This reflects the Regulator's move away from LTIFR as a measure of safety performance.

3.105 This shift in the Regulator's approach is consistent with the following recommendations from the Brady Review with respect to appropriate measures of safety performance:[315]

> *Recommendation 9: The industry should shift its focus from Lost Time Injuries (LTIs) and the Lost Time Injury Frequency Rate (LTIFR) as a safety indicator.*
>
> *Recommendation 10: The Regulator should adopt the Serious Accident Frequency Rate as a measure of safety in the industry.*
>
> *Recommendation 11: The Regulator should adopt the High Potential Incident Frequency Rate as a measure of reporting culture in the industry.*

3.106 The Board considers the HPI Frequency Rate is capable of conveying information about reporting culture *and* the effectiveness of safety and health management systems at mines.

3.107 Accordingly, the Board considers that the Regulator should continue to regard the HPI Frequency Rate as a measure of the industry's reporting culture, and as an indicator of the effectiveness of safety and health management systems.[316]

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[314] RSH.002.416.0001, .0009.
[315] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* (2019) Queensland Department of Natural Resources, Mines and Energy.
[316] RSH.002.416.0001, .0033.

3.108 The Board considers that the HPI Frequency Rate is an appropriate indicator of the effective implementation of critical controls associated with principal hazard management plans (PHMPs). In particular, the auditing of the implementation of critical controls associated with the gas management PHMPs will assist the industry to identify improvement opportunities with a view to preventing methane exceedances.[317] The results of these audits, in conjunction with the HPI Frequency Rate, will assist the industry to have a full picture of its safety performance.

[317] This refers to auditing by the Regulator, as discussed commencing in paragraph 3.36.

Findings and recommendations

Finding 7

It would be beneficial to the industry for there to be a greater number of inspectors who hold a First Class Certificate of Competency.

Finding 8

The Inspectorate continually struggles to attract and retain inspectors, in large part because of the lower levels of remuneration for inspectors compared with positions in the industry.

Finding 9

The Inspectorate has a considerable workload, including receiving a high volume of HPI notifications, of which methane exceedances are an important proportion.[318]

Finding 10

The Inspectorate has a proper appreciation of the significance of methane HPIs in underground coal mines.

Finding 11

The Inspectorate has embraced the recommendation of the Brady Review that it play a key role in collating, analysing, identifying and proactively disseminating the lessons learned from the data it collects from the industry.

Finding 12

There have been some inefficiencies in the past in the Inspectorate's management of HPIs, particularly in the areas of information processing and management.

Finding 13

A program of meaningful improvement is underway involving significant steps, including:

a. streamlining the processing of actioning HPIs, by:

   i. ensuring each HPI is triaged and referred to an appropriately qualified inspector;

   ii. enhancing the use of Lotus Notes (until it is replaced) to record the management of HPIs; and

   iii. requiring inspectors to record the closing out of HPIs;

b. enhancing the functionality of Lotus Notes so that an alert is raised in the case of repeat incidents and trends;

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[318] On the data presented, methane exceedances in underground coal mines occur at the rate of approximately 100 per year: RSH.002.278.0001, .0008.

c. establishing a Central Assessment Unit for processing;

d. replacing the incident reporting function of Lotus Notes with upgraded software, with the new program accessible by the industry and Industry Safety and Health Representatives (ISHRs); and

e. establishing a Serious Accident Investigation Unit.

Finding 14

The Regulator has rightly moved away from LTIFR as a measure of safety performance and adopted the serious accident frequency rate as a measure of safety in the industry. It should regard the HPI frequency rate as being capable of providing information about reporting culture and the effectiveness of safety and health management systems at mines.

Finding 15

Critical controls associated with principal hazard management plans should be monitored and reported on by the Inspectorate. Such monitoring and reporting on critical controls would include those associated with the gas principal hazard management plan.

Recommendations

Recommendation 3

Resources Safety and Health Queensland (RSHQ), in consultation with the Public Service Commission, undertakes a review of remuneration for inspectors:

a. to ensure that such remuneration is structured to attract and retain suitably qualified and experienced persons for such positions; and

b. to provide a financial incentive for inspectors to study to obtain a First Class Certificate of Competency.

Recommendation 4

RSHQ continues to implement the three stage process for improvement in efficiency in the management of HPIs.

Recommendation 5

RSHQ continues to monitor and report the Serious Accident Frequency Rate and the HPI Frequency Rate.

Recommendation 6

RSHQ audits and reports on the proper identification and effective implementation of critical controls associated with the management of principal hazards. In particular, RSHQ focuses on the auditing of critical controls associated with the gas principal hazard management plan.

Chapter 4 - High potential incidents

4.1 The Terms of Reference (**Appendix 1**) require the Board to inquire into the following high potential incidents (HPIs) that occurred between 1 July 2019 and 5 May 2020:

- the single HPI in and around the longwall at Oaky North mine (Oaky North);
- the single HPI in and around the longwall at Moranbah North mine (Moranbah North); and
- the 11 HPIs in and around the longwall at Grasstree mine (Grasstree).

4.2 Each HPI involved a methane exceedance above 2.5% concentration in the course of longwall mining.

4.3 Section 203(1)(a) of the *Coal Mining Safety and Health Act 1999* (the Act) further requires the Board to inquire into the probable causes of the incidents.

4.4 To that end, the Board considered:

- oral or statement evidence (or in some cases both) from representatives of each mine, including the Site Senior Executive (SSE) from Grasstree, the Underground Mine Managers (UMMs) from each mine, other statutory officials and persons concerned in the incidents;
- details of each mine's investigation into the incidents;
- details of each mine's reports to the Inspectorate;
- mine records relevant to the incidents; and
- evidence from Regional Inspector of Mines (RIOM), Mr Stephen Smith, and other inspectors, concerning the incidents.

Oaky North Mine

Introduction

4.5 Oaky North is part of the Oaky Creek Coal complex. It is located in the Bowen Basin, about 90 kilometres north-west of Emerald. As at December 2019, it had a labour force of 450 workers, comprised of 290 employees and 160 contractors.[319]

[319] OCH.504.001.0084.

4.6 The single HPI occurred at longwall 501 (LW 501). This was the fourth panel in the 500 series longwalls. LW 501 had a face width of 351 metres and was 2,983 metres long. The longwall was extracting coal from the German Creek seam. Depth of cover ranged between 215 and 300 metres. A conventional 'U' type ventilation system was utilised. Both pre-drainage and post-drainage of methane gas were employed.[320]

The incident

4.7 The incident at Oaky North occurred at 5:51pm on 6 December 2019. At that time the shearer was 'cutting through a niche' at the tailgate (TG).[321] The Form 1A submitted by the Underground Mine Manager (UMM), Mr Michael Downs, described the incident as involving 'shearing into the TG' and 'cutting into a stub in the blockside'.[322] The Ventilation Officer (VO), Mr Luca Pantano, explained in evidence that a stub would likely be created during development mining as a place for storage of equipment, or for some other purpose.[323] Its location would be mapped on a mine plan.[324]

4.8 An Incident Investigation Report (IIR) was completed by the Explosion Risk Zone (ERZ) controller on duty. A diagram within the IIR depicted the incident scene as follows:[325]

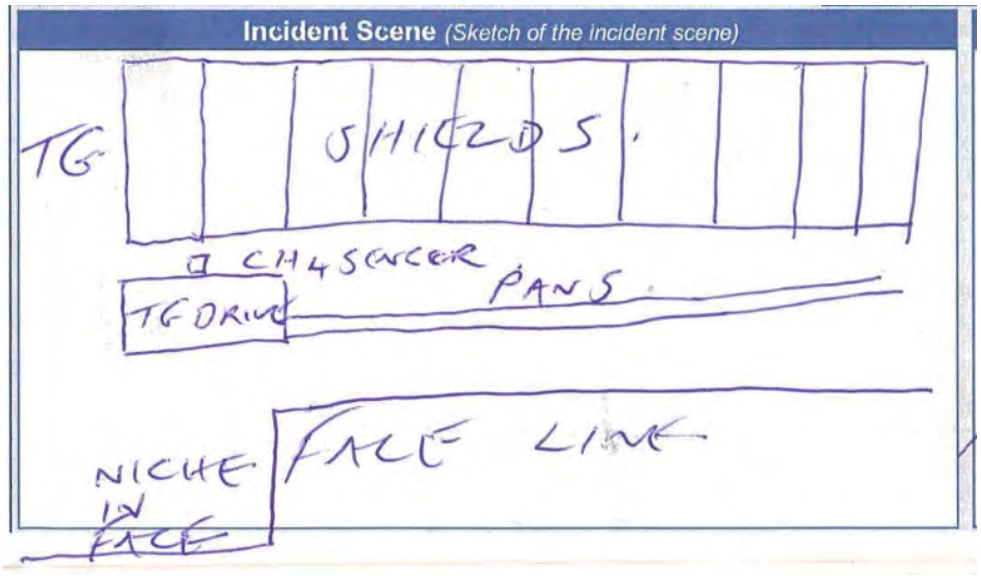

Figure 15: Diagram explaining the incident scene at Oaky North

[320] OCH.503.001.0104, .0110.
[321] OCH.500.001.0110, .0118.
[322] RSH.002.418.0001.
[323] TRA.500.005.0001, .0005, line 5–6.
[324] TRA.500.005.0001, 0005, line 18–20.
[325] OCH.500.001.0110, .0114.

4.9 By reference to the diagram, Mr Pantano explained the exceedance:[326]

> *A. As* [the shearer] *was cutting towards the tailgate, it cut into and exposed access for the ventilation to go through the stub, so it's just opening up another path for the ventilation to travel, which in this case is the path of least resistance.*
>
> *Q. So instead of being confined by the face line --*
>
> *A. Correct.*
>
> *Q.-- as it's drawn in that diagram, the ventilation is allowed to drift into the niche …?*
>
> *A. Correct.*

4.10 The consequence was to 'change the pressure dynamic around that tailgate drive area…[which] brings the goaf stream forward'.[327]

4.11 The immediate action taken by the ERZ controller was to run a brattice curtain from shield #190 to shield #203, a distance of about 20 metres.[328] This was to 'course airflow into the TG proper',[329] so as to 'keep goaf gases back'.[330] The installation was said to have 'worked well', with the methane reading on the sensor reducing to 0.45%.[331]

4.12 In an email later that day to the SSE, Mr Bradley Watson, UMM, and others, Mr Pantano set out the sequence of sensor readings, showing that the exceedance occurred between about 5:56pm and 6:04pm, peaking at 2.84%, and persisting for about eight minutes.[332]

4.13 The UMM was not on duty at the time of the incident but was informed by phone. He returned to the mine to give direction to the oncoming nightshift crew concerning installation of a Sherwood curtain,[333] as a further measure 'to provide more control over the TG area airflow'. [334]

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[326] TRA.500.005.0001, .0005, line 34–45.
[327] TRA.500.005.0001, .0006, line 1–2.
[328] OCH.500.001.0110, .0118.
[329] RSH.002.418.0001.
[330] OCH.500.001.0211, .0217.
[331] OCH.500.001.0122, .0123.
[332] OCH.500.001.0211, .0217.
[333] An example of a Sherwood curtain is displayed in Figure 16, from ACM.004.003.0002, .0013.
[334] DMI.001.002.0001, .0005; RSH.002.418.0001.

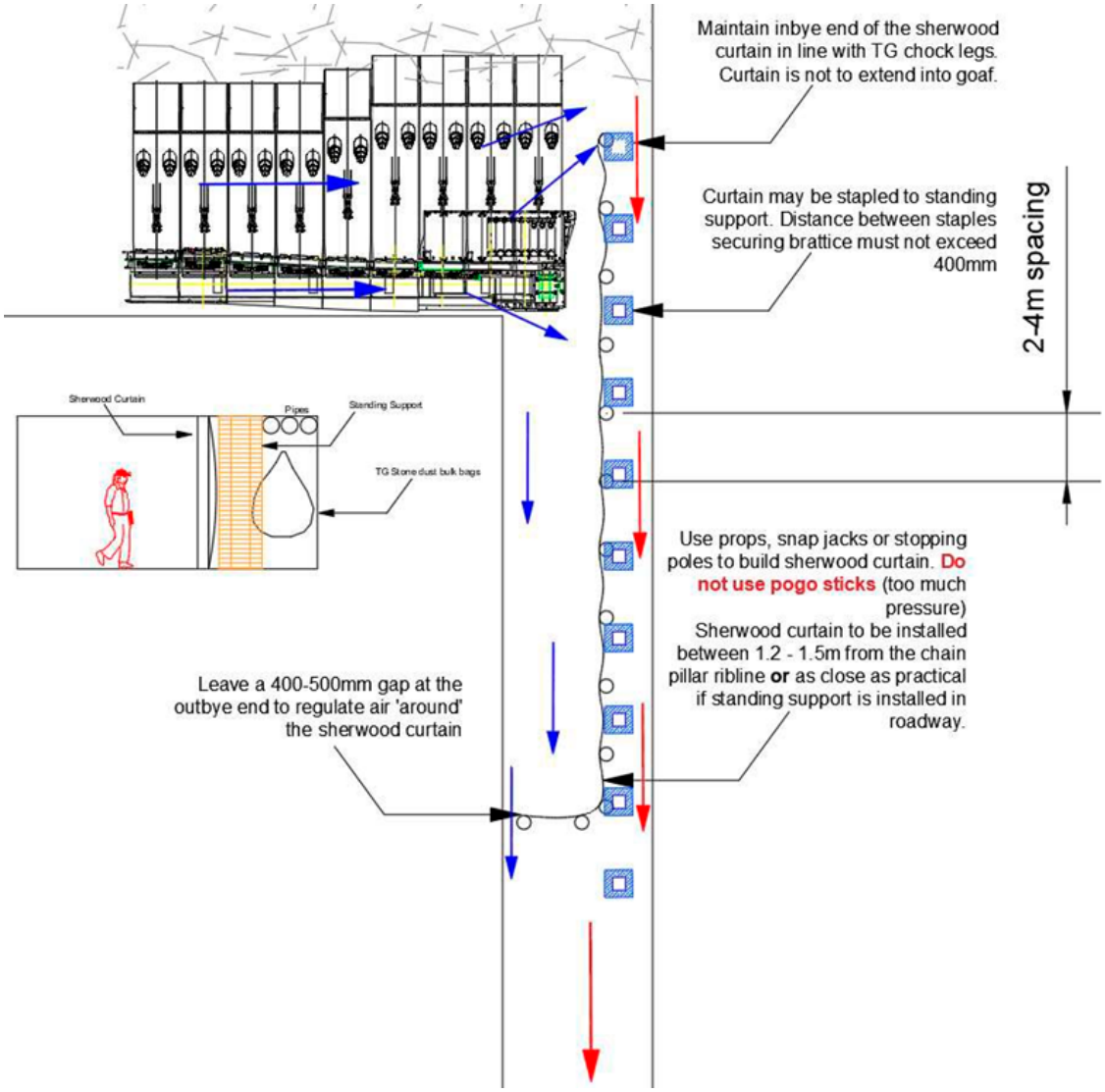

Figure 16: Example of a Sherwood curtain

4.14 Mr Pantano gave further updates to the SSE and UMM by email on the mornings of 7 and 8 December 2019.[335]

[335] OCH.500.001.0211, .0216.

4.15 The IIR recommended that in future the brattice curtain be set up in advance 'to prevent this issue happening again'.[336] Although the location of the stub had been known in advance of the incident, no such precaution had been taken for the reason that there had been two previous instances of mining into a blockside stub on that longwall where no exceedance had occurred.[337]

4.16 Forms 1A and 5A were submitted to the Inspectorate as required.[338]

4.17 Subsequently, a number of steps were taken, apparently at the instigation of the SSE, to ensure there could be no recurrence of such an incident. These were described by Mr Pantano, as follows:[339]

a. *…mandatory installation of a Sherwood curtain when intersecting a blockside stub, as a requirement contained in the permit to mine for the next two stubs in LW 501;*

b. *inspection of the Sherwood curtain installation at the 11ct*[340] *location against the existing standard contained in STD0976OCN Longwall 501 Ventilation and Gas Standard;*

c. *the development of a work instruction for holing in to blockside stubs in consultation with two separate longwall crews,… now contained in the current Safety Health Management System…; and*

d. [a direction was issued by the SSE] *to backfill any blockside stubs…on future…longwall blocks* [with grout or cementitious material][341] *before production reaches the blockside stubs,* [with a view to eliminating the methane hazard in the future].

4.18 There is no reason to doubt the efficacy of these measures, which reflect a concerted response to the incident by mine management. No further HPIs were experienced during the period of inquiry specified in the Terms of Reference.[342]

4.19 The IIR was subsequently reviewed by a number of managerial personnel at site level.[343] The HPI was reported to GCAA senior management by way of an email titled 'GCAA Reportable Incident Notification' which was distributed widely,

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[336] OCH.500.001.0110, .0120.
[337] PLU.001.002.0001, .0004.
[338] RSH.002.418.0004; RSH.002.417.0001.
[339] PLU.001.002.0001, .0004.
[340] Cut-through.
[341] TRA.500.005.0001, .0015, line 2–4.
[342] Appendix 1.
[343] OCH.500.001.0110, .0120; consistent with the *Incident Reporting and Investigation Procedure*: OCH.505.002.0001.

including to the Chief Operating Officer, directors of all companies within the GCAA corporate structure, and all general managers.[344]

4.20 Further consideration was given to the incident by the SSE, resulting in the additional measures described above.[345]

Findings

Finding 16

The HPI was caused by the shearer cutting into a blockside stub, which affected ventilation flow at that point, allowing the goaf stream to move forward onto the face.

Finding 17

The incident was unexpected. Whilst the location of the stub was known in advance, there had been two prior instances of mining through a blockside stub on the same longwall block without causing an exceedance.

Finding 18

The event resulted from the failure to install a brattice curtain. The event was not indicative of a failure of the overall ventilation system.

Finding 19

Once the incident occurred, it was appropriately managed by a number of measures:

a. the ERZ controller attended promptly and commenced appropriate rectification to reduce the methane level within a short time;

b. the VO circulated relevant data to the SSE, UMM and others by email; and

c. the UMM, who was absent at the time, returned to the mine to assess the situation and implement further controls.

Finding 20

Subsequently, engineering controls, as well as altered procedures, were put in place to prevent a recurrence. The mine backfilled the stubs before mining through them.

Finding 21

Glencore did not classify the methane exceedance as an HPRI for investigation purposes.

Finding 22

The investigation and subsequent corrective actions are a good example of learning from the experience of an HPI and putting in place controls to prevent recurrence.

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[344] Submission received from GCAA on 30 October 2020 in response to a draft chapter.
[345] Paragraph 4.17.

Moranbah North Mine

Introduction

4.21 Moranbah North is located 16 kilometres north of the Moranbah township, and approximately 220 kilometres south-west of Mackay. It adjoins Grosvenor mine. As at May 2020, it had a labour force of 1,193 workers, made up of 435 employees and 758 contractors.[346]

4.22 The single HPI occurred at LW 604. That longwall block is 3,818 metres long with a face width of 300.6 metres. Coal is extracted from the Goonyella Middle Seam (GMS), the depth of which ranges from 270 to 327 metres.[347]

The incident

4.23 The incident occurred on 20 July 2019 at approximately 11:50am. Five operators were on the face at the time.[348]

4.24 The Form 1A submitted by the UMM, Mr Michael Lerch, referred to 'methane exceedance peaking at 3.36% at LW TG drive'.[349] The contributing factors were listed as:[350]

- *Shearer cutting into TG when goaf flushing caused a methane exceedance at the TG drive tripping power.*
- *Goaf hole not yet online but in goaf.*
- *Floor emissions in goaf contributing to exceedance.*

4.25 Mr Scott Fraser was the ERZ controller on duty. Longwall coordinator, Mr Kelvin Sloan, was also on duty on the day of the incident, and was subsequently the lead investigator for the Learning From Incidents (LFI) process.

4.26 Drawing on Mr Fraser's initial reports,[351] the LFI report gave this description of the event:[352]

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[346] AAMC.001.036.0001, .0005–.0006.
[347] AMN.002.001.0691, .0695–.0696.
[348] AAMC.001.001.0824, .0828–.0829.
[349] AAMC.001.001.0857.
[350] AAMC.001.001.0857–.0858.
[351] AMN.003.001.0001; AMN.003.0001.0005.
[352] AAMC.001.001.0824, .0826.

Power to LW604 face tripped back to the DCB[353] at 11:50am on the 20th of July while completing the 2nd run into the TG. During the initial investigation the face ERZ Controller identified methane (CH4) blowers in the floor between #105 and #110 PRS[354] and a GB[355] CH4 concentration up to 2.3%. Further investigation found the TG drive CH4 sensor had failed and there was >2.5% CH4 in the TG roadway.

Leading up to the time of the event CH4 level in the TG roadway was between 1.6% and 2%. At 12:12pm the TG outbye sensor passed 2.5% CH4, peaking at 12:22pm at a GB concentration of 3.36% CH4 and did not drop below 2.5% until 1:25pm. SO670A was the closest goaf drainage well but was in standby mode due to low methane and high oxygen (O2).

4.27 The timeline of events was compiled by a Control Room Operator (CRO) and circulated to relevant parties by email at 1:46pm. The sequence was:[356]

The below is the time line from control

1144	Shearer in TG
1152	K Sloan: ask Seamgas to see if they can increase CH4 suction
1159	CH4 on face TG drive rising
1159	CH4 sharply rises to over 3% and sensor falls and goes into negative reading, U/M V/O notified
1205	TG inby sensor rising to over 3% max reading 3.29% at 1208
1210	SO670A turned up to draw 300l/s
1217	TG O/B sensor rises to over 3% max reading 3.40% at 1218
1230	S Fraser #97 >1% rear walkway, #99 > 1% walkway, #108 GB 2.3%, TG off scale
1231	Audible blower rear #109
1230	SO670A flow from 305 l/s to 1219 l/s
1234	Contacted M Lerch, Plan in place to brattice chocks to flush rear of chocks, called S Dobbie, P Tarte, B Kelly, D Bruce
1327	K Sloan booking out Brattice, Gas detectors, probe, venturi, etc.
1343	Time of email TG inby 2.09% CH4 O/B 2.38% CH4

Figure17: Timeline of events compiled by CRO

4.28 The TG drive sensor apparently failed, but readings in excess of 3% were recorded at both the TG inbye and TG outbye sensors.[357] Mr Fraser used his personal gas detector (PGD) to record readings near to the failed sensor, and in the TG roadway. His Hazard Incident Report[358] notes that in each location methane greater than 2.5% was detected, but does not specify the readings. PGDs typically read to a maximum concentration of 5%. The CRO's inclusion of the words 'TG off scale' in the timeline above (at 1230), is therefore a likely reference to the presence of methane at an explosive concentration.

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[353] Electrical distribution and control box in the maingate.
[354] Powered roof support.
[355] General body.
[356] AAMC.001.001.0824, .0844.
[357] TRA.500.004.0001, .0104, line 35–42; AAMC.001.001.0824, .0826.
[358] AMN.003.001.0001.

4.29 The cause of the tailgate sensor failure has not been described in the evidence put before the Inquiry. It is noted that catalytic diffusion type sensors may fail when exposed to explosive concentrations of methane.[359]

4.30 'Floor blowers', associated with floor heave, allowed methane to be released from the Goonyella Middle Lower seam (GML).[360] The GML was only 0.2-0.3 metres below the mined area at the time.[361]

4.31 Another factor, as noted in the LFI report, was that the most proximate gas drainage borehole, SO670A, was in standby mode at the time. This was a deliberate course, acting on the applicable TARP,[362] due to elevated oxygen levels within the extracted gas mix.[363] It came back online at 12:30pm, as indicated in the timeline above.

4.32 The immediate action taken, involving redirection of ventilation to dilute the methane, is summarised in the LFI report:[364]

> *The face ERZ Controller used cool tubes and brattice sails along the face to direct ventilation into the rear walkway and dilute CH4 make from #105 PRS to the TG. The TG drive, TG CMU,[365] and the shearer were checked internally for gas, and the incident site was then cleared by the Undermanager in consultation with the Underground Mine Manager. Production then recommenced at 5:30pm.*

4.33 Mr Sloan said that the action to redirect ventilation was a sufficient response to enable production to resume.[366] However, this was not achieved until 5:30pm, by which time more than 5.5 hours of production had been lost.[367]

4.34 The circumstances of a floor heave in proximity to the lower seam raised a question whether there had been appropriate gas drainage of that lower seam.[368] The LFI process involved review of the adequacy of that pre-drainage.

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[359] Rhodes, K., *Infrared vs. Catalytic Bead Technology: Pros & Cons* (2013) Petro Industry News <https://www.petro-online.com/article/safety/15/oldham-gas-detection/infrared-vs-catalytic-bead-technology-pros-amp-cons/1415>.
[360] TRA.500.004.0001, .0105, line 36 to .0106, line 6; TRA.500.004.0001, .0115, line 20–22.
[361] AAMC.001.001.0824, .0829.
[362] Trigger Action Response Plan.
[363] TRA.500.004.0001, .0104, line 12–30; TRA.500.004.0001, .0106, line 8–16.
[364] AAMC.001.001.0824, .0826.
[365] Control Monitoring Unit.
[366] TRA.500.004.0001, .0102, line 39–.0103, line 1.
[367] TRA.500.004.0001, .0103, line 10–12.
[368] TRA.500.004.0001, .0107, line 24–33.

4.35 The first action identified by the LFI report was to 'revise the UIS[369] strategy in similar areas to ensure adequate drainage of the GML'.[370] Mr Sloan's evidence was that prior to this incident no issues had presented themselves with respect to drainage of the GML.[371] For future blocks, it was resolved to review the GML gas content with a view to ensuring effective drainage. The course adopted was to revise the UIS 'floor touch' strategy for pre-drainage of the GML seam, by increasing the number of floor touches.[372] This was described by Mr Sloan in evidence:[373]

> *Q. And you were in the course of describing … what consequential action was taken upon that review?*
>
> *A. Yes. What we've done - sorry, it was the technical department, they put some more floor touches in to drain that gas out of the GML seam to stop that event from occurring again.*
>
> *Q. I'm going to ask you to try to explain to laypeople, including me, what floor touches are?*
>
> *A. When we do our UIS gas drainage, it's done in seam, and they can veer off and go to a roof touch or a floor touch, so that's modifying the drilling to get that gas drainage into the floor.*
>
> *Q. At the risk of oversimplifying, was the result of the review to undertake more pre-drainage?*
>
> *A. Yes, that's correct.*

[369] Underground in seam gas drainage.
[370] AAMC.001.001.0824, .0831.
[371] TRA.500.004.0001, .0109, line 6–12; TRA.500.004.0001, .0112, line 28–30.
[372] As depicted in AMN.004.001.0003.
[373] TRA.500.004.0001, .0110, line 4–24.

4.36 Figure 18 provides a schematic of the GML floor touch strategy with an exaggerated vertical scale. This method was subsequently applied to LW 605.[374]

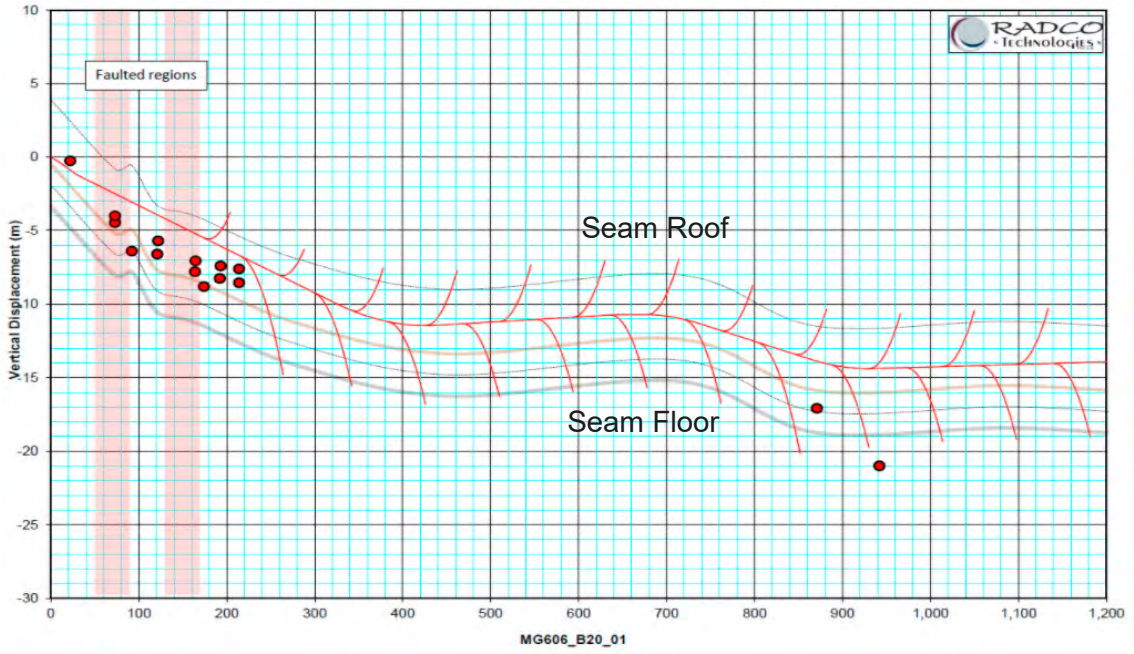

Figure 18: Diagram explaining GML floor touch drainage

4.37 For the purpose of understanding the diagram, the red dots should be ignored. The drainage hole, with seam floor and roof touch branches, is indicated in red. The floor and roof of the GML seam are indicated by the grey boundary lines.

4.38 For LW 604, the course adopted was to increase goaf drainage by drilling additional holes from the surface to maintain 50 metre spacing of drainage holes, instead of the planned 100 metre spacing.[375] This involved engaging a surface drill team over 'a couple of weeks' to achieve that 50 metre spacing.[376]

4.39 There was no recurrence of the incident, or any other methane HPI, for the period of inquiry specified in the Terms of Reference.

Findings

Finding 23

The cause of the HPI was floor heave and floor breaks, allowing methane to be released from the Goonyella Middle Lower seam (GML), which was only 0.2–0.3 metres below the mined area.

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[374] AMN.004.001.0003, .0015.
[375] TRA.500.004.0001, .0110, line 29 to .0111, line 31.
[376] TRA.500.004.0001, .0112, line 1–11.

Finding 24

An event of that kind had not previously been experienced on LW 604.

Finding 25

Contributing factors were insufficient pre-drainage of the GML, and that the most proximate gas drainage borehole was in standby mode at the time.

Finding 26

The issue was immediately managed by redirection of ventilation using brattice sails to dilute the methane.

Finding 27

On the evidence of the Control Room Operator's (CRO) email,[377] which noted gas concentration as 'TG off scale', this methane exceedance may have risen to a point within the explosive range in the tailgate area.

Finding 28

Moranbah North management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

Finding 29

The gas drainage critical control failed as a result of the inadequate drainage of the GML. This incident was not indicated on the LFI report as a failure of a critical control.

Finding 30

With a view to minimising risk of recurrence, engineering controls were adopted:

a. for LW 604, by increasing goaf drainage through drilling additional drainage holes from the surface, to maintain 50 metre spacing; and

b. for future longwall blocks, by revising the UIS strategy to ensure adequate drainage of the GML.

Finding 31

The investigation and subsequent corrective actions are a good example of learning from the experience of an HPI and putting in place engineering controls to prevent recurrence.

[377] Paragraph 4.27.

Grasstree Mine

Introduction

4.40 Grasstree is located approximately 37 kilometres south-west of Middlemount and 120 kilometres north-west of Emerald in the Bowen Basin. Together with Capcoal Open Cut Mine, it forms the Capcoal complex.[378] As at May 2020, it had a labour force of 782 workers, made up of 431 employees and 351 contractors.[379]

4.41 Development of Grasstree commenced in 2003 with the first longwall coal produced in 2006. The mine layout consists of two longwall areas known as the 800 and 900 series panels. Mining is undertaken at an average depth of 370 metres.[380]

4.42 The first of the HPIs occurred at LW 909 in July 2019. LW 909 was the production panel immediately preceding LW 808. The remaining ten HPIs occurred at LW 808 after it commenced production in mid-October 2019. LW 808 was the eighth longwall block to be extracted in the 800 series. The previous seven longwalls had been extracted and sealed.

HPI # 1 – 28 July 2019[381]

4.43 The first incident involved a peak methane reading of 2.98%.[382] The LFI report gives the following description of steadily rising gas levels at the tailgate through the day, culminating in an exceedance from 1:15pm:[383]

> *At approximately 09:00hrs on 28th July 2019 the CH4 concentration in the LW909 tailgate roadway, located outbye the longwall face, began increasing at a steady rate coincident with the falling barometric pressure. At approximately 11:00hrs the CH4 concentration had reached 1.90% and LW coal production ceased and the TG CH4 concentration continued to rise, reaching a maximum and started levelling off at 2.25% between 12:40 to 12:50hrs. At approximately 13:10hrs there was a sudden rise in the TG CH4 concentration, reaching 2.5% at 13:15hrs.*
>
> *…*
>
> *The LW tailgate CH4 concentration continued to rise and levelled off, reaching a maximum concentration of 2.98% at 14:48hrs.*

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[378] For mine history and background see ACM.002.001.0736, .0741.
[379] AAMC.001.036.0001, .0005–.0006.
[380] TGA.001.001.0001, 0005.
[381] Anglo Incident No. 206200.
[382] AAMC.001.001.0675, .0677.
[383] AAMC.001.001.0675, .0677.

4.44 In his IIR, the ERZ controller identified that there had been equipment failure at a goaf drainage hole. The IIR noted:[384]

> *…[t]he 11ct hammer hole being used for goaf drainage of LW909. Compressor blown radiator hose which isolated gas extraction on a falling barometer which elevated TG909 GB gas levels.*

4.45 The LFI report stated that an investigation of 'surface goaf drainage arrangements found there was no goaf gas drainage from the…11ct hammer hole due to a blown hydraulic oil hose on the diesel compressor'.[385] The compressor was powering a goaf drainage venturi set.[386] As a result, there was a loss of tailgate goaf gas extraction.[387] The Form 1A completed by the UMM noted 'goaf bore hole deterioration' as a contributing factor, although this was not subsequently referred to in either the Form 5A or LFI report.[388]

4.46 The Form 5A, submitted by the UMM, Mr Kelvin Schiefelbein, noted that '[g]as drainage was already at full capacity due to strata issues and due to falling barometer issues when a plant failure also occurred'.[389] He further noted that there was 'no redundant capacity' in the goaf drainage plant to meet any plant failures.[390] The seamgas technical officer attempted to locate a replacement hydraulic hose, which was not readily available.[391] Instead, the affected compressor was 'replaced by a compressor from a less critical goaf drainage venturi'.[392]

4.47 The new compressor was enabled and the 11 cut-through hammer hole venturi was returned to operation at approximately 3:00pm. This coincided with a reduction in longwall tailgate methane concentration below 2.5%.[393]

4.48 Although the immediate issue of a failed radiator hose was able to be rectified after some hours of lost production, the bigger issue was inadequate goaf drainage.

4.49 The Technical Services Manager, Mr Tim McNally,[394] gave evidence concerning the process of assessment of goaf drainage needs prior to longwall production. Amongst other responsibilities, his department was involved in planning and

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[384] AAMC.001.001.0675, .0687.
[385] AAMC.001.001.0675, .0678.
[386] AAMC.001.006.0463, .0464.
[387] AAMC.001.001.0675, .0679.
[388] AAMC.001.006.0454.
[389] AAMC.001.006.0463, .0464.
[390] AAMC.001.006.0463, .0465.
[391] AAMC.001.001.0675, .0678.
[392] AAMC.001.001.0675, .0679.
[393] AAMC.001.001.0675, .0679.
[394] Mr McNally is the holder of a First Class Mine Manager's Certificate of Competency: TRA.500.002.0001, .0054, line 1–11.

implementing gas drainage.[395] External technical reports were obtained to make decisions around goaf drainage infrastructure in the planning phase.[396] The goaf drainage capacity sought to be achieved was based upon a prediction of peak demand, which is 'the maximum expected quantity that we anticipate for all of the [potential prevailing] factors to coincide together'.[397] It appears from his evidence that no spare capacity beyond the prediction of 'peak demand' had been factored into the gas drainage plan.

4.50 The IIR contains a list of proposed corrective measures, devised by Mr Ben Millar, the mine senior official (MSO),[398] and assigned to Mr McNally:[399]

- *review and implement access rights to remotely monitor goaf well performance for VO, UMM, CRO and MSO (read only);*
- *review and implement compressor and goaf drainage critical spare list and stock store;*
- *setup 17ct hammer hole to extract;*
- *review and implement total goaf extraction capacity and increase total availability; and*
- *implement an alarming system to the control room with hole performance.*

4.51 As to that list, Mr McNally said:[400]

> *…[s]ome of these actions are rather large and have a fair amount of delegated authority, so there was certainly an opportunity for me to challenge them and decide on the veracity of those actions at a later date.*

4.52 After review, all five measures were supported by Mr McNally, and were entered into Enablon without alteration.[401] They were subsequently closed out by Mr McNally. As to the fourth measure, concerning goaf extraction capacity, Mr McNally said:[402]

> *We started off with the base case, which I talked about earlier, the Roy Moreby report. We took that and we looked at what we actually received from SGE,*[403]

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[395] Mr McNally described his department's responsibilities as 'strategic long–term management of mine planning, of ventilation, of mining geomechanics, surveying and … technical assurance of the mine': TRA.500.003.0001, .0086, line 10–19.
[396] TRA.500.003.0001, .0086, line 29–36.
[397] TRA.500.003.0001, .0087, line 15–32.
[398] An MSO is also commonly referred to as an undermanager in the mining industry.
[399] AAMC.001.001.0675, .0687; TRA.500.003.0089, line 24–30.
[400] TRA.500.003.0001, .0090, line 23–26.
[401] TRA.500.003.0001, .0090, line 40–.0091, line 1.
[402] TRA.500.003.0001, .0095, line 45–.0096, line 2. There is no criticism of Mr Moreby's report.
[403] The acronym SGE in this quote stands for specific gas emission.

and what we found was that report was prone to underestimate our peak demands at points in time by a significant margin.

4.53 The result, he said, was for the mine to 'buy an additional four blowers[404]… which gave us an extra 8,000 litres per second of capacity'.[405] The blowers were obtained from Germany at a cost, according to Mr Schiefelbein, of 'millions of dollars'.[406]

4.54 Pending the arrival of the blowers, the strategy was adopted of increasing the number of compressors. Mr Schiefelbein explained:[407]

[T]he compressor failure that we spoke of, where we had one compressor driving a Venturi, we viewed that putting two compressors in the same location, so that in the event of one compressor failing in the future, the other one would still operate and there still would be redundancy, that was taken almost immediately, and we apply that to any of our goaf wells that have a Venturi and a compressor and are running in a critical state sense.

4.55 On the same topic, Mr McNally added:[408]

From the point in time where that event occurred, our compressor or Venturi-driven capacity was increased by nearly 10,000 litres per second, which required the additional hire of 10 compressors, a number of Venturi units that we had to borrow from other mine sites.

…

[W]e needed to take some pretty significant steps until we could procure the blowers, which was a complex engineering task in buying them and took some time.

Findings

Finding 32

The cause of the exceedance was goaf drainage plant failure, due to a burst radiator hose on a compressor, at a time when the goaf drainage system was operating at full capacity.

Finding 33

It was plainly unacceptable from a safety and production perspective for the goaf drainage system, fundamental to safe mining, to fail for want of a radiator hose.

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[404] Vacuum plants.
[405] TRA.500.003.0001, .0096, line 28–34.
[406] TRA.500.003.0001, .0033, line 32–44.
[407] TRA.500.003.0001, .0034, line 28–36.
[408] TRA.500.003.0001, .0105, line 18–29.

Finding 34

The corrective measures to increase goaf drainage capacity were effective in preventing further recurrences.

Finding 35

Grasstree management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

Finding 36

The gas drainage critical control failed as a result of the plant failure when the goaf drainage system was operating at full capacity. This incident was not indicated on the LFI report as a failure of a critical control. [409]

Finding 37

The investigation and subsequent corrective actions are a good example of learning from the experience of an HPI and putting in place engineering controls to prevent recurrence.

HPI # 2 – 25 October 2019[410]

4.56 The second HPI occurred at LW 808 on 25 October 2019, a few days after production commenced on that longwall.[411]

4.57 At 6:05pm the shearer stopped and latched due to methane concentration being greater than 1.9% at the tailgate roadway sensor. The ERZ controller, Mr Graeme Read, conducted an inspection. At 6:35pm, he detected a methane reading of 2.56%[412] on his PGD, in the tailgate between the face and 19 cut-through. This was reported to the MSO.[413] The tailgate roadway sensor was reading just over 1.9%.[414] The duration of the exceedance is not clearly indicated in the documents.

4.58 The Form 1A attributed the exceedance to 'a goaf fall event [that] caused an increase in gas make'.[415] The goaf fall was the first caving of the longwall panel.[416]

4.59 The immediate solution was to run a brattice wing to 'allow for additional air to be pushed up the tailgate roadway to provide adequate dilution'.[417]

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[409] AAMC.001.001.0675, .0679.
[410] Anglo Incident No. 211887.
[411] AAMC.001.006.0437, .0438.
[412] Referred to as 2.76% in the Form 1A: AAMC.001.006.0437, .0438.
[413] AAMC.001.001.0810, .0820.
[414] AAMC.001.001.0810, .0814.
[415] AAMC.001.006.0437, .0438.
[416] AAMC.001.006.0437, .0438.
[417] AAMC.001.001.0810, .0814.

4.60 The UMM's Form 5A, furnished on 21 November 2019, gave more detail of the suspected cause:[418]

> *[During] the caving of the longwall strata, gas emissions increase. itn* [sic] *this case the first caving of the longwall was large and high gas emissions occurred. [T]he goaf gas drainage was ineffective in controlling these emissions.*

4.61 As to preventative action, the UMM suggested to 'install the sherwood curtain prior to first caving next time'.[419]

4.62 The LFI report identified a different cause of the exceedance to that outlined in the Forms 1A and 5A.[420] The exceedance was attributed to a particular ventilation arrangement in the tailgate that had not been properly implemented.

4.63 LW 808 was established with two tailgate roadways being available for ventilation, as there was no adjacent goaf.

4.64 The ventilation arrangement is illustrated in the diagram below:[421]

[418] AAMC.001.006.0442, .0443.
[419] AAMC.001.006.0442, .0444.
[420] AAMC.001.001.0810, .0815.
[421] AAMC.001.001.0810, .0818. Note that the 'C' and 'A' marks have been added for clarity.

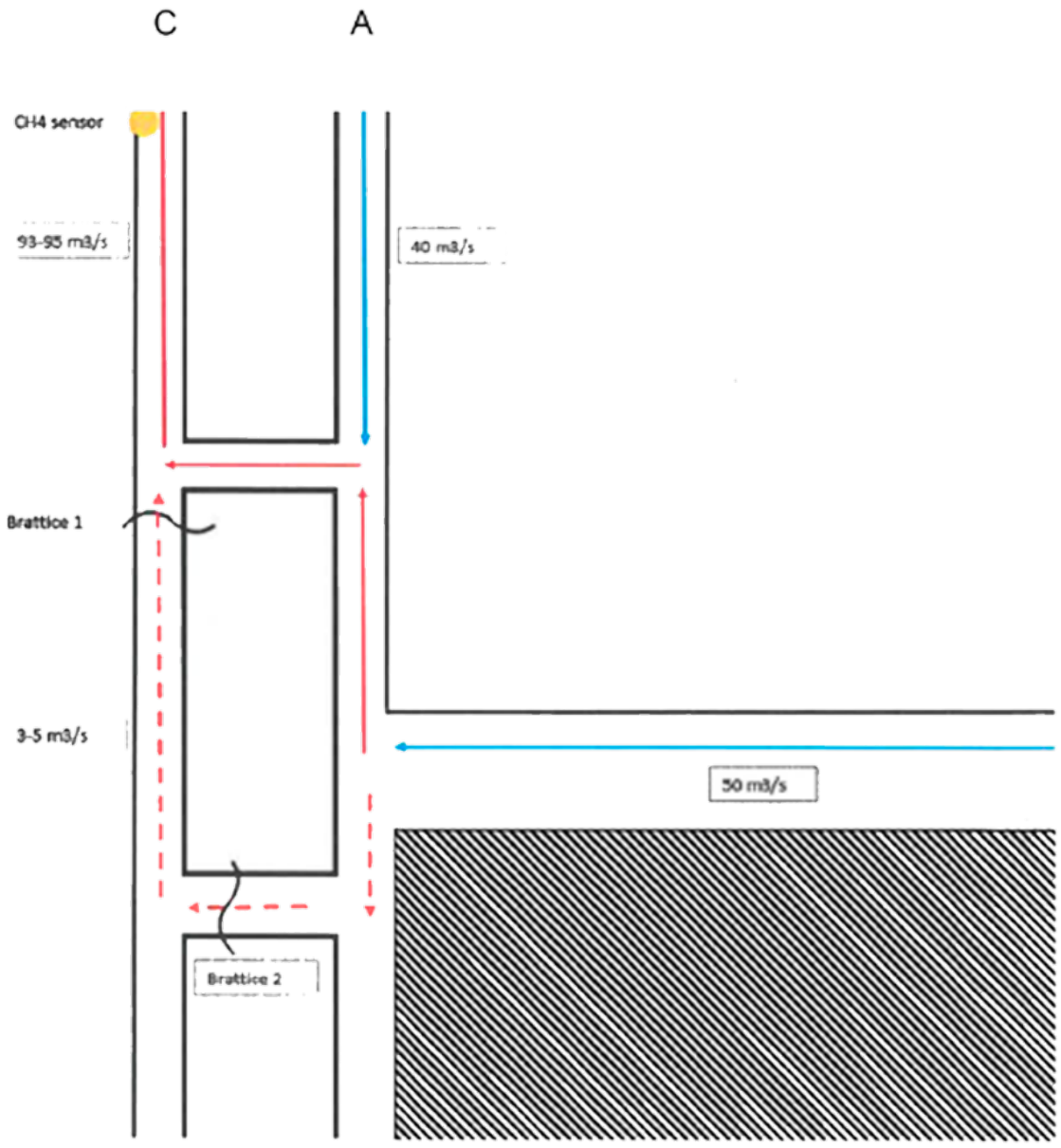

Figure 19: Ventilation arrangement at LW 808

4.65 In this arrangement a quantity of intake air (40 m^3/sec) is brought up the tailgate roadway adjacent to the longwall block (A heading). This intake airway meets with, and joins, the return air coming down from the longwall face. The combined airflow crosses through the first outbye open cut-through and then continues outbye in the other tailgate roadway (C heading).

4.66 There is also a smaller flow of air from the tailgate corner travelling inbye back through the goaf (as indicated by the dashed red line in the diagram). This smaller flow crosses over to the C heading roadway through the first inbye cut-through. This arrangement results in the goaf stream being redirected into this inbye cut-through and helps keep the tailgate corner free of methane.

4.67 This ventilation arrangement requires careful balancing of the split in airflow at the tailgate corner. The diagram illustrates a brattice (brattice 2) in the inbye cut-through. Its purpose is to regulate the smaller flow coming through the goaf. Brattice 2 is complemented by brattice 1, which also restricts the air flow, and serves as a barrier to prevent any person accessing inbye the C heading roadway, where gas concentrations may be high.

4.68 The LFI report noted that a stopping was left in place in the inbye cut-through which should have been removed and replaced with the brattice 2 screen. The result was that the stopping prevented a sufficient flow of air coming from the tailgate corner to redirect the goaf stream.[422]

4.69 The LFI report stated:[423]

> *The start up of Longwall 808 did not have the tailgate ventilation set up adequately to allow for 3-5 m^3/s to migrate inbye the longwall face to go across the inbye cut through and therefore keep the majority of the tailgate gas away from the A hdg* [heading] *Tailgate return between the LW face and the most inbye open cut through.*
>
> *The Tailgate CH_4 sensor is located in C hdg. Because of the above inadequacy, the majority of the gas was coming out of the A Hdg return and being diluted in the last open cut-through, the CH_4 sensor did not adequately measure the tailgate gas concentration. This allowed for Tailgate gas levels to be higher than the levels recorded in C hdg.*

4.70 The LFI report noted the solution that was applied:[424]

> *The problem was immediately solved by running a brattice wing inbye the last open cut-through from the A hdg roadway to the longwall tailgate. This allow* [sic] *for additional air to be pushed up the tailgate roadway to provide adequate dilution.*
>
> *Since then brattice stoppings have been installed in the cut throughs and the problem has no longer occurred.*

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[422] AAMC.001.001.0810, .0814.
[423] AAMC.001.001.0810, .0815.
[424] AAMC.001.001.0810, .0814.

4.71 No other preventative action for the future was suggested because it was not anticipated that the situation could recur. The LFI report stated:[425]

> *This situation cannot occur at Grasstree anymore as there will be no more three heading tailgates or new blocks in fresh areas with two headings in the tailgate.*

Findings

Finding 38

The cause of this HPI was as follows. A ventilation stopping was left in place in an inbye cut-through that connected the C heading to the goaf. The stopping prevented methane from being drawn from the goaf into the C heading. Instead, the methane reported to the tailgate area of the longwall face and was drawn down the A heading. This resulted in a methane exceedance in the tailgate area adjacent to the longwall face.

Finding 39

The immediate remedy was to run a brattice wing to enable additional air to be pushed up the tailgate roadway.

Finding 40

Subsequent to this incident, the permanent stoppings in the inbye cut-through were replaced with brattices on retreat, so that the intended ventilation circuit was achieved.

Finding 41

Grasstree management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

Finding 42

The ventilation critical control failed because the designed ventilation arrangement for clearing gas from the tailgate was not implemented. This incident was not indicated on the LFI report as a failure of a critical control.[426]

HPI # 3 – 11 January 2020[427]

4.72 This event occurred at LW 808 early on 11 January 2020. It involved an exceedance of four minutes' duration, peaking at 3.6%. It had a similar feature to the HPI at Oaky North in that it involved mining on approach to a stub, located at 14 cut-through.

4.73 The VO, Mr Braedon Smith, was part of the LFI team. He explained, with respect to driller stubs:[428]

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[425] AAMC.001.001.0810, .0815.
[426] AAMC.001.001.0810, .0814.
[427] Anglo Incident No. 00216236.
[428] TRA.500.003.0001, .0055, line 30–35.

We have driller stubs in various locations to help us conduct our underground inseam drainage, so they're pulled off the regular tailgate roadway and into the block. So when we approach those, they're obviously an open part of the roadway that we intersect with the longwall during retreat.

4.74 Its location was known, and the LFI report indicates that some preparations had been made to encounter it:[429]

This stub had been geotechnically assessed and additional standing support installed to ensure integrity during the longwall approaching the cut-through.

4.75 Mr Smith also said:[430]

Then when we come into the intersection of the stub itself, we have a process and a procedure and a standardised layout for how we treat those stubs, so that they remain ventilated during that process of holing into them, to prevent the accumulation of methane in the stub.

4.76 Three, rather than two, approaches of the shearer were undertaken, as described by Mr Smith:[431]

So the context surrounding this event is that we had had some, I guess, poorer than expected geotechnical conditions in that tailgate. On approach to this stub, when it was holed, we did a regular cut into the tailgate which consists of two shears, and then the subsequent advance of the chocks. The ERZ controller at the time noted that he did another push at the face and another advance because he wanted to catch the lip of the stub for geotechnical stability in this instance, and that succession of a number of pushes and advances appears to have opened up a sufficient amount of goaf area that subsequently came in in a single event at that point, flushing some of the methane from the goaf back over into the tailgate drive.

[429] AAMC.001.001.0691, .0695.
[430] TRA.500.003.0001, .0056, line 19–24.
[431] TRA.500.003.0001, .0056, line 38–.0057, line 4.

4.77 During the third advance, the roof immediately behind the tailgate caved, forcing a concentrated volume of goaf atmosphere to be pushed over the tailgate drive methane sensors. The sequence of events as extracted from the LFI report is set out in the table below:[432]

Timeline:		
10/01/20 20:30		NS Crew Shift Commences
10/01/20 23:58		LW808 Shearer cut back toward MG and completed 1st push (TG CH4 Spiked to 1.16%)
11/01/20 00:13		LW808 Shearer cut back toward MG and completed 2nd push (TG CH4 Spiked to 1.53%)
11/01/20 00:20		LW 808 Shearer cutting into TG
11/01/20 00:28		LW808 Shearer cut back to end of snake and completed 3rd push
11/01/20 00:29		Methane concentration at TG Drive Sensors reach 2.5%
11/01/20 00:32	After the Incident	Methane concentration at TG Drive Sensors peak at 3.6%
11/01/20 00:33		Methane concentration at TG Drive Sensors return below 2.5% (Total duration >2.5% CH4 – Approximately 4minutes)
11/01/20 00:35		Elevated methane from goaf fall cleared
11/01/20 00:45		TG brattice wing previously established for drill stub at 14CT Reset
11/01/20 00:45		LW ERZC notified CRO/MSO

Figure 20: Timeline of events

4.78 The object of the third advance, being to catch the lip of the driller stub, was explained by Mr Smith:[433]

> *When we cut into that, there's a portion, being what we call the tip to face, between the tip of the chock canopy and the cut face position of the longwall, and that area is not typically supported until the shield advances over it. So when the ERZ controller has tried to catch the lip, he has tried to pull the tip of the chock into under where the supported roof of that stub is.*

4.79 He expressed the opinion that there had been no error of judgement by the ERZ controller, who, notwithstanding the resulting exceedance, had made a legitimate choice in that particular scenario.[434]

4.80 The immediate action taken was to establish a brattice wing in the driller stub at 14 cut-through.[435]

4.81 The preventative action proposed by the LFI team was administrative,[436] as described by Mr Smith in evidence:[437]

[432] AAMC.001.001.0691, .0698.
[433] TRA.500.003.0001, .0057, line 35–42.
[434] TRA.500.003.0001, .0058, line 11–15, 34–36.
[435] AAMC.001.001.0691, .0694.
[436] AAMC.001.001.0691, .0696.
[437] TRA.500.003.0001, .0058, line 45–.0059, line 6.

We've gone through a process where we iterated to the ERZ controllers for them to be mindful of the decisions they're making with regards to the risks that they are trying to manage on their shift, in particular with the drill stubs. Subsequently we've also reviewed our standard work procedure for the intersection of gas drainage stubs in the longwall to make the standardised arrangement a bit more robust.

Findings

Finding 43

The HPI was caused by the shearer cutting into a blockside stub which affected ventilation flow in that area. This event, coupled with a goaf fall, allowed the goaf gases to be pushed over the tailgate drive sensor.

Finding 44

The immediate action taken was to run a brattice wing into the drill stub to direct the air up the tailgate roadway.

Finding 45

The standardised ventilation arrangement should have been in place before commencing cutting into the stub. However, once cutting into the stub commenced, it was a legitimate choice to continue advancing the face to control ground conditions.

Finding 46

The event resulted from the failure to install a brattice curtain. The event was not indicative of a failure of the overall ventilation system.

Finding 47

Grasstree management did not classify the methane exceedance as an Anglo HPI for internal reporting purposes.

HPI # 4 – 22 February 2020[438]

Introduction – the '0m (zero metre) TG sensor'

4.82 A cluster of eight HPIs occurred between 22 February and 11 April 2020. Each of them concerned methane readings of greater than 2.5% recorded on only one sensor, described in the records as the '0m TG Sensor'. The sensor is so named because it was considered to be zero metres outbye from the longwall face.

[438] Anglo Incident No. 00219432.

4.83 The first occurrence on 22 February was the subject of its own LFI report.[439] Having regard to the recurring issues with this sensor, the remaining seven HPIs were the subject of a single LFI report.[440] However, individual Forms 1A and 5A were submitted for each event.

4.84 The 0m TG Sensor was installed on 6 February 2020, purportedly in response to the requirement of section 243A of the Regulation.[441] Section 243A was introduced by section 6 of the *Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019* (Qld), with effect from 6 January 2020. It provided:

> ***243A Return airway in ventilation split intersecting with longwall face***
>
> *(1) This section applies—*
>
> *(a) in relation to a return airway in a ventilation split that intersects with a longwall face; and*
>
> *(b) in addition to the requirements under section 243.*
>
> *(2) At least 1 automatic methane detector must be located in the return airway within 400m of the intersection with the longwall face.*
>
> *(3) The detector must automatically—*
>
> *(a) activate a visible alarm when the general body concentration of methane detected in the return air exceeds the percentage stated in the mine's principal hazard management plan for ventilation as the percentage that must not be exceeded before the detector activates the alarm; and*
>
> *(b) trip the electricity supply to the armoured face conveyor and the longwall shearer cutters when the general body concentration of methane detected in the return air exceeds 2%.*

4.85 At Grasstree, the sensor was installed on the canopy of #197 shield on the coal face, as depicted below:[442]

[439] AAMC.001.001.0703.
[440] AAMC.001.006.0080.
[441] See for example, AAMC.001.006.0080, .0083.
[442] ACM.004.004.0004.

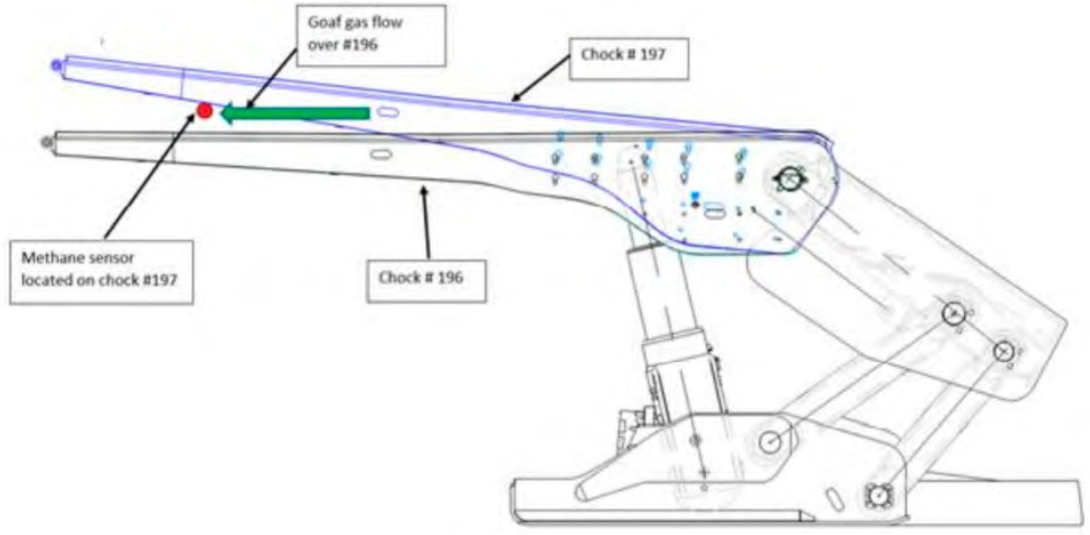

Figure 21: Demonstration of position of sensor on #197 shield

4.86 It is noted that the Grosvenor mine (Grosvenor) installed a sensor in the corresponding location.

4.87 At Grasstree, there was already a sensor in the tailgate, within the distance limited by the Regulation, that could have been configured to meet the requirements of section 243A.[443] The positioning of an additional sensor on the canopy of the last shield was a choice apparently made arising from discussions between the SSEs and the head of underground operations, Mr Glen Britton. Grasstree SSE, Mr Damien Wynn, described the process in his evidence:[444]

> *So when the 243A came about, we had discussions around understanding - during some of the consultation periods it was explained that this was to protect a potential ignition near the sprocket, which is in the location of where the canopy sensor is, so we had discussions around ourselves and then went back to the VOs and the mine managers…*
>
> *…*
>
> *So the best place to put it was the closest we could possibly get it, and all of us agreed, along with the people on the site, that underneath that canopy, because it could be protected in some way as well, was the best place to put it.*

[443] TRA.500.002.0001, .0099, line 24–33; TRA.500.002.0001, .0100, line 4–9; TRA.500.011.0001, .0046, line 47–.0047, line 8.
[444] TRA.500.011.0001, .0046, line 16–21, 40–45.

4.88 The choice of location proved problematic from more than one perspective. At times shield #197 protruded into the tailgate roadway. Also, owing to the tailgate roadway height, shield #197 was somewhat higher than its immediate neighbour, #196. Given that location, and the elevated position of the sensor under the canopy, it was soon discovered that there was a high likelihood of its picking up localised layering of methane.[445] This was apparently not foreseen in the choice of location for the sensor.

4.89 Although there was a variety of contributing causes, this sensor recorded the cluster of eight exceedances occurring between 22 February and 11 April 2020. Five occurred between 20 and 25 March, with three on 20 March alone. No other sensor recorded any of those exceedances.

4.90 In addition, at both Grasstree and Grosvenor, the sensor's location led to a dispute between the SSEs and the Inspectorate as to whether it was compliant with the Regulation. In the case of Grasstree, RIOM Smith issued a directive on 14 April 2020 suspending operations on the basis of non-compliance.[446] Another sensor was configured to satisfy the Inspectorate's requirement so that the suspension could be lifted but, as appears below, the canopy sensor, including the configuration to trip power when 2% methane was reached, was retained.[447]

The incident on 22 February 2020

4.91 The sensor was installed on 6 February 2020.[448] It recorded a reading of more than 2%, but less than 2.5%, on three occasions between 7 February and 22 February 2020.[449] Even at that stage, the elevated position of the sensor was being questioned. In relation to the first occasion of trip of power, on 7 February, the LFI report noted that:[450]

> *Anecdotal evidence indicated that at the time of this trip the canopy of #197 chock was ~200-300mm higher due to a disparity between the cutting face and the TG roadway height.*

4.92 On 22 February 2020, the LFI report identified that the following occurred:[451]

> *At approximately 0500HRs, the shearer resumed production towards the TG, reaching the tailgate at approximately 0530HRs and begins cutting the maingate when >2% methane is detected at the '0m TG Sensor' tripping face power. At the time of the power trip the face had not yet been pushed and*

[445] AAMC.001.001.0703, .0705.
[446] RSH.002.013.0001.
[447] This is discussed in paragraphs 4.134 to 4.138.
[448] AAMC.001.001.0703, .0708.
[449] AAMC.001.001.0703, .0705.
[450] AAMC.001.001.0703, .0708.
[451] AAMC.001.001.0703, .0708.

chocks had not commenced advancing. Methane concentrations subsequently fluctuated at the '0m TG Sensor' and exceeded 2.5% on four occasions over approximately 14 minutes, reaching a peak value of 3.01%.

4.93 The immediate action in response was for the ERZ controller to install a brattice curtain to direct ventilation around the sensor and purge the methane. The MSO and UMM were also notified. The height of the canopy of shield #197 was commented on. This is described in the LFI report:[452]

> *The CMWs[453] contacted the ERZ Controller (S Stingle) who inspected the area and reported 2.4% methane on his PGD. The ERZ Controller noted that the canopy of #197 chock was ~200-300mm higher than the adjacent chock and erected a brattice sail on chock #194 to direct face ventilation air around the '0m TG Sensor' to purge the methane.*

4.94 The UMM summarised his conclusion in the Form 5A, referring to the height of the shield, and issues arising:[454]

Organisational

the face horizon and face orientation relative to the tailgate roadway cut-through need to be managed with horizon control and with brattices to prevent gas accumulations.

Task/environment conditions

the last tailgate shield canopy was sitting higher than the general run of face shields as the face horizon was lower than that of the roadway. this situation creates vortex air currents which accumulated gas concentrations.

Individual/team actions

The operators of the longwall have not been able to completely manage the situation suitable top prevent a gas accumulation.

Absent or failed defences

gas readings have increased as this situation began to develop but a final control to dissipate the gas accumulation was not undertaken until a power trip occured. the power trip was due to the gas concentration exceeding limits.

Figure 22: Extract from Form 5A

[452] AAMC.001.001.0703, .0708.
[453] Coal mine workers.
[454] AAMC.001.008.0009, .0011.

4.95 The LFI report stated that the location of the sensor was amongst the 'key factors' contributing to the incident, as it was apt to record localised accumulation of methane, or layering:[455]

> *Key factors contributing to the incident were:*
>
> - *Location of a new sensor on TG chock canopy, being a position where methane is more likely to be detected being both at the tailgate end of the face (where goaf gasses are most likely to be drawn into the airstream) and high (where methane is most likely to layer due to a low relative density).*
> - *The canopy of #197 being ~200-300mm higher than the adjacent chock due to a disparity between the cut face and the TG roadway height, again making the '0m TG Sensor' in position of higher sensitivity to methane.*

4.96 One of the tasks arising from the LFI process was to '[r]eview monitoring of "0m CH4 sensor"…Determine if sensor is representative of general body atmosphere in TG'. The due date for the completion of that task was 30 April 2020.[456] In the meantime, a further seven methane HPIs occurred.

HPIs # 5 – # 11 – 20 March 2020 to 11 April 2020

Introduction

4.97 There were no further issues with the 0m TG sensor until 20 March 2020, when three incidents occurred on the same day. Further incidents then occurred on 24 March, 25 March, 6 April and 11 April. The exceedances are summarised in the table below:[457]

Date	Location	Monitoring device	Start time > 2.5%	End Time >2.5%	Duration	Max CH4 Level Reached (% v/v)
20/03/20	LW808TG	Real Time	4:44:39	4:44:43	0:00:04	2.53
		Real Time	6:08:16	6:16:13	0:07:57	3.73
		Real Time	12:00:37	12:15:32	0:14:55	4.3
24/03/20	LW808TG	Real Time	2:40:22	2:40:36	0:00:14	2.56
25/03/20	LW808TG	Real Time	17:50:18	17:50:21	0:00:03	2.63
			17:55:38	17:56:51	0:01:13	
			18:24:39	18:24:41	0:00:02	
6/04/20	LW808TG	Real Time	11:15:10	11:39:06	0:23:56	4.21
11/04/20	LW808TG	Real Time	21:25:59	22:22:24	0:56:25	4.18

Figure 23: Summary of exceedances # 5–# 11

[455] AAMC.001.001.0703, .0709.
[456] AAMC.001.001.0703, .0709.
[457] AAMC.001.006.0080, .0097.

4.98 These events were the subject of a single LFI report.[458] The following table summarised the range of contributing factors to each event, as found by the investigating team:[459]

Table 1. Factors contributing to each HPI event.

Incident No.	221991	221998	222011	222360	222495	222988	223278
Incident Date:	20/03/2020	20/03/2020	20/03/2020	24/03/2020	25/03/2020	6/04/2020	11/04/2020
Contributing Factors							
Falling Barometer	N	N	N	Y	Y	Y	N
Face position relative to cut-through	Y	Y	Y	N	P	N	P
Goaf drainage capacity	N	N	N	N	N	Y	N
Goaf drainage proximity to face	P	P	P	N	Y	Y	P
Production Rate	N	N	N	Y	Y	N	N
Location of flaps on chocks	Y	Y	N	N	N	N	N
MG Brattice Condition	N	N	N	N	N	N	N
Absence of Sherwood Curtain	N	N	N	N	P	P	P
Chock Advance Sequence	Y	Y	Y	Y	N	Y	Y
VCD Adjustment	N	N	Y	N	N	N	N
#197 Attitude 300mm Higher than Adjacent Chock	P	P	P	N	N	N	Y
TG Drive into tailgate roadway encroaching on goaf stream (due to offline roadway drivage)	P	P	P	N	N	N	Y
Caving of hang up of goaf in TG area	N	N	P	N	N	Y	N
Total No. Contributing Factors	3	3	3	3	3	5	3
Total No. Contributing and Potential Factors	6	6	7	3	5	6	6

Key:		
	Y	Considered a contributing factor to the incident
	P	Potentially a contributing factor but not accurately determined.
	N	Not considered a contributing factor to the incident

Figure 24: Factors contributing to HPI events

[458] AAMC.001.006.0080.
[459] AAMC.001.006.0080, .0093–.0094.

4.99 From the table, the most consistently present factor was 'Chock Advance Sequence', being a contributor to six of the seven incidents. Another potential contributing factor may have been the goaf drainage proximity to the face.

4.100 In giving evidence, Mr Schiefelbein sought to explain the relevance of the shield advance sequence to the escape of methane from the goaf:[460]

> *But the shields, if they advance from tail back towards the main in a fan arrangement, the back one first, then the next, then the next, then the next, then the next, they keep the clean air on the advancing face of the gap between the shields, and gas tends not to issue out.*
>
> *When the shields are advanced from the maingate towards the tailgate, where the front one is advancing beyond the one that is now behind, it creates a leeward aspect to the shield arrangement and gas can be drawn out behind the leeward side.*

4.101 The Board understands Mr Schiefelbein to mean that when a shield is moved forward it blocks the airflow travelling from the maingate to the tailgate, resulting in a low pressure zone on the return side of the shield. If a shield is moved forward relative to both adjacent shields, this low pressure zone can result in gas being drawn from the goaf into the face area.

4.102 The Board further understands that a sequence whereby the shields move forward starting from the tailgate ensures the low pressure area created is confined to the tailgate roadway and methane is not drawn onto the face.

4.103 The VO, Mr Smith, gave evidence that instructions were given to crews with a view to rectifying the position, but there was initially some misunderstanding. He said:[461]

> *[T]he sequence of shield advance in relation to the shearer position was identified as a contributing factor, I believe in seven of the eight instances specifically. And on the basis of determining that, we identified that we needed to modify the sequence of operation.*
>
> *Because we seek to implement the controls as quickly as possible, we initially gave those instructions to the crews, to operate in a sequence that varied from the normal automation state.*
>
> *…*

[460] TRA.500.002.0001, .0103, line 46–.0104, line 10.
[461] TRA.500.003.0001, .0064, line 5–22.

> *Verbally in the first instance…which inherently resulted in some people or some crews misunderstanding the intent of that instruction, which was subsequently verified and validated through a formal memo process with the sign on.*

4.104 As appears below, following HPI # 8, the written memo referred to by Mr Smith was issued to crews.

HPI # 5 – 20 March 2020 at 4:43am[462]

4.105 The first incident that day occurred at 4:43am, during normal production cutting into the tailgate. The 0m TG sensor tripped power to the face, and the concentration exceeded 2.5% for a period of four seconds, peaking at 2.53%.

4.106 The immediate action taken was for the ERZ controller to have brattice 'installed/adjusted at 195 to prevent further exceedances'.[463]

4.107 Mr Schiefelbein's evidence was that a goaf hole adjacent to the tailgate had not come online to assist gas drainage, and that this was a contributor to a number of the events, including the three on 20 March. He said:[464]

> *[I]n most of these occasions, especially on this - events that happened one, two, three in the one day, there was a goaf hole which hadn't come on, hadn't caved in the routine method or routine style.*
>
> *…*
>
> *The strata hadn't caved through yet. What that does in that case, though, is it creates the scenario of richer gases near that tailgate area.*

4.108 The preventative action that the UMM recommended in the Form 5A involved training crews on shield advance sequence, and installing additional flaps to aid ventilation.[465]

HPI # 6 – 20 March 2020 at 6:08am[466]

4.109 The second exceedance that day occurred at 6:08am when the 0m TG sensor recorded a peak of 3.73% methane.[467]

4.110 The ERZ controller, MSO, VO, UMM and others, were all involved in consultations concerning the action to be taken, namely erecting butchers' flaps on TG shields #193 and #194, and brattice along #195–#197, under the MSO's direction.[468]

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[462] Anglo Incident No. 00221991.
[463] AAMC.001.006.0239, .0240.
[464] TRA.500.002.0001, .0105, line 26–46.
[465] AAMC.001.006.0219, .0221.
[466] Anglo Incident No. 00221998.
[467] AAMC.001.006.0080, .0099.
[468] AAMC.001.006.0080, .0087.

4.111 In the Form 5A, the UMM described the hazard as resulting from a combination of goaf drainage capacity and uneven advance of the shields.[469]

4.112 The UMM reported in the Form 5A that crews had been trained in automated shield advance.[470]

HPI # 7 – 20 March 2020 at 12:00pm[471]

4.113 The third exceedance of the day occurred at 12:00pm, notwithstanding measures taken earlier in the day. On this occasion the 0m TG sensor exceeded 2.5% for a period of just under 15 minutes, with a peak reading of 4.3%.[472]

4.114 In the Form 1A, the UMM again referred to deficient goaf drainage and uneven advance of the shields. He said:[473]

> *A goaf drainage borehole was late to become active at this location and this also contributed to the exceedance. This issue was verified as major factor as gassy goaf bleed was found issuing between shields 195-196-197 by the ERZC. Shields 196-197 were found to be left back and 193-194-195 were found to be forwards. Shield staggered in this way also contributed to ventilation obstructions and gassy ventilation from behind the shields.*

4.115 In the Form 5A, the UMM described the following additional measures taken to control the situation:[474]

> *A thorough review of controls was undertaken and additional steps to control the situation included: MG seal brattices to be renewed, MG shield brattices to be adjusted, TG 6ct man door adjusted, brattices and flaps adjusted and arrangement tested with smoke tubes.*

4.116 An investigation to determine air flow and gas direction out of the goaf was conducted after the incident.[475]

4.117 In the Form 5A, the UMM also indicated that the arrangement of flaps and brattices had not been optimal to dilute the gas. By way of preventative measures undertaken, he said:[476]

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[469] AAMC.001.006.0248, .0249.
[470] AAMC.001.006.0248, .0250.
[471] Anglo Incident No. 00221011.
[472] AAMC.001.006.0080, .0087.
[473] AAMC.001.006.0285, .0287.
[474] AAMC.001.006.0268, .0269–.0270.
[475] AAMC.001.006.0080, .0099.
[476] AAMC.001.006.0268, .0270.

The ventilation arrangement of flaps and brattices was improved and design specified by the ventilation officer. [T]he advance of shields automation mode was also specified.

HPI # 8 – 24 March 2020 at 2:40am[477]

4.118 On 24 March, the 0m TG sensor tripped power at 1:59am, recording a reading of 2.2%. Production resumed at 2:15am, before an exceedance registered on the same sensor at 2:40am. A peak methane reading of 2.56% was noted.[478]

4.119 In the Form 1A, the UMM declared that the 'the primary factor was the automation parameters of the TG shields from 197 to 180 as an advancement of the shields was in progress during the exceedance'.[479] As to remedial action, he put emphasis on the manner of advance of the shields. He said in the form:[480]

A thorough review of controls was undertaken and additional steps to control the situation included:

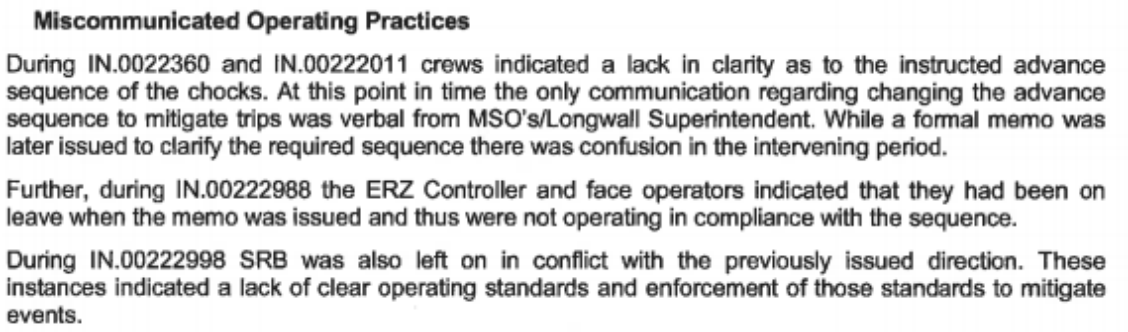
1 *Changes to automation of the TG goaf shields to ensure multiple batching does not occur. – A digital play back of the automation of the shields revealed that a group of 5 shields had been batched together.*

2 *Crew talks to include awareness of these issues and how to advance the shields without causing a gas exceedance.*

4.120 A memo to crews was issued that same day.[481] It involved an instruction to workers as to the manner of advance of the shields. They were to be advanced one at a time from the tailgate to the maingate in 'Sequential' mode, rather than in 'Batch' mode. The object was to better manage methane levels.

[477] Anglo Incident No. 00222360.
[478] AAMC.001.006.0080, .0100.
[479] AAMC.001.006.0290, .0292.
[480] AAMC.001.006.0290, .0291.
[481] AAMC.001.006.0080, .0150.

4.121 The LFI report noted that there had been some delay in successfully communicating the proper advance of the shield sequence. This was described in the following terms:[482]



Miscommunicated Operating Practices

During IN.0022360 and IN.00222011 crews indicated a lack in clarity as to the instructed advance sequence of the chocks. At this point in time the only communication regarding changing the advance sequence to mitigate trips was verbal from MSO's/Longwall Superintendent. While a formal memo was later issued to clarify the required sequence there was confusion in the intervening period.

Further, during IN.00222988 the ERZ Controller and face operators indicated that they had been on leave when the memo was issued and thus were not operating in compliance with the sequence.

During IN.00222998 SRB was also left on in conflict with the previously issued direction. These instances indicated a lack of clear operating standards and enforcement of those standards to mitigate events.

Figure 25: Operating practices miscommunication

HPI # 9 – 25 March 2020 at 5:49pm[483]

4.122 Another incident occurred at 5:49pm on 25 March 2020 while the shearer was working back from the tailgate to the maingate in the vicinity of shield #184.[484] A peak reading of 2.63% was recorded during a period of 34 minutes, with the concentration fluctuating as the gas layering cleared. The gas concentration exceeded 2.5% five times during that period.[485]

4.123 In the Form 1A, the UMM referred to having undertaken a review of controls and noted 'additional steps to control the situation':[486]

1 *Changes to automation of the TG goaf shields to correct advance sequence occurs. - A digital play back of the automation of the shields revealed that a group of 4 shields had been left back.*

2 *Crew talks to include awareness of these issues and how to advance the shields without causing a gas exceedance.*

3 *Alteration of brattices in the TG.*

4 *Discovery that the next goaf drainage well had not come into production yet – subsequent mining of the next 4 meters brought the goaf drainage well into production and gas concentration reduced generally.*

4.124 The first two matters listed were in substantially the same terms as the previous day's Form 1A. The third and fourth matters were additional.

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[482] AAMC.001.006.0080, .0092.
[483] Anglo Incident No. 00222495.
[484] AAMC.001.006.0080, .0100.
[485] AAMC.001.006.0318, .0321.
[486] AAMC.001.006.0318, .0320.

HPI # 10 – 6 April 2020 at 11:15am[487]

4.125 The incident on 6 April 2020 occurred with the shearer at a similar location, around shield #181, but appears to have been associated with a goaf fall. At around 9:00am that day an ERZ controller noted eight metres of goaf roof hanging up in the tailgate. An exceedance recorded on the 0m TG sensor commenced at approximately 11:15am[488] and continued for nearly 24 minutes, with a peak of 4.21%.[489]

4.126 In the Form 1A, the UMM recorded that there were a number of relevant circumstances:[490]

1 *The tailgate strata was reported to have been hanging back 8 meters at the start of the shift, but has fallen in during this event, and is now flush with the TG shields.*

2 *The goaf drainage boreholes had decayed due to strata movement and due to flooding from strata water make.*

3 *Additional of* [sic] *brattices and ventilation flaps in the TG were knocked down by the wind blast from the goaf fall.*

4 *Discovery that the next goaf drainage well had not come into production yet – 8 meters beyond the face position.*

5 *Shield position at the time of the goaf fall has been staggered from 185 - 193.*

4.127 The UMM expressed conclusions as follows:[491]

> *The exceedance did not appear at gas sensors downstream and therefore appears to be a gas layer.*
>
> *It has been concluded that the primary factor was the goaf fall which both flushed out gas as well as knocked down brattices and flaps used to prevent gas layering.*
>
> *The location of the next goaf drainage borehole well was also a factor as was the barometric low of the afternoon.*
>
> *The vertical goaf hole flow had reduced from 1700l/s to 500l/s and horizontal goaf hole had flooded and was with zero flow.*
>
> *GB gas concentration further Outbye remained under 2.0%*

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[487] Anglo Incident No. 00222998.
[488] AAMC.001.006.0346, .0347.
[489] AAMC.001.006.0080, .0101.
[490] AAMC.001.006.0340, .0342.
[491] AAMC.001.006.0340, .0343.

The shield locations were staggered at the time of goaf fall and this also contributed to making the gas exceedance be sustained over an extended period.

4.128 From this, it appears there were problems with goaf drainage, exacerbated by uneven shield advance. As noted at paragraph 4.121, the ERZ controller and some operators had been on leave when the memo of 24 March was issued, and were not following the sequence as directed.

HPI # 11 – 11 April 2020 at 9:25pm[492]

4.129 The lengthiest exceedance of all occurred on 11 April 2020. It lasted over 56 minutes with methane concentration peaking at 4.18%.[493] As with the event on 6 April, this was associated with a goaf fall, but was attributed to layering, on the footing that no other sensor registered an exceedance.[494]

4.130 The Form 1A was submitted by the acting UMM, Mr Tim McNally. He said that the 'gas exceedance was believed to be due to gas being purged from the goaf due to the caving of an intersection'.[495] The control measures were:[496]

1 *Installation of a Sherwood* [Curtain] *in the TG roadway*

2 *Adjustments of face deflectors to better control the airflow around the TG drive.*

4.131 The VO, Mr James Moreby, conducted an investigation the next day. He distributed an email with his findings concerning goaf gas passing over shield #196 onto the sensor. He wrote:[497]

- * Chock #197 was set approx. 300mm higher than #196 as development take additional roof when cutting intersections and the LW cutting parameter is constantly set at 2.1m (this can also occur at other times when the LW is not passing through intersections such as cavities in the TG roadway or tilting of the chock)
- * When this gap occurs it allows goaf gas to pass over the top of #196 and flows straight into the sensor located on #197, as shown in the diagrams below
- * This means in this situation the sensor located on chock #197 is not reading general body, it is reading the layering of gas that flows over #196 (See trending below #197 sensor Vs TG drive sensor)

Figure 26: Email extract

4.132 Similarly, the other VO, Mr Smith, gave evidence that:[498]

… a mismatch in the chock heights… permits an amount of gas to accumulate in that higher space where that sensor is and be detected there.

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[492] Anglo Incident No. 00223278.
[493] AAMC.001.006.0080, .0102.
[494] AAMC.001.006.0390, .0391.
[495] AAMC.001.008.0018, .0020.
[496] AAMC.001.008.0018, .0020.
[497] ACM.004.004.0004.
[498] TRA.500.003.0001, .0061, line 47 – .0062, line 2.

4.133 Mr Moreby's email included a diagram illustrating the goaf gas flow over chock #196, in addition to showing the position of the methane sensor located on chock #197:[499]

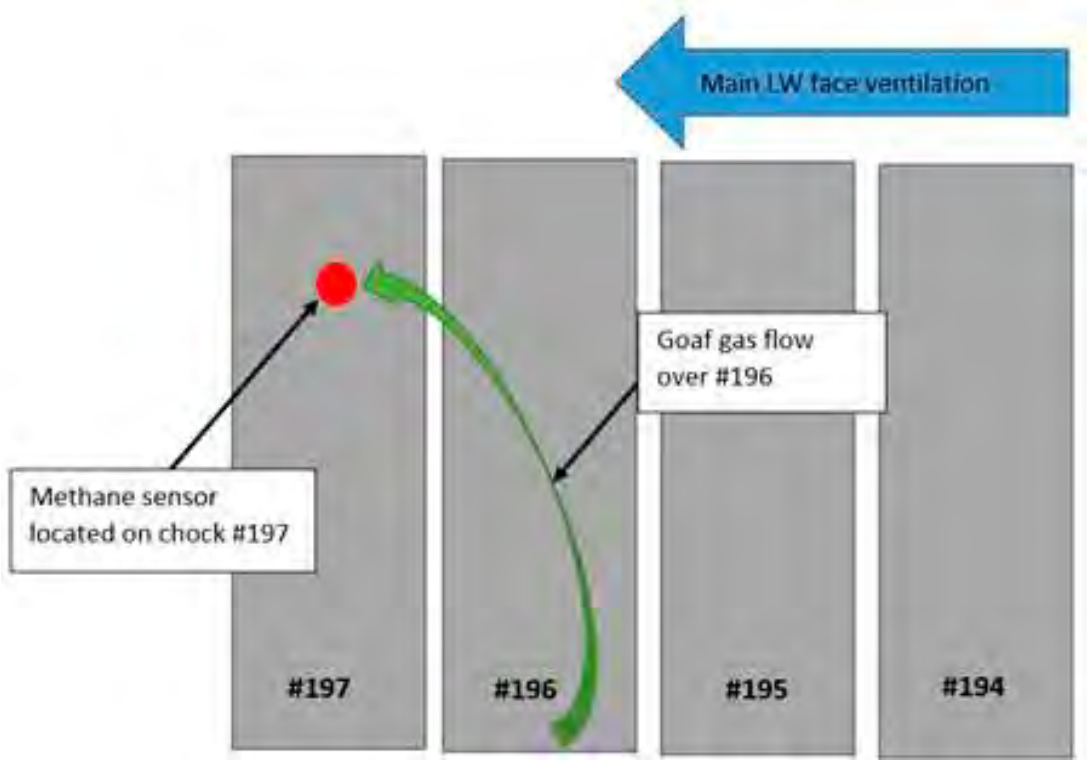

Figure 27: Diagram from email sent by Mr Moreby

Retention of the canopy sensor

4.134 The LFI report for HPIs # 5 - # 11 recommended that the sensor be relocated to reduce the likelihood of non-representative readings. It said:[500]

> *In order to reduce the likelihood of the '0m TG Sensor' measuring non-representative gas concentrations (i.e. concentrated goaf stream) the sensor should be relocated to the carport of the TG drive close to the TG sprocket (being the identified ignition source). Further, the nominal sensor for maintaining compliance with s243A should be located within 400m of the face in the TG roadway.*

4.135 Notwithstanding the consensus view that it was detecting localised layering, the sensor was retained.[501] As Mr Schiefelbein said in evidence:[502]

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[499] ACM.004.004.0004, .0005.
[500] AAMC.001.006.0080, .0094.
[501] Section 344(1)(a) of the Regulation requires the Ventilation Officer to minimise layering of flammable gas.
[502] TRA.500.002.0001, .0102, line 23–40.

[I]t identified a hazard that we didn't know existed at that time…

…

The reason we were keeping it is because of the number of exceedances that had occurred that had found a hazard that we weren't aware of until the sensor had been placed.

4.136 Although the LFI report had recommended moving the sensor, Mr Smith acknowledged an obligation not to do so. He said in evidence:[503]

...so we identified a hazard in a potential area of risk and we then therefore, obviously, had an obligation to control it, and removing the sensor was not in the interests of complying with that obligation.

4.137 The canopy sensor was not removed but an additional sensor was installed on the tailgate drive. Mr Smith said:[504]

[W]e've since implemented …installing a secondary sensor on that tailgate drive, which we now refer to as the sprocket sensor, which is located more or less directly below the chock canopy sensor so that we can get an understanding as to whether - if they're both registering a methane concentration relative to one another or divergent from one another.

4.138 Mr Smith's evidence was that there were no further exceedances involving the canopy sensor during the period of inquiry.[505]

Findings HPIs # 4 - # 11

Finding 48

The eight HPIs at Grasstree involving the 0m TG Sensor could be viewed as a category. The Board accepts a number of propositions advanced by Mr Gavin Taylor[506] concerning them:

a. although there was more than one contributing factor, they were essentially of a recurring theme;[507]

b. given the chosen position of the sensor, there was a high likelihood of its detecting localised layering of methane;[508] and

[503] TRA.500.003.0001, .0078, line 42–45.
[504] TRA.500.003.0001, .0063, line 10–16.
[505] TRA.500.003.0001, .0076, line 1–5.
[506] Consultant; retired mine official and former Chief Inspector of Coal Mines.
[507] TGA.001.001.0001, .0011.
[508] TGA.001.001.0001, .0013 –.0014.

c. a consistent and uniform system of shield advance should have been developed as a means of addressing repeated HPIs.[509]

Finding 49

As to proposition b., irrespective of whether it was general body concentration or layering, section 344 of the Regulation requires that the ventilation system must provide for minimising, within acceptable limits, layering of flammable gas. No doubt this requirement exists because ignition of a methane layer may provide a pathway for a flame to propagate to a larger adjacent explosive concentration of methane, in this case, the goaf.

Finding 50

As to proposition c., a uniform system of shield advance was in fact developed, however, it took some substantial time for it to be implemented.

Finding 51

There was unacceptable delay in mine management successfully communicating to workers the proper sequence of shield advance. This in turn contributed to the delay in addressing the exceedances.

Finding 52

Grasstree management did not classify any of these eight methane exceedances as an Anglo HPI for internal reporting purposes.

Inspectorate's response to the HPIs in this chapter

4.139 With respect to HPIs, the most pertinent of the inspectors' functions under section 128 of the Act are:

> …
>
> *(g) if unsafe practices or conditions at coal mines are detected, to ensure timely corrective or remedial action is being taken and, if not, require it to be taken;*
>
> *(h) to investigate serious accidents and high potential incidents at coal mines;*
>
> …

4.140 Those functions do not involve an inspector taking full ownership or responsibility for HPIs as they occur at an underground mine. Consistently with risk-based legislation, primary responsibility lies with the obligation holders at the site, foremost among them being the operator, SSE, UMM, ERZ controller and VO.

[509] TGA.001.001.0001, .0014.

4.141 The three-stage procedure for reporting HPIs to the Inspectorate (verbal, followed by a Form 1A and Form 5A) has already been noted. Chief Inspector Newman and RIOM Smith gave evidence to the effect that for practical purposes the assessments to be made from these reports (and any other information provided) were:[510]

- whether the site needed to be secured;
- whether intervention was required by deployment of an inspector to the site, or by directive;
- whether the mine appeared to understand the cause of the exceedance; and
- whether the proposed controls were reasonable.

4.142 In the case of each HPI, the three-stage reporting procedure was engaged. The incidents were not such as to require securing of a scene, or the immediate presence of an inspector. It is apparent that there was genuine consideration given to the mine's understanding of the cause of the exceedances, and to the proposed controls.

4.143 Further follow up was undertaken in a number of instances:

- HPI # 1 at Grasstree was the subject of discussion between Inspector Keith Brennan and site officials in the course of an inspection on 15 August 2019;[511]
- An inspection at Moranbah North Mine on 17 September 2019 by Inspectors Brownett and Brennan commenced with a review of methane exceedances from 27 April to 8 September 2019 (which time period incorporated the HPI on 20 July 2019);[512]
- Inspector Paul Brown engaged in email and verbal dialogue with mine officials at Grasstree concerning the group of HPIs occurring on 20 March 2020;[513]
- Inspector Mark Lydon requested that the UMM at Grasstree supply further information concerning the last of the HPIs on 11 April;[514] and

[510] TRA.500.001.0001, .0075, line 14–.0076, line 6; .0096, line 7–13.
[511] BKE.001.001.0001.
[512] RSH.002.168.0001, .0001–.0002.
[513] BPA.001.001.0001.
[514] LMA.001.001.0001.

- RIOM Smith suspended operations at Grasstree for a time upon establishing that the 0m TG sensor was being used as the section 243A sensor, which was not compliant with the Regulation.[515]

Findings

Finding 53

In accordance with the system at the time, the cluster of high potential incidents that occurred at Grasstree, involving the 0m TG sensor, was distributed amongst several inspectors rather than managed as a group. The proposed central assessment unit[516] can be expected to ensure a systematic response to such a scenario in future.

Finding 54

As discussed in the chapter dealing with the role of the Inspectorate,[517] improvements in HPI management have either already been made, or are shortly to be made, by the Inspectorate. At the time of the occurrence of the HPIs in this chapter, the Inspectorate's systems for management of HPIs needed improvement. Nonetheless, the Inspectorate's statutory function was performed, and there was no adverse consequence for safety from the manner of investigation with respect to the HPIs at these three mines.

General findings and recommendations for this chapter

Findings

Finding 55

Each HPI was investigated by the mine concerned.

Finding 56

The probable causes for the HPIs were as found by those investigations.

Finding 57

The HPIs were reported to the Inspectorate and safety representatives as required.

Finding 58

The Inspectorate investigated each HPI as required.

Finding 59

Ventilation and gas drainage are critical controls for methane management.

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[515] SST.001.001.0001, 0017.
[516] NPE.001.001.0001, .0008–.0009.
[517] Chapter 3.

Finding 60

In respect of the HPIs in this chapter, the combined controls of ventilation and gas drainage did not deliver the desired outcome in terms of keeping methane concentration below prescribed levels.

Finding 61

None of the HPIs in this chapter was viewed by the mines' investigation teams as involving a failure of a critical control.

Finding 62

In relation to the first exceedance at Grasstree, no spare capacity beyond the prediction of peak demand had been factored into the gas drainage plan. This was a likely contributing factor in the exceedance.

Finding 63

None of the HPIs in this chapter was classified by the mine operator or relevant parent company as an HPI (in Anglo's case) or an HPRI (in Glencore's case) for internal investigation and reporting. Anglo classified these as DNRM/DNRME HPIs.

Finding 64

In Anglo's case, there was no formal, documented process by which methane exceedances under the legislation were notified as soon as possible to the most senior executives of the parent companies.

Finding 65

The SSE at Grasstree and Underground Mine Managers (UMMs) from all three mines gave evidence, as did Ventilation Officers (VOs) from Grasstree and Oaky North. Each witness presented as experienced, knowledgeable and competent, with genuinely expressed commitment to safe mining.

Recommendations

Recommendation 7

Mine operators and parent companies classify all methane exceedances at or above 2.5% concentration in the general body as HPIs for internal incident reporting purposes.

Recommendation 8

Mine operators and parent companies treat such methane exceedances as indicating that a critical control may have failed, and undertake an investigation into the performance of the relevant critical control to determine if that is so.

Recommendation 9

Mine operators and parent companies ensure that such methane exceedances are formally notified as soon as possible to senior executives of the parent company.

Recommendation 10

Mine operators and parent companies ensure adequate spare capacity in goaf drainage systems, above the predicted maximum methane emissions.

Chapter 5 - Training and competencies

Introduction

5.1 Training of coal mine workers is an important part of achieving a competent workforce which, in turn, is essential for safety at coal mines. The evidence heard in the Inquiry establishes that each of the mines, the subject of the Inquiry, has robust training systems in place. This chapter does not contain a review of those training systems.

5.2 In the course of the Inquiry, the Board heard evidence about industry training processes as well as competencies for some positions provided for by the *Coal Mining Safety and Health Act 1999* (Qld) (the Act). This chapter considers that evidence and makes relevant recommendations, consistently with section 2.1(v) of the Terms of Reference and section 203(2) of the Act. It is not intended to be a comprehensive review of training and competencies generally; rather, it focuses on selected issues raised in the evidence.

5.3 The Board heard evidence from Mr Greg Dalliston, a retired Industry Safety and Health Representative (ISHR). Until his retirement, Mr Dalliston had a lengthy involvement in coal mining training and skill development. He was the Chair of the Queensland Mining Industry Training and Advisory Board (and, later, the Resource and Infrastructure Industry Skills Council, as it became known). He sat on the Board of Examiners from 1998 until June 2020.

5.4 The Board also heard evidence from Mr John Sleigh, Vice-President of the Mine Managers Association of Australia (MMAA). Mr Sleigh's career in the industry was also heavily focussed on training. He sat on the Board of Examiners from 2010 to 2015.

Specialist training

5.5 Specialist training in emergency response is available through the Queensland Mines Rescue Service (QMRS). The QMRS runs an Underground Coal Mine First Response Training Program which is designed to provide the skills and knowledge to safely respond to a fire or other underground emergency.[518]

5.6 The QMRS also runs courses in Underground Coal Mine Emergency Response and Rescue, and Underground Coal Mine Inertisation Team Operations. The courses can be undertaken by underground coal mine workers sponsored by a Queensland

[518] Queensland Mines Rescue Service, *Underground Coal Mines First Response Training Program* (accessed 20 October 2020) <https://www.qmrs.com.au/training/underground-coal-mine-first-response-training-program/>.

coal mine organisation. They are designed to equip underground coal mine workers with the skills to respond to all manner of mine emergency incidents.[519]

5.7 The QMRS rescue station is conveniently located in the Bowen Basin. The Board understands that its facilities are of a high standard. The Board considers there would be benefit to the industry if the QMRS was able to provide self-escape training for all underground coal mine workers, as well as generic inductions, site-specific inductions and refresher training. The Board is aware that the New South Wales Mines Rescue Service is used by industry for this purpose.

5.8 QMRS is a not-for-profit company owned by the Queensland coal industry and is primarily funded by an industry levy. The Board notes that if the QMRS were to provide an expanded service, there would need to be a review of its funding model.[520]

5.9 The Mackay Resources Centre of Excellence, which opened in August 2020, is another industry resource. In October 2020, the Board visited the Centre. It is jointly funded by the State Government and Mackay Regional Council and is a hub for training, development, research, and collaboration in the resources sector. In addition to training rooms and laboratory facilities, the Centre also incorporates a 240 metre replication of an underground coal mine which will be able to be used by the industry for training and the testing of equipment.

Competencies for statutory positions

5.10 Workers who hold statutory positions in underground coal mines are required to have certain prescribed competencies. These competencies are determined by the Coal Mining Safety and Health Advisory Committee (CMSHAC).[521]

5.11 Part 6 of the Act provides for the establishment of CMSHAC.[522] Its primary function is to give advice and make recommendations to the Minister about promoting and protecting safety and health at coal mines.[523] CMSHAC has the function of recognising, establishing and publishing the competencies accepted by the committee as qualifying a person to perform the tasks prescribed by the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation), as well as the safety and health competencies required to perform the duties under the Act.[524]

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[519] Queensland Mines Rescue Service, *Underground Coal Mines Emergency Response and Rescue Training Program* (accessed 20 October 2020) <https://www.qmrs.com.au/training/emergency-response-and-rescue/>; Queensland Mines Rescue Service, *Underground Coal Mine Inertisation Team Operations* (accessed 20 October 2020) <https://www.qmrs.com.au/training/underground-coal-mine-inertisation-team-operations/>.
[520] Submission received from QMRS on 28 October 2020 in response to a partial draft Chapter.
[521] Act section 76A(a).
[522] Act section 74.
[523] Act section 76.
[524] Act section 76A.

5.12 Part 10 of the Act provides for the establishment of the Board of Examiners which grants certificates to those applicants who demonstrate the appropriate level of competency.[525]

5.13 The certificates of competency issued by the Board of Examiners in respect of underground coal mining are:[526]

a. First Class (Underground Mine Manager (UMM));

b. Second Class (Undermanager);

c. Deputy; [527] and

d. Ventilation officer.

5.14 The Board of Examiners also issues Site Senior Executive (SSE) notices to those applicants who have demonstrated the safety and health knowledge required to perform the duties of an SSE.[528]

Process for obtaining certificates of competency

5.15 Applicants who wish to apply for a certificate of competency are required to have a prescribed minimum of experience in underground coal mines. For example, applicants who wish to apply for a First or Second Class Certificate of Competency must have a minimum of five years' experience in an underground coal mine. Applicants who wish to apply for a Deputy's Certificate of Competency must have a minimum of three years' experience in an underground coal mine.[529]

5.16 There are other prerequisites, including that applicants are required to have completed various prescribed national competencies at an appropriate level. Applicants who have the necessary experience and have completed the required prerequisites must first sit a two hour written law examination. If successful, applicants then undertake an oral examination conducted by three persons nominated by the Board of Examiners.[530]

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[525] Act section 185.
[526] SLJ.001.001.0001, .0004.
[527] In the industry, an Explosion Risk Zone (ERZ) Controller is also known as a Deputy.
[528] SLJ.001.001.0001, .0007.
[529] SLJ.001.001.0001, .0005.
[530] SLJ.001.001.0001, .0005.

5.17 Those who obtain a competency in New South Wales or New Zealand, equivalent to a competency available in Queensland,[531] may apply to have it recognised by mutual recognition.[532] To obtain mutual recognition of the competency in Queensland, an applicant is required to hold a specified risk management competency.[533] The Board of Examiners reviews the application to ensure that the applicant has the qualifications and experience required to hold that competency in Queensland.[534]

5.18 In his evidence to the Board, Mr Dalliston expressed some concern about a feature of the current operation of the mutual recognition scheme. He said that, until last year, if a person obtained a First Class Certificate of Competency in New South Wales and came to Queensland to work, the person was required to sit an examination before the Board of Examiners to demonstrate appropriate knowledge of the relevant Queensland legislation.

5.19 He said that the examination is no longer a requirement. The Board of Examiners discontinued that requirement, he thought, on the basis that 'the SSE at the mine should determine whether you're competent or not'.[535]

5.20 That part of his evidence appeared to reference the SSE's obligation under section 42(h)(iii) of the Act to ensure that work is not undertaken by a coal mine worker at the mine until the worker has received training so the worker is competent to perform the worker's duties.

5.21 Section 82(1) of the Regulation provides that a coal mine's safety and health management system must provide for a training scheme for persons at the mine.

5.22 Further, section 82(3) of the Regulation provides that the training scheme must cover a number of specified matters, to the extent that the matters are relevant to the duties of the person undergoing the training. One of the matters that must be covered by the training scheme is the mine's safety and health management system.

5.23 The Regulation does not presently require that the training scheme cover the statutory obligations imposed on various persons and entities at a coal mine. The Board considers there would be merit in each worker being familiar with the statutory

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[531] First Class, Second Class, Deputy or Ventilation Officer Certificates of Competency, or SSE notice.
[532] Pursuant to the *Mutual Recognition (Queensland) Act 1992* (Qld) and the *Trans-Tasman Mutual Recognition (Queensland) Act 1997* (Qld).
[533] For First Class Certificates of Competency, the required competency is RIIRIS601E - Establish and maintain the risk management system. For the Second Class and Deputy Certificate of Competency, the required competency is RIIRIS402E – Carry out the risk management process.
[534] Queensland Government: Business Queensland *Mutual recognition of interstate mining competencies* (accessed 20 October 2020) <https://www.business.qld.gov.au/industries/mining-energy-water/resources/safety-health/mining/competencies-certificates/interstate>.
[535] TRA.500.013.0001, .0020 line 39-41.

obligations in Part 3 of the Act. The Board considers that it would be beneficial to safety for the training scheme to cover the applicable legislation (the Act and Regulation) including, but not limited to, the safety and health obligations imposed by Part 3 of the Act.

Person in charge of an underground coal mine

5.24 Section 60(2) of the Act requires that the SSE of an underground coal mine must appoint a person to be the UMM to control and manage the mine.

5.25 Section 60(5) of the Act provides that a coal mine operator or SSE must not appoint a person as a UMM unless the person holds a First Class Certificate of Competency for an underground coal mine.

5.26 Despite the requirement in section 60(5) that the UMM hold a First Class Certificate of Competency, the person appointed to have control and management of the mine when the UMM is not in attendance need only hold a Deputy's Certificate.[536]

5.27 In Mr Dalliston's view, allowing a person who holds a Deputy's Certificate of Competency (but not a First or Second Class Certificate of Competency) to be in charge of a mine, is inadequate to ensure safety. He considers that the person in charge of a mine in the absence of the UMM ought to have at least a Second Class Certificate of Competency.[537]

5.28 Mr Dalliston explained this view in the following exchange with Counsel Assisting:[538]

> *Q. I'll just ask you the question. Who fills in for the UMM and what qualifications do they need to have?*
>
> *A. Under section 60(8) of the Act, it says that if the first class manager's away or absent from the mine, a person with a first class or second class or deputy's ticket[539] can be in control of the mine. So the manager is not always there. They do other stuff. They're looking at running, managing and operating a mine, and especially on the back shifts. There used to be an under-manager in charge who had a second class ticket, under the old Act. That was withdrawn, removed, and now you can have either a first or a second or a deputy's ticket.*
>
> *Some mines use deputies. I was in charge of the mine on weekends when I was at Southern. But it depends on the level of experience you've got – between a deputy that's had their ticket for a little while and hasn't done much*

[536] Act section 60(8).
[537] DGR.001.001.0001, .0008.
[538] TRA.500.013.0001, .0019, line 29–.0020, line 22.
[539] A term commonly used to refer to certificates of competency.

or a deputy that's been at a few mines and understand the operation – I don't believe a deputy should be in charge.

I believe that the minimum should be at least a second class ticket, because the deputy, in the units of competency, applies the units of competency, the under-manager implements, and the manager establishes.

…

Q. In your view, is that sufficient, that someone who has merely got a deputy's ticket should be able to act in place of the UMM, in the absence of the UMM?

A. Well, like I said, I don't think it is, because you can get a deputy and you can get a deputy. And usually if they've got a good deputy, they'll have them at the face or they'll have them looking after projects, so it's usually the leftover one that might look after the shift, which is not a good idea.

5.29 Mr Sleigh agreed that it would be preferable for the person in charge of a mine in the absence of the UMM to hold at least a Second Class Certificate of Competency. He said:[540]

I need to be clear here that I'm expressing a view of the Mine Managers Association, which I do hold, that, yes, the New South Wales standard, that when the manager is away from the mine, if production is going on or if there are more than 15 people underground, you are required in New South Wales to have a second class certificate of competency – we see that as an appropriate level.

5.30 RSHQ submitted that the Board might consider a recommendation that the legislation be amended to require that a person left in charge of an underground coal mine in the absence of the UMM must be the holder of a First or Second Class Certificate of Competency.[541]

5.31 The control and management of an underground mine is central to safety at the mine. The importance of that role is reflected in the requirement under section 60(5) of the Act.

5.32 The Board agrees that, when the UMM is absent from the mine, the person who is left in charge of the mine should have a First or Second Class Certificate of Competency. In the Board's view, it is incongruous that, in the UMM's absence, the person left to control and manage the mine might hold less than a Second Class Certificate of Competency.

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[540] TRA.500.012.0001, .0050, line 1–7.
[541] RSH.999.001.0001, .0049.

Site Senior Executive

5.33 Section 25 of the Act provides that the SSE for a coal mine is the most senior officer employed or otherwise engaged by the coal mine operator for the coal mine who is located at or near, and has responsibility for, the coal mine.

5.34 Section 42 of the Act imposes numerous obligations on the SSE in relation to the safety and health of persons who may be affected by coal mining operations. The first (and fundamental) obligation is to ensure that the risk to persons from coal mining operations is at an acceptable level.[542]

5.35 Despite the significant safety and health obligations imposed on an SSE, the Act does not require that the SSE hold any particular qualifications or certificates of competency.

5.36 An SSE need only hold a notice issued by the Board of Examiners. To obtain such a notice, an SSE must complete the RIIRIS601E competency (Establish and maintain the risk management system) and undertake the examination conducted by the Board of Examiners to demonstrate adequate knowledge of the legislation.[543]

5.37 The position of the MMAA is that an SSE for an underground coal mine ought to hold a First Class Certificate of Competency.[544] Mr Sleigh explained that view in the following exchange with Counsel Assisting:[545]

> *Q. Do you see any tension between the fact that the UMM is required to hold a first class certificate of competency, but the SSE is not required to hold such a certificate?*
>
> *A. Look, it is difficult to understand how you can manage and control and not be in control and be the senior manager. The tradition has been the qualified manager – the tradition prior to the introduction of the Act. But even post the introduction of the Act, quite a number of SSEs are people that have been promoted from the position of UMM to SSE, as Damien, yesterday's witness was.*
>
> *Q. I think we saw yesterday from Mr Wynn's evidence that he does in fact hold a first class certificate?*
>
> *A. He holds it, yes. And that's not unusual. There are a number of board members that hold a first class. They've been progressively moved up through the organisation.*

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[542] Act section 42(a).
[543] SLJ.001.001.0001, .0007. Mr Sleigh's statement–which was correct at the time it was written–refers to the previous competency, RIIRIS601D. The competencies are equivalent.
[544] SLJ.001.001.0001, .0010.
[545] TRA.500.012.0001, .0052, line 13–47.

Q. In your view, would there be any benefit in the introduction of a requirement that SSEs do hold a first class certificate of competency?

A. The position of the Mine Managers Association is to favour that. We have made a number of submissions to the Minister, both in New South Wales and in Queensland, that that standard should be returned to. That was also a standard that was established at the 1902 inquiry into the Mount Kembla explosion in New South Wales, was reinforced in 1925 after the Mount Mulligan disaster in Queensland, where 75 people were killed, and most recently in Queensland after the explosion at Moura No. 4 in the mid 1990s and at Pike River in 2010. Whenever an inquiry is held, it seems obvious to those sitting on the inquiry that the competence of the mine manager is absolutely critical.

5.38 Mr Dalliston referred to the prohibition, in section 60(6) of the Act, on a person giving a direction to the UMM about a technical matter in relation to the underground mine, unless the person giving the direction holds a First Class Certificate of Competency. He adverted to the fact that the most senior officer at the mine need not hold a First Class Certificate of Competency. In that event, the SSE would not be able to give a technical direction to the UMM even though the SSE sits above the UMM in the management structure.[546]

5.39 Anglo submitted that the Board consider making a recommendation that an SSE hold a competency in the Mine Emergency Management System (commonly referred to as the 'MEMs training'), on the basis that the SSE will assume the position of incident controller during an emergency.[547] The Board recognises the value of persons in the position of incident controller holding this competency. However, the Board finds it difficult to reconcile how the SSE, without holding a First Class Certificate of Competency, can assume the role of incident controller without having the authority to give a technical direction to the UMM.

5.40 RSHQ submitted that the Board might consider a recommendation for a legislative requirement that the SSE for an underground coal mine be the holder of a First Class Certificate of Competency.[548] Similarly, CFMMEU and Glencore supported the proposition that the SSE be required to hold a First Class Certificate of Competency.[549] Anglo submitted, on the other hand, that an SSE does not require this qualification in order to competently perform the role.[550]

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[546] TRA.500.013.0001, .0018, line 22–.0019, line 19.
[547] Submission received from AAMC on 2 November 2020 in response to a draft chapter.
[548] RSH.999.001.0001, .0048.
[549] CMU.008.008.0001, .0041; Submission received from GCAA on 30 October 2020 in response to a draft chapter.
[550] Submission received from AAMC on 2 November 2020 in response to a draft chapter.

5.41 In the Board's view, that an SSE is not required to hold a First Class Certificate of Competency does not sit well with the nature and extent of the obligations imposed on an SSE by section 42 of the Act. Indeed, it seems illogical.

5.42 The Board considers that it would be appropriate for there to be a legislative requirement that the person appointed as the SSE for an underground coal mine holds a First Class Certificate of Competency. It would be also appropriate for there to be a legislative requirement that the person appointed to act as the SSE, if the SSE is absent from duty for more than 14 days, holds a First or Second Class Certificate of Competency.

5.43 On the evidence before the Inquiry, there would be practical barriers to immediately mandating these requirements. For a start, the average time for completing a First Class certificate is two years and no First Class certificates of competency were issued in Queensland in the financial years 2017/2018 and 2018/2019. Only five persons were issued with a Second Class certificate in the same period (including pursuant to mutual recognition). Furthermore, the Board recognises that not all current SSEs hold First Class Certificates of competency. It follows that the implementation of any such legislative requirements would need to be transitional.

SSE's obligation to develop and implement a safety and health management system

5.44 Section 42(c) of the Act imposes an obligation on an SSE to develop and implement a safety and health management system for all persons at the mine, including contractors and service providers.

5.45 Despite that obligation, and the centrality of the safety and health management system to ensuring safety at mines, there is no obligation on the SSE to hold the RIIWHS601E competency (Establish and maintain the work health and safety management system).[551] It is sufficient that a person named in a senior position in the management structure for the mine holds that competency.[552]

5.46 The Board considers that the Act should require that SSEs hold that competency. Mr Dalliston gave some evidence about the apparent contradiction between the SSE's role and the fact that they don't have to personally hold the competency, saying in response to a question from Counsel Assisting:[553]

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[551] The Board notes that before 22 September 2020 an equivalent predecessor competency was in place, namely RIIWHS601D, which is referenced in MMA.001.001.017.0001.
[552] MMA.001.001.017.0001, .0002.
[553] TRA.500.013.0001, .0018, line 41–.0019, line 5.

A. So I really can't see how – and I was going to legally challenge it before I left – SSEs don't have to hold that unit of competency, because that's – that whole thing they have to do is look after the safety management system.

Q. I suspect it might be argued that an SSE could discharge that obligation by having someone on site who did have that competency?

A. There's a piece in the Act that says you can't discharge your obligation – you can't give them away. You can have other people do your work for you, but it's still your obligation to make sure.

Competencies for inspectors

5.47 Section 126 of the Act provides that the Chief Executive Officer (CEO)[554] may appoint a person as an inspector only if the CEO considers the person has appropriate competencies and adequate experience to effectively perform an inspector's functions. This topic is dealt with in Chapter 3.

Findings and recommendations

Findings

Finding 66

There would be benefit to the industry if the Queensland Mines Rescue Service (QMRS) was able to provide self-escape training for all underground coal mine workers, as well as generic inductions, site-specific inductions and refresher training.

Finding 67

It would be beneficial to safety for the training scheme required by section 82(3) of the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation) to cover the provisions of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act) and Regulation, including the safety and health obligations imposed by Part 3 of the Act.[555]

Finding 68

The person appointed to have control and management of an underground coal mine must hold a First Class Certificate of Competency.

Finding 69

It is unsatisfactory that a person appointed to have control and management of an underground coal mine in the UMM's absence holds less than a Second Class Certificate of Competency.

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[554] This is the CEO of the Regulator, Resources Safety and Health Queensland (RSHQ).
[555] Section 82(3) requires that a person be trained about certain matters to the extent the matters are relevant to the duties of that person.

Finding 70

A Site Senior Executive (SSE) for an underground coal mine ought to hold a First Class Certificate of Competency.

Finding 71

A person appointed to act as the SSE during an SSE's absence of more than 14 days ought to hold a First or Second Class Certificate of Competency.

Finding 72

An SSE ought to be required to hold the RIIWHS601E[556] competency (Establish and maintain the work health and safety (WHS) management system).

Finding 73

Implementation of legislative requirements giving effect to these findings would need to be transitional to avoid disruption to mining sites.

Recommendations

Recommendation 11

The industry and the QMRS consult to determine whether it is viable for the QMRS to provide self-escape training for all underground coal mine workers, as well as generic inductions, site-specific inductions and refresher training.

Recommendation 12

RSHQ takes steps to amend the Regulation to provide that the training scheme required by section 82(3) must cover the provisions of the Act and Regulation, including the safety and health obligations imposed by Part 3 of the Act.

Recommendation 13

RSHQ takes steps to amend the Act to require that the person left in charge of an underground coal mine in the absence of the UMM must hold either a First or Second Class Certificate of Competency.

Recommendation 14

RSHQ takes steps to amend the Act to require that an SSE for an underground coal mine must be the holder of a First Class Certificate of Competency.

Recommendation 15

RSHQ takes steps to amend the Act to require that a person appointed to act as the SSE for an underground coal mine, during an SSE's absence of more than 14 days, must be the holder of a First or Second Class Certificate of Competency.

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[556] This supersedes and is equivalent to RIIWHS601D.

Recommendation 16

CMSHAC includes the RIIWHS601E competency (Establish and maintain the WHS management system) as a competency required to be held by an SSE.

Chapter 6 - Corporate governance

Introduction

6.1 This chapter considers how Anglo American Metallurgical Coal Pty Ltd (AAMC) and Glencore Coal Assets Australia Pty Ltd (GCAA) manage safety risks at a corporate level.

6.2 Corporate governance is the system of rules, practices and processes by which a corporate entity is directed and controlled. Governance processes of a corporate entity form the framework through which the organisation's objectives are achieved.

6.3 Numerous publications address the importance of sound corporate governance as an essential part of the management of risk, including safety risk. Centralised risk control within an organisation is conducive to managing catastrophic hazards. Decentralisation of risk control in an organisation undermines process safety.[557]

6.4 Organisations which are effective in managing innately risky technologies are sometimes referred to as High Reliability Organisations (HROs) in the literature.[558]

6.5 The Brady Review[559] considered the use to be made of HRO theory. Recommendation Six from the Brady Review states:[560]

> *The industry should adopt the principles of High Reliability Organisational theory in order to reduce the rate of Serious Accidents and fatalities. At its most fundamental level, High Reliability Organisational theory focuses on identifying the incidents that are the precursors to larger failures and uses this information to prevent these failures occurring.*

6.6 The Terms of Reference (**Appendix One**) of this Inquiry require the Board to, *inter alia*:

> *…*
>
> *assess and determine whether the operational practices and management systems in existence at each of the mines or at corporate levels above them at the time the incidents occurred were adequate and effective to achieve compliance with the relevant safety laws and standards;* and
>
> *make recommendations for mine operators, relevant obligation-holders and other relevant parties for improving safety and health practices and procedures for mitigating against the risk of similar incidents occurring in the future…*

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[557] Hopkins, A., *Organising for Safety: How structure creates culture* (CCH Australia Limited, 2019).
[558] Hopkins A., *Learning from High Reliability Organisations* (CCH Australia Limited, 2014).
[559] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* (2019) Queensland Department of Natural Resources, Mines and Energy.
[560] Ibid. page iv–v.

6.7 In this Inquiry, the Board heard evidence from senior executives representing Resources Safety and Health Queensland (RSHQ), AAMC and GCAA about how corporate governance addresses safety risks across their respective organisations.

6.8 Evidence was given by:

- Mr Mark Stone, Chief Executive Officer (CEO) of RSHQ;
- Ms Kylie Ah Wong, General Manager Health Safety and Training of GCAA;
- Mr Tyler Mitchelson, CEO of AAMC; and
- Mr Damien Wynn, Site Senior Executive (SSE) of Grasstree mine (Grasstree) and a director of Anglo Coal (Capcoal) Management Pty Ltd.

6.9 This chapter considers their evidence and material from a number of published sources. Special attention is given to the issue of the management of principal hazards, including monitoring and reporting on the effectiveness of critical controls. Recommendations are made with a view to improving how corporate governance addresses safety risks, including by critical control management.

Obligations under the Act

6.10 The Act imposes safety and health obligations on persons and entities who may affect safety and health at coal mines or as a result of coal mining operations.[561] Those obligations are set out in Part 3 of the Act and are imposed on the following persons and entities:

- persons generally (section 39);
- a holder (section 40);
- a coal mine operator (section 41);
- an SSE (section 42);
- a contractor (section 43);
- designer, manufacturer, importer or supplier of plant for use at a coal mine (section 44);
- an erector or installer of plant at a coal mine (section 45);
- a manufacturer, importer or supplier of substances for use at a coal mine (section 46); and
- a person who provides a service at a coal mine (section 47).

[561] Act section 33(1).

6.11 A holder is defined as follows: [562]

> ***holder**, for a coal mine, means the holder under the* Mineral Resources Act 1989 *of an exploration permit, mineral development licence or mining lease for the coal mine.*

6.12 The obligations imposed on a holder are contained in section 40(2):

> *The holder must—*
>
> *(a) inform the proposed coal mine operator, by notice, of all relevant information available to the holder that may help the proposed coal mine operator—*
>
> *(i) ensure the site senior executive for the coal mine develops and implements a safety and health management system for the mine; and*
>
> *(ii) prepare and implement principal hazard management plans for the mine;*
>
> *(b) include in the contract appointing the coal mine operator an obligation on the operator—*
>
> *(i) to establish a safety and health management system for the mine; and*
>
> *(ii) other than for exploration activities under an exploration permit or mineral development licence—to be a party to a mines rescue agreement.*

6.13 A coal mine operator is defined as follows:[563]

> *A* **coal mine operator** *for a coal mine is—*
>
> *(a) the holder; or*
>
> *(b) if another person has been appointed as the coal mine operator under section 53 and the appointment is notified to the chief inspector under section 49, the other person.*

[562] Act schedule 3 'Dictionary'.
[563] Act section 21.

6.14 The obligations imposed on a coal mine operator are contained in section 41:

> *(2) A coal mine operator for a coal mine has the following obligations—*
>
> *(a) to ensure the risk to coal mine workers while at the operator's mine is at an acceptable level, including, for example, by providing and maintaining a place of work and plant in a safe state;*
>
> *(b) to ensure the operator's own safety and health and the safety and health of others is not affected by the way the operator conducts coal mining operations;*
>
> *(c) not to carry out an activity at the coal mine that creates a risk to a person on an adjacent or overlapping petroleum authority if the risk is higher than an acceptable level of risk;*
>
> *(d) to appoint a site senior executive for the mine;*
>
> *(e) to ensure the site senior executive for the mine—*
>
> *i. develops and implements a safety and health management system for the mine; and*
>
> *ii. develops, implements and maintains a management structure for the mine that helps ensure the safety and health of persons at the mine;*
>
> *(f) to audit and review the effectiveness and implementation of the safety and health management system to ensure the risk to persons from coal mining operations is at an acceptable level;*
>
> *(g) to provide adequate resources to ensure the effectiveness and implementation of the safety and health management system.*
>
> *(3) Without limiting subsection (1), the coal mine operator has an obligation not to operate the coal mine without a safety and health management system for the mine.*

6.15 SSE is defined as follows: [564]

> *The* **site senior executive** *for a coal mine is the most senior officer employed or otherwise engaged by the coal mine operator for the coal mine who —*
>
> *(a) is located at or near the coal mine; and*
>
> *(b) has responsibility for the coal mine.*

[564] Act section 25.

6.16 The primary obligations of the SSE are contained in section 42. Pursuant to section 42(c) of the Act, an SSE has an obligation to develop and implement a safety and health management system for all persons at the mine, including contractors and service providers. The safety and health management system must include principal hazard management plans (PHMPs) to control the risks associated with principal hazards.[565]

6.17 Mr Stone said that the Act and the *Coal Mining Safety and Health Regulation 2017* (Qld) (the Regulation) are structured so that the sites 'own the hazards'.[566] In the context of a question concerning the operator ensuring that principal hazards are effectively managed, he said that recent amendments to the Act were designed to impose obligations on those who 'sit above the SSE' to ensure that they are aware of the hazards at the site and the degree to which the risks are being managed.[567] This evidence refers to the introduction of section 47A. This section imposes an obligation on each officer of a corporation that has an obligation under the Act, such as corporations that are holders and operators of coal mines. Each such officer must exercise due diligence to ensure the corporation complies with the obligations imposed on it.

6.18 In many cases, holder and operator companies sit within a larger corporate structure. There is an argument that a parent company of an operator company holds obligations under section 39 of the Act. If that is so, officers of the parent company would have the obligation under section 47A to exercise due diligence to ensure the parent company complies with the obligations under section 39. Section 32D of the *Acts Interpretation Act 1954* provides that, in any Act, a reference to a person generally includes a reference to a corporation as well as an individual. However, the Board has some doubt that, in the context of section 39, 'a person' includes a corporation.

6.19 Regardless of any doubt about its application to corporations, section 39 imposes general safety and health obligations on individuals 'who may affect the safety and health of others at a coal mine'. This would include employees and officers of parent companies who play a role in the making of decisions that impact safety and health at coal mines.

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[565] Act section 62(5)(d).
[566] TRA.500.001.0001, .0024, line 31–33.
[567] TRA.500.001.0001, .0046, line 31–.0047, line 5.

6.20 Mr Stone referred to that part of the Brady Review which said that in order to reduce fatalities and serious injuries at coal mines 'organisations need to pick up the characteristics of high reliability organisations…one of those characteristics is a relentless appetite or desire for senior managers, senior leaders, corporates, to really understand what is going on at site'.[568]

6.21 Mr Stone said that best practice would be:[569]

> *[E]xecutives within organisations routinely reviewing things like fatality report recommendations, critical control verification and convincing themselves that all is well at site and demonstrating to the site that they have a deep interest in the safety and health performance.*

Company structures within GCAA

6.22 The Board heard evidence from Ms Ah Wong on behalf of GCAA, which conducts Glencore plc's[570] Australian coal business. The Oaky North mine (Oaky North) is operated by Oaky Creek Holdings Pty Ltd, which is a wholly owned subsidiary of GCAA. Oaky North is only one of several mines and associated operations conducted under the umbrella of GCAA.

6.23 GCAA's management structure consists of the Chief Operating Officer (COO), to whom report several directors of such departments as engineering, finance, business development and logistics, as well as general managers of safety, environment and human resources. Also reporting directly to the COO[571] are three directors of operations for underground and open cut mining, with separate directors for Queensland and New South Wales open cut operations and a single director for underground operations across both states. The general managers and functional directors define, monitor and audit the systems under which the mines operate. The directors of operations are responsible for implementation and delivery of those systems.[572]

6.24 The SSE at Oaky North reports to the director of underground operations, Mr Darren Nicholls. Mr Nicholls is employed by GCAA and reports directly to the GCAA COO. Mr Nicholls is also a director and officer of the operator, Oaky Creek Holdings Pty Ltd.

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[568] TRA.500.001.0001, .0047, line 7–14.
[569] TRA.500.001.0001, .0047, line 17–22.
[570] The definition of plc is 'public liability company'.
[571] OCH.507.002.0001, .0013.
[572] OCH.507.002.0001, .0002.

6.25 GCAA's control of risk is structured such that it designs the safety framework, including the risk management system, within which the various operations (of which there are 17) are to be conducted. Each operation is then required to determine the specific manner in which the objectives of the safety framework are to be achieved. Put simply, GCAA provides each operator with certain objectives, and it is up to the operator's managers to decide how those objectives are to be achieved. However, GCAA has a comprehensive assurance program designed to ensure that its requirements are met at operator level.[573]

Company structures within AAMC

6.26 Anglo American plc (Anglo) has a similar structure in that AAMC or 'MetCoal' is the business unit that sits above the companies that operate the Grasstree mine (Grasstree), Moranbah North mine (Moranbah North) and Grosvenor mine (Grosvenor).[574] Those companies are, respectively, Anglo Coal (Capcoal Management) Pty Ltd, Anglo Coal (Moranbah North Management) Pty Ltd and Anglo Coal (Grosvenor Management) Pty Ltd.

6.27 However, unlike at Oaky North, at Anglo underground mines the SSE is also a director of the mine operator company.[575] Whilst this structure means that there is not the entirely independent oversight of the SSE by the mine operator, envisaged under the Act, the legislature has plainly considered the structure and accommodated it.[576] Each of these SSEs reports to the Head of Underground Operations at AAMC.[577]

6.28 Although Mr Damien Wynn, the SSE at Grasstree, suggested that his dual role as SSE and director of the operating company meant that he had greater statutory obligations than any other person,[578] the Board notes that section 47A(4) of the Act operates to exclude the SSE from liability under section 47A. Other officers of the operating company, however, would have the due diligence obligation imposed by that section. Executives at AAMC may, depending on the circumstances, have obligations pursuant to both sections 39 and 47A of the Act, although as discussed in paragraph 6.18, the application of section 47A will depend upon whether corporations are caught by section 39.

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[573] TRA.500.008.0001, .0002, line 30–.0005, line 13.
[574] These companies are the operator of each mine under section 41 of the Act.
[575] MTY.001.002.0001, .0012–.0014.
[576] Section 47A(4) *Coal Mining Safety and Health Act 1999*; Explanatory Note, Mines Legislation (Resources Safety) Amendment Bill 2018, page 27.
[577] This position was, until recently, held by Mr Glen Britton.
[578] TRA.500.011.0001, .0006, line 39–47.

6.29 Mr Wynn explained that Anglo parent entities made financial resources available to the operating company at Grasstree by way of a budgeting process whereby a budget was prepared at site level for approval by AAMC,[579] although the Board notes that the exercise was also driven by corporate goals set by AAMC, for example, the doubling of 2012 production rates by 2022.[580]

6.30 Similarly to GCAA, a standard framework known as the 'Anglo American Operating Model' applies across all Anglo American entities.[581] It provides the structure to define business processes including the setting of business expectations for the organisation as a whole.

6.31 In his statement, Mr Mitchelson explained that this structure ensures alignment and consistency across the various Anglo entities but allows for sufficient flexibility to accommodate specific safety and operational requirements between jurisdictions and at different mines.[582] Some aspects of that structure relevant to this Inquiry are set out in the overarching Safety, Health & Environment (SHE) Policy which provides that the 'managers of every MetCoal function or operation are responsible for the implementation of Group Technical Standards, the SHE Way, and their Safety, Health and Environment Management System procedures, guidelines and specifications'.[583]

6.32 The SHE Way[584] sets out safety, health and environmental standards and objectives that are to be applied across the Anglo group. However, each mine has its own individual SHE Policy.[585]

Corporate governance practices

Terminology used in this chapter

6.33 The Board heard evidence about how AAMC and GCAA manage safety risks across the respective organisations. This section will describe the corporate governance strategies adopted by both organisations with a particular focus on the management of risks and hazards with the potential to lead to catastrophic events.

6.34 As will be seen, there is some variance in the terminology used to describe such risks, hazards and events, depending on the source. Within the Act, hazards at a coal mine with the potential to cause multiple fatalities are referred to as principal hazards.[586] GCAA risk management documentation uses the terminology of

[579] TRA.500.011.0001, .0008 –.0009; .0014, line 24–36.
[580] AAMC.001.006.0504, .0511.
[581] AAMC.001.031.0142, .0143.
[582] MTY.001.002.0001, .0015.
[583] AAMC.001.005.0092.
[584] AAMC.001.005.0093.
[585] MTY.001.002.0001, .0016.
[586] Act section 20.

catastrophic events and catastrophic hazards that may lead to such events.[587] Within the International Council on Mining and Metals (ICMM) Good Practice Guide[588] these such events are described as Material Unwanted Events (MUEs). AAMC uses the term Priority Unwanted Event (PUE).[589]

Corporate governance practices within GCAA

6.35 Ms Ah Wong said the role of the GCAA executive team is to identify and develop the processes that provide the framework for the operating sites to manage their respective businesses. In particular, the Health Safety Environment and Community (HSEC) plan is developed at GCAA level and forms the basis from which the individual sites develop their own plan.

6.36 The GCAA *Regional Asset HSEC Standard 1.0 Leadership, Culture and Accountability* (the LCA Standard) outlines the overall approach taken to managing safety risks across the organisation.[590]

[587] See e.g. OCH.507.001.0208, 0210.
[588] International Council on Mining & Metals, *Health and Safety Critical Control Management – Good Practice Guide* (2015) <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>.
[589] See e.g. AAMC.001.005.0093, .0122.
[590] OCH.504.001.0005, .0020.

6.37 The Organisational WHS Culture model, found at Appendix C of the LCA Standard and reproduced below, sets out two strategies referred to as personal safety and process safety. Personal safety focuses on addressing the risk of personal injuries, whilst process safety is designed to address the risk of fatalities and catastrophic incidents.

Figure 28: Organisational WHS Culture at GCAA

6.38 The personal safety strategy focuses on human behaviour, including expected safety behaviours and minimum standards of safety for all persons within GCAA's operations. This strategy includes scorecards, workforce engagement, non-technical skills, challenge testing and targeted visible leadership.

6.39 The process safety strategy focuses on higher order controls[591] and is supported by fatal hazard protocols, legislative compliance, critical control management (CCM), High Potential Risk Incident (HPRI)[592] reporting and assurance processes. CCM is particularly focused on controls to prevent or mitigate catastrophic events.

6.40 The GCAA *Risk Management Standard* draws a distinction between a catastrophic hazard and a fatal hazard.[593] A catastrophic hazard is defined as a hazard with the potential to result in multiple fatalities (five or more fatalities in a single incident), whereas a fatal hazard is defined as a hazard that has the potential to result in fewer than five fatalities. This is not consistent with the definition of a principal hazard in the Act.[594]

6.41 The GCAA *Regional Assets HSEC Protocol for Catastrophic Hazards* provides the framework whereby GCAA and their operations implement processes to manage catastrophic hazards, their associated controls and critical controls.[595]

6.42 GCAA catastrophic hazard management includes:[596]

a. *a risk register that is readily available and up to date, identifying the …catastrophic hazards…;*

b. *developing a bowtie risk analysis for each catastrophic hazard for GCAA;*

c. *identifying specific controls that require additional monitoring and reporting* (critical controls) *to manage the catastrophic hazards and for implementation across all operations where relevant; and*

d. *monitoring and verifying* catastrophic hazards *and* critical controls.

6.43 A bowtie analysis (BTA) is a graphical depiction of pathways from the causes of an event or risk to its consequences. It is a simplified combination of a fault tree that analyses the causes of an event or risk (depicted on the left-hand side of the

[591] The higher order controls are isolation, substitution and engineering controls. See glossary.
[592] See OCH.507.002.0001, .0003 which provides, 'A HPRI is an event, or near miss, which could have caused major or catastrophic incidents/accidents according to the Glencore Corporate Risk Management Guideline: multiple fatalities; multiple cases of permanent total disability/health effects; fatality or permanent incapacity/health effects'.
[593] OCH.507.001.0151, .0167.
[594] Section 20 Act.
[595] OCH.507.001.0208, .0210.
[596] OCH.507.001.0208, .0211.

diagram) and an event tree that analyses the consequences (depicted on the right). An example of a BTA diagram is shown below:[597]

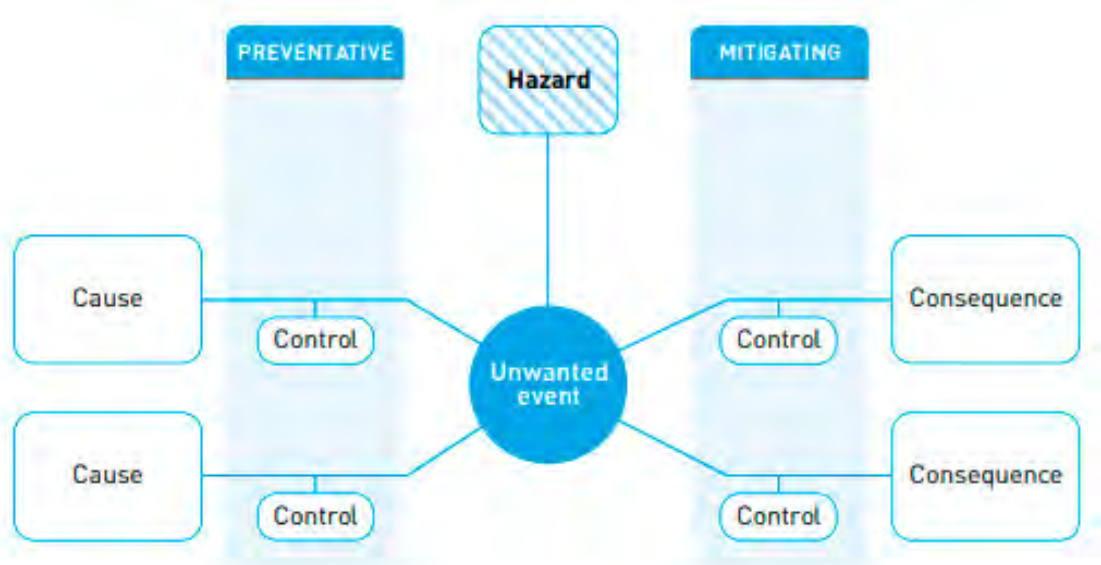

Figure 29: Simple bowtie diagram

6.44 Within GCAA, the results of the BTA for each catastrophic hazard are used by the individual operations to develop their own hazard management plans. The protocol for catastrophic hazards also requires that there be an owner appointed for each catastrophic hazard at the GCAA level and at the site level. The owners are responsible for overseeing the implementation of the particular catastrophic hazard management plan.[598]

6.45 Important components within the GCAA system are the monitoring, verification and reporting on the effectiveness of the controls.[599]

6.46 Each level of the organisation has a particular function for monitoring and verifying the effectiveness of the controls.[600] There is monthly reporting to the GCAA executive team on the effectiveness of the implemented controls.[601]

6.47 There is also a requirement to determine if a critical control has failed or contributed to an incident where the potential consequences are catastrophic according to the GCAA risk matrix.[602]

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[597] ICMM *Critical Control Management: Implementation Guide* (2015), page 22 <https://www.icmm.com/website/publications/pdfs/health-and-safety/9722.pdf>.
[598] OCH.507.001.0208, .0213.–0214.
[599] OCH.507.001.0208, .0217–.0224.
[600] OCH.507.001.0208, .0223, .0227.
[601] OCH.507.001.0208, .0221.
[602] OCH.507.001.0208, .0222.

Corporate governance practices within AAMC

6.48 The Anglo document SHE Way states that the corporate entity performs the following function:[603]

> *The corporate centre defines, communicates and reviews requirements in relation to the vision, leadership, principles, policy and standards for SHE management.*
>
> *The business units implement and build the corporate requirements into business-specific programmes.*

6.49 The document also details how Operational Risk Management (ORM) is applied across the group in four layers: [604]

a. the first layer is a baseline risk assessment identifying PUEs as well as other risks and opportunities;

b. the second layer is the development of detailed control strategies for PUEs based on the bowtie risk management tool;

c. the third layer is the performance of task-based risk assessments that cover all the risks identified in the baseline risk assessment. This includes the development of standard operating procedures; and

d. the fourth layer is the continuous management of the risks by the people executing the work through the use of personal risk assessment tools such as SLAMs.[605]

6.50 Another program within the corporate governance framework is the Elimination of Fatalities program, which commenced in 2018 and applies to the whole of the Anglo organisation.

6.51 In his statement, Mr Mitchelson explained that he led the development of an annual plan for actions to be achieved each year in advancing the Elimination of Fatalities objectives and incorporating the six key elements of the Elimination of Fatalities plan: leadership, planning and scheduling, a learning organisation, a caring culture, risk and change management, and monitoring and assurance.[606]

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[603] AAMC.001.005.0093, .0100.
[604] AAMC.001.005.0093, .0111.
[605] A workplace tool to remind persons to think about a task. SLAM stands for stop, look, assess and manage.
[606] MTY.001.002.0001, .0017.

6.52 The Anglo corporate governance strategy also includes the application of group technical standards and safety rules across the operating sites. Examples include:

- the *Anglo American Safety & Sustainable Development (S&SD) Group Standard Learning from Incidents*[607] (S&SD Standard);
- the *MetCoal Incident Reporting Standard*[608] (MetCoal Standard); and
- the *Grosvenor Incident Reporting & Investigation Procedure*[609] (Grosvenor Procedure).

6.53 Each of these deals with, amongst other things, the procedures for the reporting and investigation of HPIs.

6.54 The S&SD Standard requires that 'significant incidents'[610] are reported to the CEO (Mr Mitchelson) of the Business Unit (BU, i.e. MetCoal) within two hours. However, HPIs are to be notified to the relevant Anglo SHE discipline head within 48 hours.[611] This Standard does not require notification of HPIs to the MetCoal CEO.

6.55 The MetCoal Standard requires incidents with an actual outcome of Level 4 or 5 to be immediately notified to the BU Head of Operations, and to the BU CEO within two hours. The BU CEO must notify the Anglo CEO and Chairman within four hours.[612] HPIs, however, must be notified to the relevant Head of Operations within 12 hours. The process is set out in the MetCoal Standard as follows:[613]

[607] AAMC.001.004.1472.
[608] AAMC.001.004.0002.
[609] AGM.005.002.0484.
[610] Incidents with an actual consequence of Level 4 or 5, which include permanent disability or death suffered by one or more persons.
[611] AAMC.001.004.1472, .1474.
[612] AAMC.001.004.0002, .0021.
[613] AAMC.001.004.0002, .0022.

Step #	Step	Responsibility	Who Gets Notified	Timing	How
1	Notification of HPI Occurring	Affected General Manager / Most Senior Site Manager	• Head of S&SD • Relevant Head of Operations, Project or Technical	Within 12 hours	Phone (verbal or text) with follow up email
2	Initial Entry into Enablon triggering an Alert Level 1	Affected General Manager / Most Senior Site Manager	All Operations	Within 48 hours	Enablon
3	15min phone hook up to discuss initial findings	Affected General Manager / Most Senior Site Manager	• Head of S&SD • Relevant Head of Operations, Project or Technical, Safety or Environment	Within 7 days	Verbal / Phone
4	Proposed actions for review and sign off	Affected General Manager / Most Senior Site Manager	Relevant Head of Operations, Project or Technical, Safety or Environment	Within 14 days	Email
5	Final Incident Investigation Report and Level 2 Alert	Affected General Manager / Most Senior Site Manager	• Head of S&SD • Relevant Head of Operations, Project or Technical, Safety or Environment	Within 30 days	Email

Figure 30: MetCoal HPI and High Potential Hazard Table of Notification Requirements

6.56 The MetCoal Standard does not require the BU CEO to be notified of the occurrence of an HPI. Further, whilst it prescribes a process of escalation in respect of repeat environmental incidents, no such process exists with respect to repeated HPIs.[614]

6.57 The Grosvenor Procedure requires a significant incident[615] to be immediately reported to the relevant Head of Operations and the Head of S&SD, and to the Coal (Australia and Canada) CEO and other relevant leaders within two hours. Anglo HPIs[616] are to be reported to the relevant Coal Head of Operations and Head of S&SD.[617] DNRME HPIs[618] that occur underground are to be notified to the

[614] AAMC.001.004.0002, .0008.
[615] Also defined as one with an actual Level 4 or 5 consequence.
[616] Defined as incidents where it is reasonable to expect a Level 4 or 5 potential consequence.
[617] AGM.005.002.0484, .0491.
[618] A reference to an HPI under the legislation, 'DNRME' (the Department of Natural Resources, Mines and Energy), previously 'DNRM' (the Department of Natural Resources and Mines) being the regulator at the time of writing the Procedure. The current regulator is Resources Safety and Health Queensland.

Underground Mine Manager (UMM) as soon as possible, whereas those that occur on the surface must be notified to the SSE as soon as possible. A verbal report must then be made to the Inspectorate, followed by formal notice by the SSE within 48 hours.[619]

6.58 The Grosvenor Procedure does not require the MetCoal CEO to be notified of the occurrence of either Anglo or DNRME HPIs.

6.59 Mr Mitchelson said that Anglo has:

> *…critical control monitoring that's reported every month, that comes through, that I look at - or the business looks at to ensure the critical controls are operating effectively in the business.*[620]

6.60 He said that he also received 'daily reports' from the Enablon system,[621] a system which is used for 'all hazard, incident, investigation, Visible Felt Leadership (safety interaction), action management and operational risk management'.[622]

Critical controls

6.61 Critical control management (CCM) is a risk management process that focuses on identifying and managing the controls that are critical to the prevention of catastrophic or fatal events.

6.62 CCM is a progression in risk management practices, not a revolutionary change. Current risk management practices are still relevant, but CCM adds aspects that help organisations focus on, and more effectively manage, catastrophic risk.[623]

6.63 CCM has been adopted by AAMC and GCAA.

6.64 The adoption of CCM by Anglo was outlined in a briefing paper provided to the Board of Inquiry. Part 9.3 of that document explains:[624]

a. *The critical controls is a process that commenced in approximately 2015, with the MetCoal business as the pilot, consequent upon the death of Mr Paul McGuire in 2014. Initially, it was a site based process, with each site developing its own critical controls.*

b. *In approximately 2017, the wider businesses recognised that it was necessary to align the various identified critical controls across all of the*

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[619] AGM.005.002.0484, .0492.
[620] TRA.500.009.0001, .0018, line 42–45.
[621] TRA.500.009.0001, .0008, line 18–19.
[622] AAMC.100.002.0001, .0017.
[623] Hassall, M. & Joy, J., *Effective and Efficient Implementation of Critical Control Management in the Australian Coal Mining Industry by 2020* (2016) Project No. C24006 Report, Australian Coal Association Research Program.
[624] AAMC.100.002.0001, .0018.

sites internationally. So now, there is a process whereby Functional bowties are done at a Group level which focuses Priority Unwanted Events with a classification of 4 or 5 (being, single or multiple fatality risks). A bowtie analyses [sic] *identifies the causes and consequence of the unwanted event, the controls that prevent it and if the unwanted event occurs mitigator controls to prevent a fatality event occurring.*

c. *As part of the continuous improvement process MetCoal operations conducted a series of workshops to align operations and implement the Group critical controls, including expanding to include erosion and supporting factors of critical controls, and alignment of critical control monitoring activities.*

d. *The changes are currently being uploaded into the system on a site by site basis.*

6.65 Anglo's implementation of the CCM approach generally followed the processes outlined in the International Council on Mining & Metals *Critical Control Management Implementation Guide* (ICMM Implementation Guide), which lists the following definitions:[625]

A control is an act, object (engineered) or system (combination of act and object) intended to prevent or mitigate an unwanted event.

A critical control is a control that is crucial to preventing the event or mitigating the consequences of the event. The absence or failure of a critical control would significantly increase the risk despite the existence of the other controls. In addition, a control that prevents more than one unwanted event, or mitigates more than one consequence is normally classified as critical.

Material Unwanted Event (MUE)[626] *is an unwanted event where the potential or real consequence exceeds a threshold defined by the company as warranting the highest level of attention – for example, a high-level health, safety or environment impact.*

6.66 The ICMM Good Practice Guide outlines a nine-step approach for implementation of the CCM approach. These steps are:[627]

1. [Create] *a plan that describes the scope of the project, including what needs to be done, by whom and the timescales.*

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[625] ICMM *Critical Control Management: Implementation Guide* (2015), Appendix A <http://www.icmm.com/website/publications/pdfs/health-and-safety/9722.pdf>.
[626] Anglo uses the term Priority Unwanted Event (PUE) instead of the term Material Unwanted Event (MUE). Glencore uses the term Catastrophic Incident for an MUE.
[627] ICMM *Health and Safety Critical Control Management – Good Practice Guide* (2015), page 7 <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>.

2. *Identify MUEs that need to be managed.*
3. *Identify controls for MUEs, both existing controls and possible new controls. Prepare a bowtie diagram.*
4. *Identify the critical controls for the MUE.*
5. *Define the critical controls' objectives, performance requirements and how performance is verified in practice.*
6. [Compile a] *list of the owners for each MUE, critical control and verification activity. A verification and reporting plan is required to verify and report on the health of each control.*
7. [Define] *MUE verification and reporting plans, and* [prepare] *an implementation strategy based on site-specific requirements.*
8. *Implement verification activities and report on the process. Define and report on the status of each critical control.*
9. [Ensure critical] *control and MUE owners are aware of critical control performance. If critical controls are underperforming or following an incident, investigate and take action to improve performance or remove critical status from controls.*

6.67 These nine steps are illustrated in the ICMM Good Practice Guide and reproduced in the GCAA protocol on catastrophic hazards as set out below:[628]

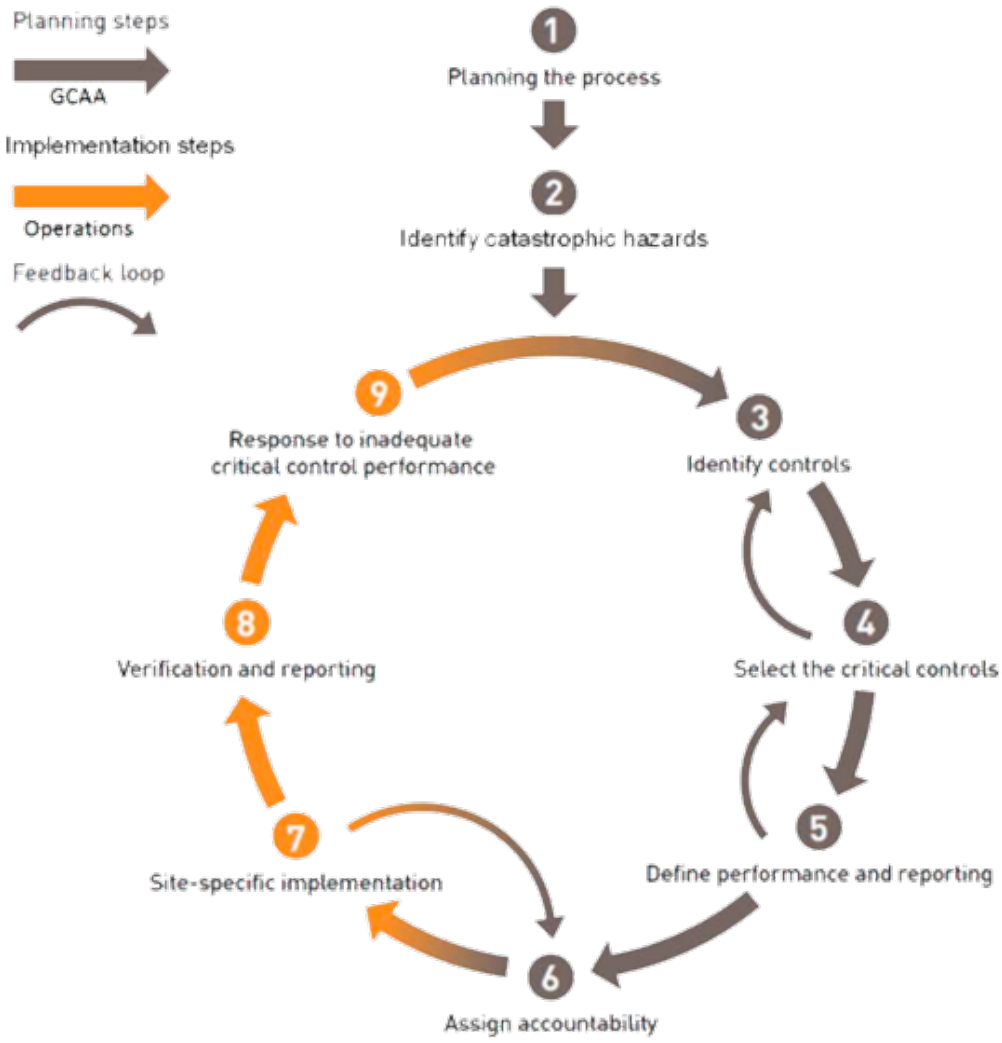

Figure 31: GCAA protocol on catastrophic hazards

6.68 Step 3 requires that a BTA be used to examine both causation factors and consequences for an MUE. The BTA also assists in identifying those controls that could prevent the MUE or mitigate the consequences if it does occur.

6.69 It is important that the definition of a control, as set out in paragraph 6.65, is strictly applied when identifying controls as part of the BTA. It should be noted that the

[628] OCH.507.001.0208, .0212.

definition of a control excludes risk assessment tools, standard operating procedures (SOPs), behaviour-based safety tools, training and inspections.[629]

6.70 The identification of the critical controls from the full set of controls is a challenging process as indicated by both Ms Ah Wong[630] and Mr Mitchelson.[631] Their respective organisations sought expert assistance to facilitate the BTA and identify the critical controls for each MUE or PUE.[632]

6.71 Mr Mitchelson summed up some of the issues encountered in attempting to implement CCM across AAMC as follows:[633]

> *So when the original work was done in 2015, it was put in place in the critical controls, and you can see the PUEs and the critical controls from 2015. Each site, you know, while they consulted with one another, didn't actually come up with a consistent view and a consistent evaluation of the critical controls. You see Moranbah North at 247 versus 138 at Grasstree. When you dug into some of what was listed as a critical control, it was more a monitoring activity or it was - it doesn't fit the definition, which dilutes the value of having it as a critical control.*

6.72 Ms Ah Wong was asked whether, during the implementation of CCM at Glencore, there were challenges in distinguishing monitoring and supporting activities from critical controls. Her response was: [634]

> *I guess one of the things that we found in the facilitation of the critical control workshops was not only were we taking everybody through quite a new process, which was a bow tie analysis; the second was then getting people to understand what is a control, that it's not a hazard management plan, it's not these broader concepts that we've utilised for some time.*

6.73 Ms Ah Wong further agreed that if identification of controls and critical controls was not done correctly, it could result in an excessive administrative burden that would make the CCM process very difficult to implement.[635]

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[629] ICMM *Health and Safety critical control management: good practice guide* (2015), page 11 <http://www.icmm.com/website/publications/pdfs/health-and-safety-management/8570.pdf>.
[630] TRA.500.008.0001, .0047, line 37–.0049, line 11.
[631] TRA.500.009.0001, .0040, line 44–.0042, line 14.
[632] TRA.500.008.0001, .0017, line 26. –0018, line 35; .0047, line 45–.0048, line 81; TRA.500.009.0001, .0041, line 38–44.
[633] TRA.500.009.0001, .0041 line 20–29.
[634] TRA.500.008.0001, .0048, line 22–28.
[635] TRA.500.008.0001, .0048, line 39–42.

6.74 The ICMM Good Practice Guide provides a flow chart to assist in identifying critical controls from the full set of controls. The flowchart is reproduced here:[636]

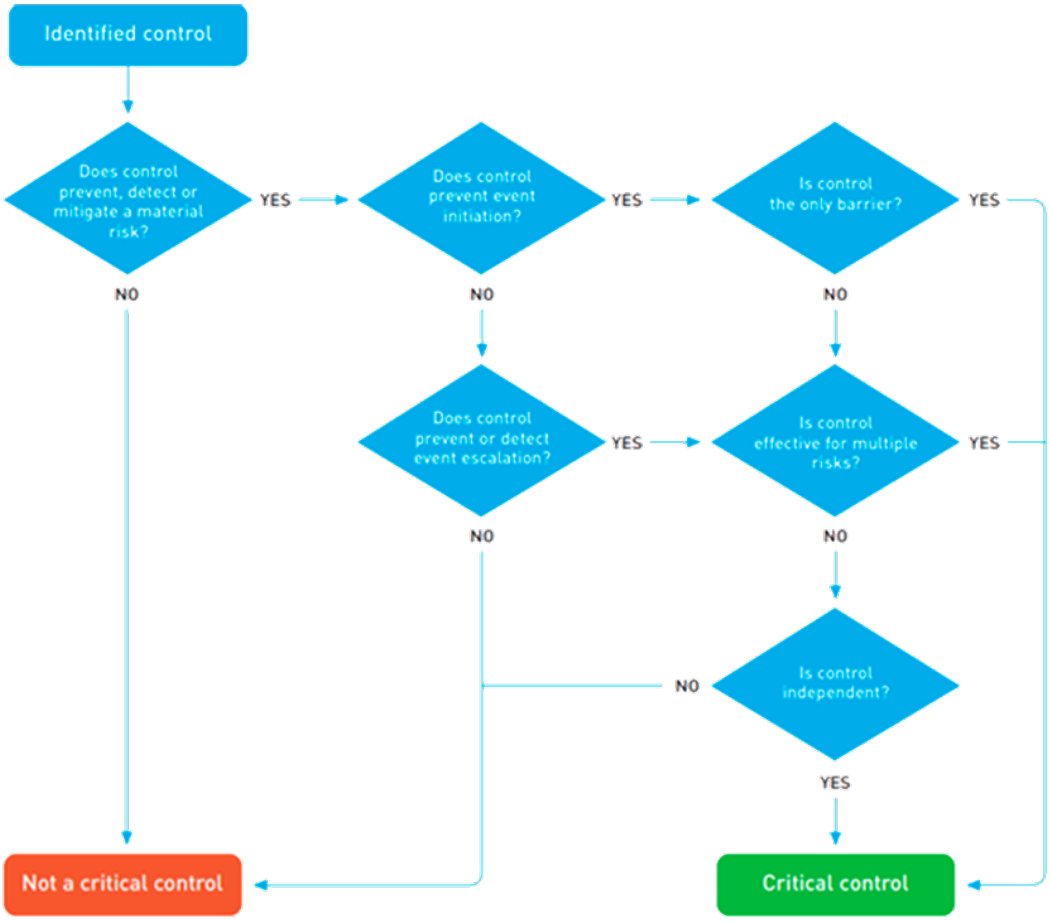

Figure 32: ICMM Good Practice Guide Application of the decision tree

6.75 Glencore has identified 71 critical controls for the group.[637] Anglo has recently undertaken a process of critical control 'alignment' which has identified 117 critical controls to be implemented at each of the Anglo mines with the exception of Grasstree, where Anglo has a shaft winder for transportation.[638] Failure of the shaft

[636] ICMM *Critical Control Management: Implementation Guideline* (2015), page 56 <http://www.icmm.com/website/publications/pdfs/health-and-safety/9722.pdf>. This flowchart is also shown in this Report at paragraph 2.122.
[637] TRA.500.008.0001, .0048, line 10–12.
[638] TRA.500.009.0001, .0041, line 18–36.

winder has the capacity to cause multiple fatalities, which explains why there are additional critical controls identified for that mine.

6.76 The Board was supplied with the critical control register for Grosvenor, which reflects CCM at that mine during the period covered by the Terms of Reference and prior to the 'alignment' process.[639] The PHMPs specifically refer to this document as the reference source for critical controls.[640] The document is in the form of an excel spreadsheet and contains a number of description columns. It lists a number of PUEs in one column. Another column is titled 'Critical Controls' and the entries appear to address an associated PUE. There are 637 entries below the title 'Critical Controls' although there are 168 unique items.

6.77 The register is a lengthy and unwieldy document which is of limited use in identifying the critical controls in place at Grosvenor. Furthermore, and most surprisingly, gas drainage is not specified as a critical control with respect to the PUE of 'gas/hybrid explosion'. It is difficult to comprehend how gas drainage could be regarded as anything other than a critical control intended to prevent gas/hybrid explosions. The failure of that system would significantly increase the risk of such an event occurring despite the existence of other controls.

6.78 Many of the items listed in the 'critical control' column in the register do not appear to meet the ICMM definition of a control. Items such as 'review process for drained area', 'gas composition monitoring' and 'gas and gas flow monitoring' are monitoring activities rather than controls. Further, the item 'drainage design and planning' is not an act, object, or system that would control the methane hazard, although this activity could form part of a broader system.

6.79 In short, consistently with what Mr Mitchelson said at paragraph 6.71 above, the document appears to reflect a misconceived approach to the identification of critical controls. The contents of the document are in stark contrast to, for example, the 11 specified controls with respect to 'ignition of gas underground' at Oaky North.[641]

6.80 As noted earlier, Grosvenor's new critical control register, which was, at the time Mr Mitchelson gave evidence, still in draft form, contains only 117 critical controls.[642]

6.81 Chief Inspector Newman was asked whether critical controls should be introduced into the Regulation to support the development and implementation of PHMPs. His response was:[643]

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[639] AGM.003.001.0830; Mr Tyler Mitchelson identified alignment of critical control management in his statement: MTY.001.002.0001, .0005–.0006; and in evidence TRA.500.009.0001, .0041, line 31–36.
[640] See, for example, AGM.002.001.0385, the PHMP for Explosions, at .0394.
[641] OCH.507.001.0105, .0106.
[642] TRA.500.009.0001, .0043, line 7–13.
[643] TRA.500.002.0001, .0027, line 29–35.

Yes. Yes, I agree. In fact, last year some of the inspectors undertook some training in terms of critical controls, critical risk and critical controls, and looking at the ICMM guidelines that some mines or some organisations have adopted and others have not, and the principal hazard management plans are certainly an area where those controls should be outlined for the operation. As an inspectorate, we are - I mentioned about liaising with my counterpart in New South Wales and we are working with the inspectorate down there in terms of developing critical control inspection processes and audit processes as a way forward.

6.82 When Mr Mitchelson was asked his thoughts about the industry having an agreed set of critical controls, his response was:[644]

I think it's possible. I would really want to think through the implications of that. I do really believe there is value, and we certainly saw it within our own mines, of the sites or the actual business doing that. You learn so much about the process and the value of the controls by actively engaging in the process. The outcomes could be similar, but I would not want to lose the opportunity to learn through that process, to understand how critical controls actually work.

In listening to Glencore's testimony through here, I think they had 76, off the top of my head. One of my notes is to follow up with Glencore and see if they are willing to compare notes on the critical controls across the two. But I do think sharing those and understanding what each other is doing would be valuable. Whether they are standardised across the business, you would really have to think that through in the nature of the context of unique features of a mine, but I certainly would absolutely encourage the sharing.

6.83 Ms Ah Wong was asked whether she would recommend that CCM be adopted by industry generally to augment the currently-prescribed PHMPs. She responded:[645]

I think it's an opportunity. I think at the end of the day, that has to be coupled, though, with a fairly substantial or integrated assurance program that supports it. The critical controls are really but one indicator, and it's the assurance program, for me, that it sits within that is just as important.

6.84 The effective implementation of CCM is one way for an organisation to move towards developing characteristics of an HRO.[646]

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[644] TRA.500.010.0001, .0035, line 24–43.
[645] TRA.500.008.0001, .0049, line 17–22.
[646] The concept of implementing CCM as a way to move towards being a High Reliability Organisation is explained in greater detail later in this chapter at paragraphs 6.146 to 6.155.

Management and measurement of safety performance

6.85 This section examines the ways in which safety performance can be managed and measured, and considers the processes and systems used by GCAA and AAMC to do so.

6.86 It is a generally accepted proposition that it is important to be able to measure the results from a process or system to determine if it is achieving its stated aim and to determine whether any improvements are occurring as a result of the process or system. It has been said:[647]

> *To effectively manage, you need to measure. Senior management understands that the measurement system influences organizational behaviour. Effective measurement has to be predictive as well as prescriptive in nature if it is to provide information for managing performance.*

6.87 The measurement of safety performance as an output from a safety and health management system is a 'lag' indicator.

6.88 By contrast, 'lead' indicators are sometimes described as inputs.[648] They identify the actions necessary to achieve the goals with measurable outcomes. They 'lead' to successfully meeting overall business objectives.

6.89 Lead indicators in terms of safety management include (but are not limited to):

1. identification of critical controls;
2. verification of the effectiveness of critical controls;
3. appropriate identification and investigation of all high potential incidents;
4. close-out of corrective actions resulting from incident investigations;
5. conduct of audits and close out of identified corrective actions;
6. provision of quality training in risk management; and
7. conduct of emergency exercises and completion of identified system improvements.

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[647] Furst P.G., *Measuring Success—Integrated Risk Management* (2006), International Risk Management Institute <https://www.irmi.com/articles/expert-commentary/measuring-success-integrated-risk-management>.
[648] See, for example: O'Niell, S., *Measuring and Reporting WHS Information* (2020) Safe Work NSW, NSW Government <https://www.safework.nsw.gov.au/__data/assets/pdf_file/0011/895475/measuring-and-reporting-whs-information.pdf>.

6.90 These are inputs or actions necessary to achieve an organisation's safety goals. They identify and provide advance warning of latent safety hazards and prompt the implementation of proactive actions designed to prevent future safety incidents.[649]

6.91 If a lead indicator informs business leaders how to produce desired results, a lag indicator measures past performance. It reflects past safety outcomes with a focus on the measurement of adverse events sustained as a consequence of inappropriate safety performance.[650]

6.92 Lag indicators include (but are not limited to):

1. fatalities;
2. permanently disabling injuries;
3. minor or lost time injuries (and lost time injury frequency rate (LTIFR));
4. medical treatment injuries;
5. injury severity rates (number of employment days lost);
6. workers compensation insurance payments; and
7. number of high potential incidents.

6.93 An organisation should use both lead and lag indicators to measure the effectiveness of its safety systems.

6.94 A poor reporting culture may compromise the effectiveness of the lag indicators and can lead to a false sense of security about safety performance. A system which inadvertently discourages the reporting of HPIs would lead to the missed opportunity of thoroughly investigating such incidents and identifying corrective actions.

6.95 A number of published sources point to the limitations of some of the lag indicators listed above, particularly minor injuries and the LTIFR, as predictors of catastrophic incidents.

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[649] O'Neill, S., Martinov-Bennie, N., Cheung, A., Wolfe, K., *Issues in the Measurement and Reporting of Work Health and Safety Performance: A Review* (2013), page 19 <https://www.safeworkaustralia.gov.au/system/files/documents/1703/issues-measurement-reporting-whs-performance.docx>.

[650] Pawlowska, Z., *Using lagging and leading indicators for the evaluation of occupational safety and health performance in industry* (2015) International Journal of Occupational Safety and Ergonomics, page 284.

6.96 An illustration of this problem can be found in McLaren's analysis of the Deepwater Horizon disaster:[651]

> *There are many catastrophic failure events that illustrate that a reduction in incidents numbers does not result in a decreased* [sic] *fatalities. Possibly the best known event is Deepwater Horizon. On 20 April 2010, a well control event led to hydrocarbons escaping from the Macondo well in the Gulf of Mexico onto Transocean's Deepwater Horizon offshore platform. This resulted in a series of explosions and fires on the oil rig. Eleven people lost their lives, seventeen others were injured. The fire which was fed by the hydrocarbon release continued for 36 hours until the rig sank. Hydrocarbons continued to flow for another 87 days. The day before the accident BP and Transocean managers were on the offshore rig to celebrate 7 years Lost Time Injury free and to undertake behavioural observations on such things as slips and trips and working at heights. None of the four executives took time to be curious about the operational challenges people on the rig were trying to address. Hayes and Hopkins (2012) have written extensively on the lessons learnt from the Deepwater Horizon disaster.*

6.97 McLaren challenges some of the early work published by Heinrich and argues that there is, in fact, no scientific basis for Heinrich's asserted relationship between lost time injuries and catastrophic events.[652]

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[651] McLaren, M., *When counting ever smaller numbers becomes potentially dangerous* (2019), Paper presented at the 2019 ALC & ALT Supply Chain Safety Summit <https://www.austlogistics.com.au/wp-content/uploads/2019/09/SAFETY-SUMMIT-When-counting-ever-smaller-Marc-McLaren.pdf>.
[652] McLaren, M., *When counting ever smaller numbers becomes potentially dangerous* (2019), Paper presented at the 2019 ALC & ALT Supply Chain Safety Summit, pages 2-3 <https://www.austlogistics.com.au/wp-content/uploads/2019/09/SAFETY-SUMMIT-When-counting-ever-smaller-Marc-McLaren.pdf>.

6.98 In 1931, Heinrich proposed that there was a natural ratio between near misses and minor incidents, and serious injury and fatality events.[653] This proposition was expressed graphically in the following diagram which became known as the accident triangle or Heinrich's triangle:[654]

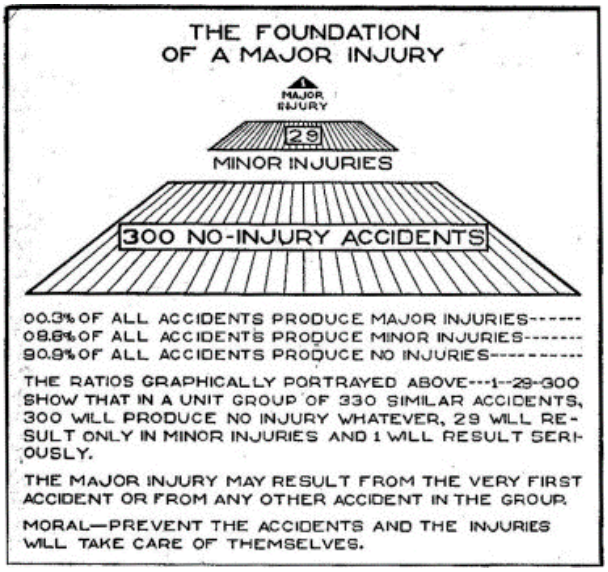

Figure 33: Heinrich's Triangle

6.99 The theory was that if minor injuries were prevented then a major injury or fatality associated with the same activity would be prevented. The theory also suggested that 88% of all accidents were caused by a human decision to carry out an unsafe act.

6.100 In 2011, Manuele also reviewed Heinrich's theory and concluded that:[655]

1. *there is no evidence that reducing accident frequency rates will reduce the equivalent number of serious injuries; and*
2. *unsafe acts are not the primary cause of serious accidents and catastrophic events.*

6.101 The Brady Review analysed the circumstances of all fatal accidents in the Queensland mining industry between 2000 and 2019. It noted that of the 47 fatal accidents:[656]

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[653] Heinrich, H.W., *Industrial accident prevention: a scientific approach* (McGraw-Hill Book Company Inc, 1931).
[654] Heinrich, H.W., *Industrial accident prevention: a scientific approach* (McGraw-Hill Book Company Inc, 1931).
[655] Manuele, F.A., *'Reviewing Heinrich: Dislodging two myths from the practice of safety'* (2011) Professional Safety 56(10), page 52.
[656] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* Queensland Department of Natural Resources, Mines and Energy (2019), page iii.

> *Almost all of the fatalities were the result of systemic, organisational, supervision or training failures, either with or without the presence of human error. Human error alone would not have caused these fatalities. 17 involved no human error* at all *on the part of the deceased.*

6.102 Recommendation 9 from the Brady Review was set out in brief terms at paragraph 3.105. The entire recommendation is as follows:[657]

> *Recommendation 9: The industry should shift its focus from Lost Time Injuries (LTIs) and the Lost Time Injury Frequency Rate (LTIFR) as a safety indicator.*
>
> *LTIs as a safety indicator are problematic. LTIs are prone to manipulation, are a measure of how the industry manages injuries after they have occurred, as opposed to a measure of industry safety. It is possible, therefore, to reduce the LTIFR without making the industry safer.*
>
> *Further, an analysis of the fatalities shows that many of the causal factors would not have caused injuries prior to the fatality. Therefore, they would not be recorded as LTIs, with them remaining unidentified as issues. At best the LTI Frequency Rate is a distraction that focuses industry on the wrong safety measure, at worst it results in early warning signs being missed.*

6.103 The *Commissioner for Mine Safety and Health Annual performance report 2018-2019* described the industry's safety performance over the preceding five years by using both the LTIFR and serious accident frequency rate.[658]

6.104 It is notable that there is a negative correlation between the LTIFR expressed as a rolling average over the five year period and the serious accident frequency rate. Figures 13 and 14 in Chapter 3 illustrate the two trends. They illustrate that the LTIFR rate for coal mines declined slightly, whilst the serious accident frequency rate rose over the same period.

6.105 There is plainly a problem with using LTIFR as a predictor of serious accidents.

6.106 The measurement of process safety performance should be based on appropriate lead indicators. The lead indicators should be based on the controls that have been implemented to prevent a fatal or catastrophic event.

6.107 The remainder of this chapter examines the approaches taken by GCAA and AAMC to the management and measurement of their safety performance.

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[657] Ibid. page vi.
[658] Commissioner for Mine Safety and Health *Annual performance report 2018–19* (2019), page 10 <https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0011/1478522/mine-safety-health-annual-report-2018-2019.pdf>.

GCAA's safety management and measurement

6.108 GCAA's approach to safety management is illustrated at Figure 28 set out earlier in this chapter.

6.109 The upper third of this figure articulates the values, assumptions and beliefs held by the organisation. It is an expression of the expected safety culture of GCAA.

6.110 The diagram demonstrates that GCAA takes a dual approach to managing safety, comprising 'process safety' and 'personal safety'.

6.111 These terms are widely used in safety publications. Hopkins draws the distinction between process safety and personal safety in the following way:[659]

> *Moreover, an appropriate focus on high-consequence damage requires officers to explicitly consider both 'people safety' hazards and 'process safety' hazards. It has become increasingly clear that a singular focus on aggregated indicators of people safety, such as traditional injury measures, does not provide business surety as to the complete WHS risk profile. There is a critical need 'for alternative indicators of safety which have a real bearing on how well major hazards are being managed'. This is often referred to as process safety.*

6.112 Mataqi and Adivi describe the common understanding of personal safety within the petroleum and gas industry:[660]

> *Occupational (personal or personnel) safety is what is thought of when most people hear the word 'safety.' They think of trips, falls, struck against and the use of PPE. Traditionally, in the industry, focus of 'safety' has been assumed to be totally described by the personal safety and related injury rates. If you ask any organization about their safety performance, the answer almost always was a statement of their incident rates which consists of injury frequency rates (IFR), lost time rates (LTR), total recordable incident rate, etc.*

6.113 The dual approach to managing safety adopted by GCAA suggests GCAA has recognised that the causative factors that result in fatalities and catastrophic incidents are different from those that result in most injuries.

6.114 Critical controls and assurance are important strategies in the GCAA Organisational WHS Culture model for managing process safety.[661]

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[659] Hopkins, A., *Lessons from Longford: The Esso Gas Plant Explosion*. (CCH Australia Limited, 2000), 79 (footnotes removed; citation omitted).
[660] Mataqi, I.Y and Adivi, B.S.S., *Process Safety vs. Personal Safety: Can't We Get Along with One?* Conference Paper American Society of Safety Engineers Professional Development Conference and Exhibition (American Society of Safety Engineers, 2013).
[661] OCH.504.001.0005, .0020. Also at paragraph 6.37 in this chapter.

6.115 In her statutory declaration, Ms Ah Wong describes the key performance indicators (KPIs) used to measure safety performance.[662] The KPIs in broad terms, fall into two categories.

6.116 The first category is directed at personal safety, and comprises traditional lag indicators including the Total Recordable Injuries Frequency Rate (TRIFR). Total Recordable Injuries are made up of:

1. Lost Time Injuries (LTIs);
2. Medical Treatment Injuries (MTIs); and
3. Restricted Work Injuries (RWIs).

6.117 The second category is directed at process safety. The Health and Safety Index is based on effective planning and control in relation to site safety performance. The Health and Safety Index is calculated from actions taken under the HSEC plan, critical controls implementation and close out of corrective actions identified from HPRI investigations.[663]

6.118 The Board acknowledges that, consistently with submissions made on behalf of GCAA, these are not the only safety measures employed by the organisation.[664]

6.119 Ms Ah Wong indicated that the selected safety KPIs sought to achieve a balance between process safety and personal safety with a mix of lead and lag indicators. Ms Ah Wong explained this in the following exchange: [665]

Q. The first question is in relation to the health and safety index. Looking at the components, would it be fair enough to say they're a bunch of leading indicators that you're measuring?

A. Yes, that's correct, yes.

Q. The TRIFR, of course, is a lagging indicator?

A. Lagging, that's correct.

Q. So is the intention there to balance the leading indicators with the lagging indicators in your KPIs?

A. Yes. That's exactly right. One is about the leading and lagging indicators, but the other thing was that there was a balance between personal and process safety.

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[662] OCH.507.002.0001, .0003.
[663] OCH.504.001.0003.
[664] Submission received from GCAA on 28 October 2020 in response to draft chapter.
[665] TRA.500.008.0001, .0047, line 14–35.

Q. It's fair enough to say that the TRIFR would be an output from the leading indicators?

A. Yes, that's right.

Q. And could be said to be a measure of whether or not you have actually picked the right leading indicators?

A. Yes. Yes, that's right.

AAMC's safety management and measurement

6.120 The SHE Way outlines a high-level approach to the way in which Anglo manages safety. However, it does not contain clearly articulated measurements of safety performance. Rather, it outlines the requirement for each business or operation to define its own safety performance measurements. The SHE Way requires that:[666]

Each Anglo American business or operation must prepare and implement a detailed SHE monitoring plan that will enable it to measure, analyse, evaluate and report on its SHE performance against its defined objectives and the SHE Way. Specifically, the evaluation of performance must:

- *confirm that facilities are being operated within the parameters defined through the Planning and Operational Control process;*
- *confirm the effectiveness of the management measures to enable the site to meet its SHE objectives;*
- *assess performance against the defined SHE objectives, which encompass the compliance obligations; and*
- *ensure that SHE risks and impacts are adequately controlled as per the hierarchy of controls.*

The SHE monitoring plan must clarify:

- *what needs to be monitored and measured;*
- *the methods for monitoring, measurement, analysis and evaluation to ensure valid results, including requirements for calibration and verification. This should include consideration of the potential for participatory monitoring, where applicable;*
- *the criteria and indicators against which SHE performance will be evaluated - these must be in line with the defined SHE objectives and compliance obligations; and*

[666] AAMC.001.005.0093, .0115.

- *the frequency of monitoring and measurement, as well as analysis, performance evaluation and reporting.*

6.121 The MetCoal Elimination of Fatalities Plan 2020 & Road Map to 2024 (the 2020 Plan) outlines some strategies to eliminate fatalities, and strategies to manage safety in general.

6.122 In terms of measurement, the 2020 Plan sets out the actual safety performance results for 2019 against the safety performance targets. The table of results is reproduced below:[667]

MET COAL 2019 SAFETY PERFORMANCE REVIEW
Indicators

Indicator	Metric				Status
	Target	2019 Actual	2018 Actual	2017 Actual	
Fatality	0	1	0	0	
HPI	0	12	15	9	
HPH		190	156	191	
TRCFR	8.36	6.03	9.04	12.19	
LTIFR	6.29	4.24	7.33	7.34	
OCILFR	3.13	3.04	4.95	3.45	

Figure 34: MetCoal 2019 Safety Performance Review Results table

6.123 Of note, all the indicators listed in this particular table, with the exception of High Potential Hazard (HPH), are lag indicators.[668] A target of zero HPIs is listed. Elsewhere, the document makes special mention of Grasstree achieving a full year without an HPI (notwithstanding that there were multiple 'DNRME HPIs' in that year). That result is a consequence of the fact that AAMC does not class a DNRME HPI as an HPI.

[667] AAMC.001.029.0028, .0031.
[668] This is not to suggest that lead indicators are not used in performance review in other contexts. For example, monthly Metallurgical Coal Performance Reviews of the Grasstree and Moranbah North mines, such as the one at AAMC.001.005.1274, contain reports on critical control improvements, which is a lead indicator.

6.124 The document also sets out six high level focus areas as a framework for the elimination of fatalities. They are:

1. leadership;
2. caring culture;
3. planning and scheduling;
4. risk and change management;
5. learning organisation; and
6. monitoring and assurance.

6.125 The 2020 Plan contains a mix of projects, some of which involve personal safety strategies and others, process safety strategies.[669]

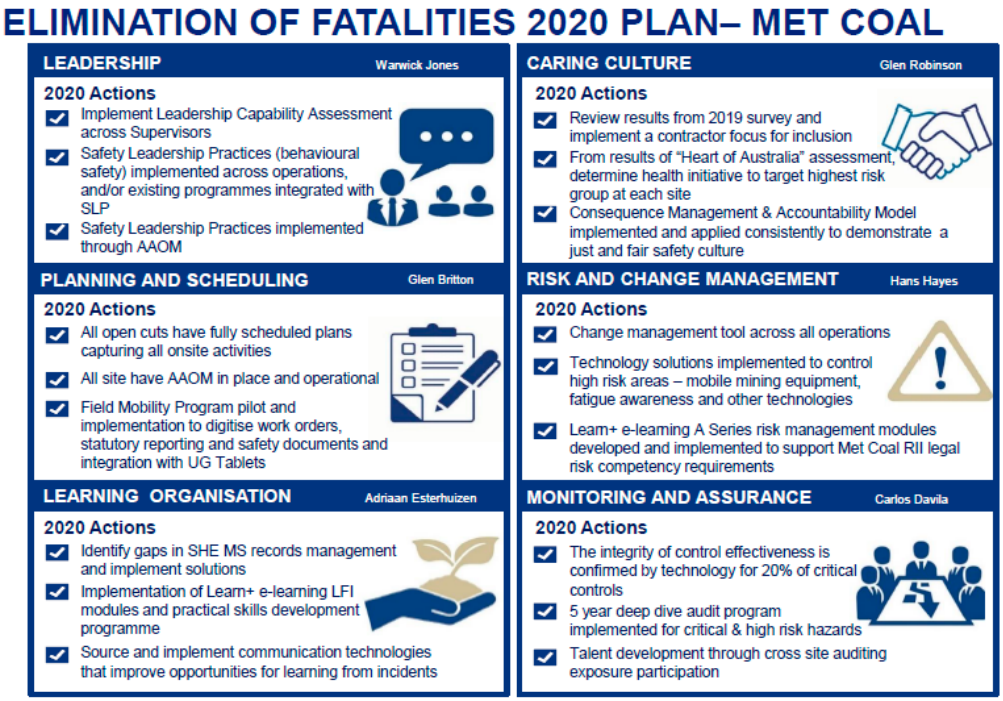

Figure 35: Elimination of Fatalities 2020 Plan - MetCoal

6.126 For example, the focus areas of 'leadership' and 'caring culture' contain personal safety projects, as they address behavioural safety and consequence management and accountability. On the other hand, the 'risk and change management' focus area includes technology solutions to control high risk areas, which is a process safety strategy.

6.127 CCM is included later in that document as an important focus area for 2020 to 2024.

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[669] AAMC.001.029.0028, .0041.

6.128 It is worth noting the contrasting approaches taken by GCAA and AAMC to safety management and measurement at a corporate level.

6.129 GCAA has been very particular in defining strategies that separately address personal and process safety. As previously noted,[670] GCAA appears to have recognised that, for fatalities, there are different causative factors than those that account for most of the injuries to workers at its mines.

6.130 AAMC strategies, on the other hand, do not separately deal with personal and process safety. It does not appear that there is a recognition of the difference in causative factors that lead to personal injuries as opposed to those that result in fatalities or catastrophic events.

Lead and lag indicators and incentive schemes

6.131 The health and safety components of the incentive schemes at GCAA and AAMC are similar in their use of lead and lag indicators. Both organisations place varying weightings on lead and lag indicators.

6.132 Within the health and safety component of the GCAA incentive scheme, the relative weighting is tailored to specific roles. There are also lead indicators incorporated into other areas of the incentive scheme.

6.133 At GCAA and Oaky Creek Holdings Pty Ltd, the short term incentive plan (STIP) for management level employees is set out in the document *EM XPAD KRA Summary – EOY_ 2019*.[671]

6.134 In her statutory declaration, Ms Ah Wong outlined a generic example of how a senior manager's STIP would be calculated at Oaky North:[672]

Contribution from each element summing to a total score of 100 consists of:

15%	*HSEC Performance*
30%	*Business Performance*
25%	*Managerial Customer Service Indicators*
20%	*Individual Customer Service Indicators*
10%	*Customer Feedback*

[670] See paragraph 6.114.
[671] OCH.504.001.0001; TRA.500.008.0001, .0037, line 30–43.
[672] OCH.507.002.0001, .0011–.0012; these percentages will vary according to the duties performed in a particular position.

6.135 In the example, the TRIFR[673] contributes 10% of the total 15% for HSEC performance, and the Health and Safety Index contributes 5% of the total 15%. There may be additional HSEC related contributions in the STIP within the Individual Customer Service Indicators Section, Managerial Customer Service Indicators and Customer Feedback sections.[674]

6.136 If it is assumed that the Health and Safety Index components are all lead indicators, then the lead indicator portion of the HSEC component contributes 5% to the overall bonus in this example.[675]

6.137 The HPRI Frequency Rate is not factored into the calculation of STIPs within GCAA.

6.138 For AAMC, the calculation of the annual incentive bonus is described in general terms in the document *Re-Imagining Incentives in Support of our Burning Ambition – Employee Briefing*.[676]

6.139 The annual bonus is calculated by a bonus rate (a percentage of base salary) multiplied by a percentage score for business results plus an additional component for completion of critical tasks. There is potential for an additional component based on outstanding individual contribution to business success. This results in a bonus from which there may be a safety deduction based on poor safety performance at the site.[677]

6.140 Details of the bonus calculation can be found in the document *FINAL KRA assessment template - MetCoal FY19 - performance scorecard*.[678] This document explains that for each of the mines, safety, health and environment KPIs comprise 18% of the bonus. The bonus is divided into various sections that are given a weighting out of 100. For safety, the KPIs are:[679]

Elimination of Fatalities (weighted average): 4%

Total recorded case frequency rate (TRCFR): 5%

Zero Level 3, 4 & 5 environmental incidents: 4.5%

Health – medical surveillance: 4.5%

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[673] The number of fatalities, lost time injuries, restricted work injuries, and other injuries requiring treatment by a medical professional per million hours worked.
[674] OCH.504.001.0100, .0103–.0106.
[675] Refer to paragraph 6.135.
[676] AGM.003.004.0985, .0994.
[677] AGM.003.004.0985, .1001.
[678] AGM.003.002.0080, .0998.
[679] AGM.003.002.0080.

6.141 Taking elimination of fatalities and TRCFR (the Anglo equivalent of TRIFR) as the direct safety KPIs, there is a contribution of 9% towards the total bonus. At some sites there are additional safety-related components from the completion of critical tasks that contribute towards the bonus.

6.142 The safety deduction is based on fatalities above a baseline of zero. For each fatal incident,[680] a deduction of 20% is made to the bonuses payable to executives at the site where the fatal incident occurred. A deduction of 10% applies at the corporate level for each fatal incident across the group.[681]

6.143 At the Capcoal Open Cut mine there is a critical task within the bonus scheme to reduce HPIs by 50%. This is the only mine at which HPIs are taken into account in calculating executive bonuses, and the HPIs in question are 'Anglo HPIs'. DNRME HPIs play no role in the calculation of any bonuses across the Anglo coal mines.[682]

6.144 If it is assumed that the Elimination of Fatalities components are all leading indicators, then the lead indicator portion of the safety health and environment KPIs contributes 4% towards the total bonus. There may also be health and safety lead indicators associated with the completion of critical tasks, allocated to each site, that contribute to the overall bonus.

6.145 Both organisations place a substantial emphasis on TRIFR/TRCFR in the HSEC components of their incentive schemes, potentially at the expense of lead indicators.

High reliability organisations

6.146 This section considers how CCM and the identification of appropriate lead indicators can assist an organisation to become an HRO.

6.147 It has already been noted that the Brady Review recommends that the industry should adopt the principles of HRO organisational theory.[683]

6.148 Weick and Sutcliffe described the principles of HROs as follows:[684]

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[680] A fatal incident is one in which either a single or multiple fatalities occur.
[681] AGM.003.002.0080.
[682] See the evidence of Mr Mitchelson, TRA.500.009.0001, .0040, line 7–8; and also that of Warwick Jones, TRA.500.010.0001, .0076, line 20–26.
[683] Brady, S., *Brady Heywood Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019* (2019), Department of Natural Resources, Mines and Energy. See paragraph 6.5 in this chapter.
[684] Weick, K.E., & Sutcliffe, K.M., *Managing the Unexpected: Assuring High Performance in an Age of Complexity* (2001) Wiley, University of Michigan.

> *HROs manage the unexpected through five processes: (1) pre-occupation with failures rather than successes, (2) reluctance to simplify interpretations, (3) sensitivity to operations, (4) commitment to resilience and (5) deference to expertise, as exhibited by encouragement of a fluid decision-making system. Together, these five processes produce a collective state of mindfulness.*

6.149 Both GCAA and AAMC have robust HSEC investigation systems for incidents which is an enabler for the first and third processes of an HRO, namely 'preoccupation with failures' and 'sensitivity to operations'.

6.150 Mearns provides an explanation of the fourth process, namely 'commitment to resilience':[685]

> *The 'resilience' movement focuses on how people in high reliability organizations successfully deal with complexity and are attentive to minor fluctuations that could signal potential failure, i.e. by taking a proactive approach. Resilient organizations put mechanisms in place to recognise, anticipate and defend against failure and it may be that the high reliability organizations of the future will focus even more on LPIs in an attempt to build resilience and prevent incidents from occurring. The challenge now is to find out what those key indicators are through high quality, systematic research.*

6.151 The BTA is an appropriate tool to identify controls that recognise, anticipate and defend against catastrophic failures. The CCM process then isolates the 'critical few' controls from the full set of controls. The CCM process is also used to implement verification activities that define and report on the status of each critical control.[686]

6.152 The implementation of identified critical controls and ongoing monitoring and verification of critical control effectiveness are appropriate lead indicators in terms of managing catastrophic risks.

6.153 A monitoring and assurance program that communicates the effectiveness of the critical control to the most senior people at the corporate level is another characteristic of an HRO, namely having 'sensitivity to operations'.

6.154 The BHP case study outlined in the ICMM report '*Overview of leading indicators for occupational health and safety in mining'* provides a good example of the implementation of the CCM process and how it supports corporate governance:[687]

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[685] Mearns, K., *From reactive to proactive- Can LPIs deliver?* (2009), Safety Science - SAF SCI. 47; In this article, Mearns uses 'LPI' to mean leading performance indicators.
[686] OCH.507.001.0208, .0212–.0221.
[687] ICMM *Overview of leading indicators for occupational health and safety in mining* (2012), page 46 <http://www.icmm.com/website/publications/pdfs/health-and-safety/4800.pdf>.

The approach adopted by BHP Billiton is to:

- *identify all material risks*
- *identify critical controls for each material risk*
- *establish a performance standard for each critical control*
- *implement verification processes for critical control performance standards*
- *regularly assess effectiveness*
- *deliver this approach within an organizational structure, supported by the right systems and processes, that enables each business to adequately plan work and work the plan, improving stability, predictability, safety and productivity.*

This approach recognizes that lagging safety indicators and the traditional methodologies based around the safety pyramid did not reflect the true business risk profile nor was it effective in consistently delivering a working environment free of serious injury or fatality.

BHP Billiton is driving simplification of the way it manages safety and improving the focus on the identification and management of risk. The simpler its requirements the more transparent they are and with this comes greater likelihood it will achieve consistent compliance.

The future is a place where BHP Billiton will have simple, effective safety systems logically matched to its risks, with systems in place that track compliance with critical control performance standards. Leading performance metrics will give early indication of breakdown in critical controls and provide an opportunity to remedy them before incidents result.

The main focus is on doing the critical few – flawlessly and consistently.

One of the key messages from the BHP Billiton experience is that the successful implementation of leading indicators takes time and engagement of leadership at all levels. The company also understands there may be tension between lagging and leading indicators, and this should be accepted and worked with, not avoided. Finally, BHP Billiton's focus on verification of the critical controls for material risks, and their effectiveness, is an important governance process.

6.155 It is clear from the above that the adoption of the CCM process and the identification of appropriate lead indicators moves an organisation towards achieving some of the characteristics of an HRO. The next section identifies a pathway to effective implementation of the CCM process.

Implementation of CCM in the Australian coal industry

6.156 A 2016 Australian Coal Association Research Program (ACARP) report (2016 ACARP Report)[688] made a series of recommendations to assist the Australian coal industry to move towards successful implementation of the ICCM process as defined in the ICMM Implementation Guideline,[689] by 2020.

6.157 The Board is not aware of how many of those recommendations have been adopted by the Australian coal mining industry. They are reproduced below:[690]

> *Moving the Australian coal mining industry to CCM by 2020 will require careful planning. As a result of the survey and included discussion about requirements, the following specific recommendations for the change are suggested. The list is more detailed in the Recommendations section of the full report.*
>
> 1. ***Leadership and communication:*** *Establish a supported and funded industry working group through the MCA to develop and operate a CCM communication initiative.*
> 2. ***Organisational risk culture:*** *Make the journey model in this report available to help companies and mines define their journey plan, possibly through mining industry associations and councils.*
> 3. ***Education and training:*** *Provide education and training in CCM with short 'G3' and 'G2'conversion or update courses and by updating 'G3', 'G2' and 'S1, 2 and 3' qualification levels.*[691]
> 4. ***Knowledge and sharing:*** *Improve the existing RISKGATE on-line coal industry resource to support the move to CCM.*
> 5. ***Knowledge and sharing:*** *Develop conceptual design, feasibility study for industry knowledge sharing resource.*
> 6. ***Stakeholders:*** *Look for opportunities to include the Regulators in the development of CCM.*

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[688] Hassall, M. & Joy, J., *Effective and Efficient Implementation of Critical Control Management in the Australian Coal Mining Industry by 2020* (2016) Project No. C24006 Report, Australian Coal Association Research Program.
[689] ICMM *Critical Control Management – Implementation Guideline* (2015) <http://www.icmm.com/website/publications/pdfs/health-and-safety/9722.pdf>.
[690] Hassall, M. & Joy, J., *Effective and Efficient Implementation of Critical Control Management in the Australian Coal Mining Industry by 2020* (2016) Project No. C24006 Report, Australian Coal Association Research Program.
[691] The course 'G3' is now referred to as RIIRIS601E.

7. ***Research and Education:*** *Support further research into the development of sharing systems that address the overriding concern that sharing data or information about events may lead to legal exposures.*

8. ***Research and Education:*** *Support further research into the development of practical methods of establishing the effectiveness of individual controls, control sets for causes or consequences and the overall adequacy of controls to reduce the risk of an unwanted event.*

9. ***Research and Education:*** *Support the development of methods of verifying Critical Controls that are Acts, so that they can be effectively managed and their reliability established.*

6.158 These recommendations were directed at the whole of the Australian coal industry. In order to be applied in Queensland, they will require modification, which would include involvement of representative industry bodies and RSHQ. Furthermore, the implementation of the CCM process can be supported by the development of a recognised standard.[692]

6.159 The Board considers that these recommendations represent a useful pathway to the effective implementation of the CCM process.

[692] Section 7(c) of the Act provides that one of the ways its objects are to be achieved is by the making of 'recognised standards' to require and promote risk management and control. The Minister may make a recognised standard stating ways to achieve an acceptable level of risk to persons arising out of coal mining operations: Act sections 71 and 72.

Findings and recommendations

Findings

Findings

Finding 74

If a parent company of an operator company holds obligations under section 39 of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act), officers of the parent company would have the obligation under section 47A of the Act to exercise due diligence to ensure that the parent company complied with its obligations under section 39. The legislation should be cast in terms that remove any doubt that this is so.

Finding 75

Reliance on lag indicators to the exclusion of lead indicators to measure safety performance is not an attribute of a High Reliability Organisation (HRO) and is likely to obscure an organisation's catastrophic risk level.

Finding 76

Safety management systems should recognise that the causative factors resulting in fatalities and catastrophic incidents are different from those that result in less significant injuries. An appropriate focus on catastrophic risk requires consideration of process safety strategies.

Finding 77

Lead indicators prompt the implementation of proactive actions designed to prevent future incidents. As such, they are important measures for the implementation of process safety strategies to prevent fatalities and catastrophic events.

Finding 78

The effective implementation of Critical Control Management (CCM) will move the industry towards adopting the principles of HRO theory, the desirability of which was recognised in the Brady Review and by Mr Mark Stone, Chief Executive of RSHQ, in his evidence.

Finding 79

Consistently with the recommendations in the 2016 ACARP Report, education and training will be required to support the effective implementation of critical control management.[693]

Finding 80

The industry should give lead safety indicators greater weight than lag safety indicators in the determination of executive bonuses.

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[693] Hassall, M. & Joy, J., *Effective and Efficient Implementation of Critical Control Management in the Australian Coal Mining Industry by 2020* (2016) Project No. C24006 Report, Australian Coal Association Research Program (2016 ACARP Report).

Recommendations

Recommendation 17

RSHQ takes advice as required and, if necessary, takes steps to amend the Act to clearly reflect that a parent company holds obligations under section 39.

Recommendation 18

The industry adopts strategies and performance measures to address process safety and personal safety separately.

Recommendation 19

RSHQ takes steps to amend the Act and the *Coal Mining Safety and Health Regulation 2017* (Qld) (Regulation) to require a coal mine to develop a set of critical controls with performance criteria which must be incorporated into Principal Hazard Management Plans, and which require:

a. the SSE to notify the Regulator in the event of a failure of the critical control to meet its performance criteria;

b. the SSE to monitor the effectiveness of the critical controls, and report the results to the mine operator, on a monthly basis; and

c. coal mine operators to audit critical controls as part of the audit prescribed by section 41(1)(f) of the Act.

Recommendation 20

RSHQ, in consultation with the industry, advise the Minister on proposed content for a recognised standard for the implementation of critical control management, based on the ICMM Good Practice Guide and ICMM Implementation Guideline.

Recommendation 21

RSHQ audits the effectiveness and implementation of critical controls associated with a mine's Principal Hazard Management Plans at regular intervals, and publishes the results of these audits in its Annual Safety Performance and Health Report.

Recommendation 22

The Coal Mining Safety and Health Advisory Committee works with registered training organisations to include CCM in the standard risk management training packages (particularly RIIRIS601E).[694]

[694] This training package was formerly known, and referred to in the 2016 ACARP Report, as 'G3'.

Recommendation 23

The industry gives lead safety indicators greater weight than lag safety indicators when measuring safety performance.

Recommendation 24

The industry gives lead safety indicators greater weight than lag safety indicators in the determination of executive bonuses.

Chapter 7 - Industrial Manslaughter

Introduction

7.1 In October 2017 the Queensland Parliament introduced industrial manslaughter provisions within the *Work Health and Safety Act 2011* (Qld) (WHS Act). For whatever reason, the resources sector was excluded from the Industrial Manslaughter legislation.

Work Health and Safety Act

7.2 Under the WHS Act, the entities exposed to liability for industrial manslaughter are plainly and relevantly identified, namely, a person conducting a business or undertaking and a senior officer of a person conducting a business or undertaking:

> ***34C Industrial manslaughter—person conducting business or undertaking***
>
> *(1) A person conducting a business or undertaking commits an offence if–*
>
> *(a) a worker–*
>
> *(i) dies in the course of carrying out work for the business or undertaking; or*
>
> *(ii) is injured in the course of carrying out work for the business or undertaking and later dies; and*
>
> *(b) the person's conduct causes the death of the worker; and*
>
> *(c) the person is negligent about causing the death of the worker by the conduct.*
>
> *…*
>
> ***34D Industrial manslaughter—senior officer***
>
> *(1) A senior officer of a person who carries out a business or undertaking commits an offence if–*
>
> *(a) a worker–*
>
> *(i) dies in the course of carrying out work for the business or undertaking; or*
>
> *(ii) is injured in the course of carrying out work for the business or undertaking and later dies; and*
>
> *(b) the senior officer's conduct causes the death of the worker; and*
>
> *(c) the senior officer is negligent about causing the death of the worker by the conduct.*

Coal Mining Safety and Health Act

7.3 During the life of this Inquiry, Part 3A (Industrial Manslaughter) of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act) became law. At the same time, other pieces of legislation within the resources sector introduced industrial manslaughter provisions.[695]

7.4 The explanatory notes to the Bill[696] introducing the industrial manslaughter offences into the Act (and other Acts in the resources sector) referred to the principal policy objectives of the Bill, including to improve safety and ensure consistency in how deaths of workers on Queensland work sites are treated:[697]

> *1. Safety and health – to strengthen the safety culture in the resources sector through the introduction of industrial manslaughter offence provisions…*

7.5 A further explanation followed: [698]

> ***Safety and Health***
>
> *Industrial manslaughter*
>
> *The policy objective is to introduce industrial manslaughter offences in the* Coal Mining Safety and Health Act 1999 *… to ensure that there are sufficient penalties where there is criminal negligence by an employer or senior officer and it has caused a workplace fatality.*
>
> *Unlike in the* Work Health and Safety Act 2011*, there is no industrial manslaughter offence in the* Coal Mining Safety and Health Act 1999 *… The current offences in these Acts are insufficient where actions or omissions involving criminal negligence (recklessness or gross negligence) result in worker fatalities.* ***The new offences will ensure there is consistency in how deaths of workers on Queensland worksites are treated and aligns with the Queensland Government's commitment to ensuring the safety and health of all workers across all industries.***

7.6 However, under Part 3A of the Act, the entities exposed to liability for industrial manslaughter are not the person, and senior officer of the person, conducting the business or undertaking. Relevantly to the business of coal mining, the person conducting the business or undertaking is the mine operator.

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[695] *Mining and Quarrying Safety and Health Act 1999* (Qld), *Explosives Act 1999* (Qld), *Petroleum and Gas (Production and Safety) Act 2004* (Qld).
[696] Mineral and Energy Resources and Other Legislation Amendment Bill 2020.
[697] Explanatory Note, Mineral and Energy Resources and Other Legislation Amendment Bill 2020.
[698] Ibid. page 1 (emphasis added).

7.7 Under Part 3A of the Act, the entities exposed to liability for industrial manslaughter of a coal mine worker are an employer of the worker and a senior officer of the employer:

> ***48C Industrial manslaughter—employer***
>
> *(1) An employer for a coal mine commits an offence if–*
>
> *(a) a coal mine worker–*
>
> *(i) dies in the course of carrying out work at the coal mine; or*
>
> *(ii) is injured in the course of carrying out work at the coal mine and later dies; and*
>
> *(b) the employer's conduct causes the death of the coal mine worker; and*
>
> *(c) the employer is negligent about causing the death of the coal mine worker by the conduct.*
>
> *…*
>
> ***48D Industrial manslaughter—senior officer***
>
> *(1) A senior officer of an employer for a coal mine commits an offence if–*
>
> *(a) a coal mine worker–*
>
> *(i) dies in the course of carrying out work at the coal mine; or*
>
> *(ii) is injured in the course of carrying out work at the coal mine and later dies; and*
>
> *(b) the senior officer's conduct causes the death of the coal mine worker; and*
>
> *(c) the senior officer is negligent about causing the death of the coal mine worker by the conduct.*
>
> *…*

7.8 Coal mine worker is defined more expansively in the Act, but, relevantly, it means 'an individual who carries out work at a coal mine …'.[699]

7.9 It may be that by the definition of 'employer' in Part 3A of the Act the legislature intended that liability would be at all times extended to the mine operator, the person conducting the business or undertaking of mining. However, in the Board's view, the definition of 'employer' fails to do so.

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[699] Act schedule 3 'Dictionary'.

7.10 The relevant definition in Part 3A of the Act is:

> ***employer**, for a coal mine, means a person who employs or otherwise engages a coal mine worker.*

7.11 The definition of 'employer, for a coal mine', refers to the person who employs or engages a coal mine worker. It is the Board's view that, in context, 'engages' means engage a coal mine worker under a contract **for** service.[700]

7.12 If the Board's view is correct, liability for industrial manslaughter under Part 3A of the Act attaches only to an entity which:

a. employs a coal mine worker under a contract of service; or

b. engages a coal mine worker under a contract for service.

7.13 It would follow that in the event a labour hire coal mine worker sustained a fatal injury in the course of carrying out work at a coal mine, only the employer, namely the labour hire agency, would be exposed to liability for industrial manslaughter. This would be an anomalous outcome given that, ordinarily, responsibility for any negligent conduct causing the death of a labour hire worker at a mine site is far more likely to rest with the mine operator than the labour hire company. Furthermore, the result that a mine operator is not liable to prosecution for industrial manslaughter in the event that it negligently caused a worker's death is inconsistent with the stated objective of the amendments, namely to 'ensure there is consistency in how deaths of workers on Queensland work sites are treated'.[701]

7.14 The same situation arises in the event that an independent contractor's employee dies in the course of carrying out work at a coal mine. Only the employer would be liable to prosecution for industrial manslaughter. The mine operator would not be liable to prosecution under Part 3A of the Act, even if its negligence caused the death.

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[700] In support of this interpretation, see *DPP vs Philip Anderson* [2009] VSC 613 (emphasis added).
[701] Explanatory Note, Mineral and Energy Resources and Other Legislation Amendment Bill 2020, page 1.

Findings and recommendations

Findings

Finding 81

As the explanatory notes to the Bill[702] suggest, the intention of Parliament in extending industrial manslaughter provisions to the Act was to strengthen the safety culture in coal mining and to ensure consistency in how deaths of workers on work sites are treated.

Finding 82

If the Board's interpretation of the definition of employer is correct, the amendments to the Act may not reflect Parliament's intention as to who should be liable to prosecution under Part 3A of the Act.

Recommendation

Recommendation 25

Resources Safety and Health Queensland takes advice as required, and if necessary, takes steps to amend Part 3A of the Act so that it reflects Parliament's intention with regard to:

a. strengthening the safety culture in coal mining and ensuring consistency in how deaths of workers on work sites are treated; and

b. who should be liable to prosecution.

[702] Explanatory Notes, Mineral and Energy Resources and Other Legislation Amendment Bill 2020 (Qld).

Glossary of terms

Term	Meaning
Acceptable level of risk	For risk to a person from coal mining operations to be at an acceptable level, the operations must be carried out so that the level of risk from the operations is – a) within acceptable limits; and b) as low as reasonably achievable. 'Within acceptable limits' and 'low as reasonably achievable' must have regard to – a) the likelihood of injury or illness to a person arising out of the risk; and b) the severity of the injury or illness. *Coal Mining Safety and Health Act 1999* (Qld) (the Act), section 29.
Attendance Notice	A notice, usually in the form of a letter, which is issued by the Chairperson of the Board of Inquiry and which requires a person to attend the Inquiry at a stated time and place to give evidence or produce specific documents or things. The Act, section 201.
Automation	Process of making an apparatus or system operate automatically through the use of technology to monitor and control the apparatus or system.
Automatic methane detector / methane sensor	A methane detector that automatically activates a visible alarm and trips the electricity supply when the methane concentration in the atmosphere reaches a particular level.
Block side	The longwall block side of a roadway.
Blowers / Vacuum plants	A venturi arrangement on a goaf well that creates a partial vacuum and assists gas extraction. The venturi is operated using compressed air.
Bowtie analysis	An analytical method for identifying and reviewing controls intended to prevent or mitigate a specific unwanted event.
Brattice curtain	A temporary ventilation device consisting of a woven anti-static and fire-resistant propylene cloth that is hung from the roof to redirect airflow. A brattice curtain is also sometimes referred to as a brattice sail or a brattice wing.

CABA	Compressed air breathing apparatus.
Cavities	The holes created in the roof from strata failure.
Caving	The process by which the goaf collapses on retreat during longwall mining.
CH_4	Methane.
Coal Handling and Preparation Plant (CHPP)	A facility that washes coal to remove rock and other contaminants, crushes to a specified size, and stockpiles the product ready for transportation, and more often than not loads coal into trucks, rail wagons or barges. They can also be referred to as a coal preparation plant, prep plant, and tippler or wash plant.
CO	Carbon monoxide.
CO_2	Carbon dioxide.
Coal mine operator	A coal mine operator for a coal mine is— (a) the holder; or (b) if another person has been appointed as the coal mine operator under section 53 and the appointment is notified to the chief inspector under section 49, the other person. The Act, section 21.
Competence	The demonstrated skill and knowledge required to carry out the task to a standard necessary for the safety and health of persons. The Act, section 12.
Cool tubes	A compressed air operated ventilation device for redirecting air and for cooling a work area.
Crib room	A location where mineworkers eat and a meeting station for the ERZ controllers.
CRO	Control room operator.
Cut-through (c/t)	A passage cut through the coal which connects two parallel headings.
Direct audio communications (DAC)	An underground intercom system.
DCB	Distribution control box.
Deputy	ERZ Controller.

Development	Development is the process of mining roadways (or headings) and reinforcing the roof and sides (walls) of an area in preparation for secondary extraction (extracting the coal).
Directive	A notice issued by a mines inspector for the purpose of requiring the mine operator to take some form of action. Directives are related to safety and risk management.
Drift	A tunnel made in the rock or ground for access to the mine workings.
Driftrunner	Brand name for a flameproof diesel powered man-riding vehicle carrying up to 12 personnel. Also sometimes colloquially referred to as a 'drifty'.
Enablon	A brand name for a software system used to manage operational tasks.
Explosion risk zone	Any part of a mine on the return side of a place where a methane level equal to or greater than a level prescribed by regulation is likely to be found.
First workings	See Development.
Flame proof	Electrical components contained within a robust protective enclosure that, in the event of the electrical components causing an ignition of flammable gas, contains the ignition within the enclosure.
Floor blowers	Gas emissions released from fractures in the coal seam floor.
Floor heave	The failure and subsequent upward displacement of the seam floor strata due to in-situ stress.
Form 1A	An unofficial form used within the Queensland coal mining industry to identify and make the first written notification of an incident to the Inspectorate.
Form 5A	Pursuant to section 16 of the Regulation, a form used in the Queensland coal mining industry to give notice to the Inspectorate of the occurrence of: - a high potential incident; or - an incident in which a person suffers an injury— - requiring medical treatment; or - that prevents the person carrying out normal duties. The Form 5A is submitted within one month of the incident.

General body concentration	For gas in an underground mine or part of an underground mine, means the concentration of gas measured at a representative location in the mine or part.
Goaf	That part of a mine from which the coal has been partially or wholly extracted and then abandoned.
Goaf stream	The contaminant rich flow of gasses from the goaf into the return airway.
Hammer hole	A surface to seam borehole drilled with a percussive drill bit.
Hazard	A hazard is a thing or a situation with potential to cause injury or illness to a person. The Act, section 19.
Heading (hdg)	A roadway in a mine.
Hierarchy of Controls	A system of assessing the effectiveness of controls to manage hazards in the workplace. Eliminating hazards is the highest level of control within the hierarchy.
High potential incident (HPI)	An event, or series of events, that causes or has the potential to cause a significant adverse effect on the safety or health of a person. The Act, section 17.
Holder	Holder, for a coal mine, means the holder under the *Mineral Resources Act 1989* of an exploration permit, mineral development licence or mining lease for the coal mine. The Act, Schedule 3 Dictionary.
Inbye	Mining term for an underground mine for going away from the surface and towards the working coal face from the point of reference.
Industry (the)	When referring to the Industry, the Board refers to the Queensland coal mining industry, including both underground and open cut mines. Context will disclose that some findings and recommendations in the report will apply only to underground coal mines, but others will apply to coal mines generally.
Industry safety and health representative (ISHR)	A person appointed under section 109(1) to represent coal mine workers on safety and health matters and who performs the functions and exercises the powers of an industry safety and health representative per Part 8, Division 2 of the Act. The Act, section 27.

Inertisation	Means the replacement of the normal atmosphere by an inert (inactive) atmosphere. Use of inert gas to prevent the formation of an explosive mixture and to control the risk of spontaneous combustion.
Inspector of Mines	Government official employed to make examinations of, and to report upon, mines and surface plants for compliance with mining laws, rules and regulations, safety methods.
Inspectorate (Coal Mines Inspectorate)	An organisational unit within the Regulator (RSHQ) of the coal mining industry.
Intake air	A name for fresh air brought to the working face by the ventilation system, as defined in the coal mine regulations.
Intake roadway/airway (Intake)	An underground roadway that carries the intake air.
Intrinsically safe	Equipment designed and constructed so that the amount of electrical energy within the equipment is unable to, in any circumstance, generate sufficient heat or sparks to ignite a flammable gas.
Labour hire	The concept of outsourcing a business' recruitment process to a third party who not only undertakes the hiring process, but directly employs the workers who are then deployed to perform work at the 'host' business.
Latched	If the alarm on a methane detector is activated or trips power, the alarm and power incapacity latches (locks) and remains latched until the methane detector is reset.
Longwall	A longwall is a panel (block) of coal. Longwall mining is a form of underground coal mining. The face of the longwall panel is continuously cut mechanically as the panel retreats.
Lotus Notes	Lotus Notes is a brand of groupware that is now owned by IBM. It is a desktop application that organises and displays databases on a user's local workstation. The physical database files can be stored either on the workstation itself or on a server.
MEMS	Mine Emergency Management System.
MRAS	Mine Re-entry Assessment System.
O_2	Oxygen.
Outburst	A violent ejection of seam gas and coal into the workings.

Outbye	Mining term for an underground mine for going away from the working coal face and towards the surface from the point of reference.
Overcast	A structure that separates intake air and return air allowing them to cross over without mixing.
Panel	The working of coal seams in separate panels or districts, e.g. a development panel or a longwall panel.
Personal emergency device (PED)	Ultra-low frequency through-the-earth communication system used for paging. Originally developed to provide a fast and reliable method of informing underground miners of emergency situations.
Personal gas detector (PGD)	A handheld device for measuring the presence of gas (usually methane) in air. Used as part of the mine safety system for gas detection and monitoring.
Personal safety	Safety strategies designed to address the risk of personal injuries.
Pneumoconiosis (CWD)	A general term for interstitial lung diseases where inhalation of dust has caused interstitial fibrosis. Coal miners' pneumoconiosis (CWP) is colloquially referred to as 'Black Lung'.
Principal hazard	A principal hazard at a coal mine is a hazard at the coal mine with the potential to cause multiple fatalities. The Act, section 20.
Process safety	Safety strategies designed to address the risk of fatalities and catastrophic events.
(a) Regulator	A ventilation control device used for controlling the volume of air entering a mining district. (To be distinguished from 'the Regulator', RSHQ).
Return air	Name for air that has ventilated a working face often contaminated with heat, dust and gases.
Return roadway/airway (Return)	An underground roadway that carries the return air.
Roadway	An underground passageway developed during the initial mining process and used for transport and ventilation.
Rib	The side wall of a roadway.

Serious accident	An accident at a coal mine that causes – c) the death of a person; or d) a person to be admitted to a hospital as an in-patient for treatment for the injury. The Act, section 16.
Secondary support	Rock support installed after the primary support installed during development. Secondary support provides additional rock support over and above the primary support.
Second workings	The process of extracting coal after an underground area has been accessed and developed for this purpose.
Sherwood curtain	A ventilation arrangement consisting of a brattice curtain in the return roadway at the tailgate end of the longwall face. The purpose is to divert some of the ventilation flow towards the goaf stream and divert it away from the tailgate motors.
Self-contained self-rescuer (SCSR)	A respiratory device used by miners for the purpose of escape during mine fires and explosions—it provides the wearer a closed-circuit supply of oxygen for periods of time usually less than one hour.
Simtars	Safety in Mines Testing and Research Station.
Site safety and health representative (SSHR)	A coal mine worker elected under section 93 by coal mine workers at the coal mine to exercise the powers and perform the functions per Part 7, Division 2. The Act, section 28.
Site Senior Executive (SSE)	The most senior officer employed or otherwise engaged by the coal mine operator, for the coal mine who – a) is located at or near the coal mine; or b) has responsibility for the coal mine. The Act, section 25.
Specific gas emissions (SGE)	The volume of gas that is released from the combined gas sources per tonne of coal mined.
Stopping	A ventilation control device which stops ventilation flow through a roadway or cut-through.
Stub	A room developed into a coal pillar or a longwall block for operational purposes such as in-seam drilling and equipment storage.

Tag board	A peg board where underground personnel place a token or tag to indicate their presence in a section of the mine.
Tailgate drives	The electric motors that drive the longwall armoured face conveyor (AFC) at the tailgate end of the face.
Tailgate roadway	The longwall return roadway/airway.
Tube bundle system	A tube bundle system is a mechanical system for continuously drawing gas samples through tubes from multiple monitoring points located in an underground coal mine. The gas samples are drawn via vacuum pump to the surface and are typically analysed for oxygen, methane, carbon dioxide and carbon monoxide.
Undermanager	Mineworker who is in charge of the mine on a shift basis (i.e. shift supervisor).
Vacuum plants	An arrangement installed at the top of goaf drainage wells that creates a vacuum to assist gas extraction.
Ventilation control device	A structure to control or direct ventilation flow, which includes stoppings, regulators, overcasts, brattices and seals.
Venturi set	A ventilation control device that uses a stream of compressed air to divert the ventilation flow.

List of acronyms

Acronym	Meaning
AAMC	Anglo American Metallurgical Coal
AFC	Armoured Face Conveyor
ASX	Australian Stock Exchange
BSL	Beam Stage Loader
BTA	Bow Tie Analysis
BU	Business Unit
c/t or C/T	Cut-through, also cut through
CCM	Critical Control Management
CEO	Chief Executive Officer
CFMMEU	Construction, Forestry, Mining, Maritime, Energy Union
CH_4	Chemical formula for methane
CMSHA	*Coal Mining Safety and Health Act 1999*
CMSHAC	Coal Mining Safety and Health Advisory Committee
CMSHR	*Coal Mining Safety and Health Regulation*
CMU	Control monitoring unit
CMW	Coal Mine Worker
DNRME	Department of Natural Resources Mines and Energy The Queensland Government established the Department of Natural Resources, Mines and Energy on 12 December 2017 through machinery-of-government changes under the *Public Service Act 2008*. Following these changes, the former Department of Natural Resources and Mines (DNRM) was renamed the Department of Natural Resources, Mines and Energy (DNRME) and gained all functions of the former Department of Energy and Water Supply (DEWS).
DNRM/DNRME HPI	An HPI as defined by the legislation, DNRME (previously DNRM) being the Regulator for the coal mining industry until 1 July 2020. On 1 July 2020, Resources Safety and Health Queensland (RSHQ) became the Regulator for the industry.
CRO	Control Room Operator
EoF	Elimination of Fatalities
ERZ	Explosion Risk Zone

Acronym	Meaning
ERZ Controller	Explosion Risk Zone Controller
GB	General Body
GCAA	Glencore Coal Assets Australia
GHG	Greenhouse Gasses
GML	Goonyella Middle Lower Seam
GMS	Goonyella Middle Seam
HPI	High Potential Incident
HPRI	High Potential Risk Incident (Glencore)
HRO	High Reliability Organisations
HSEC	Health Safety Environment and Community
ICAM	Incident Cause Analysis Method
ICMM	International Council on Mining and Metals
IIR	Incident Investigation Report
ISHR	Industry Safety and Health Representative
IOM	Inspector of Mines
KPI	Key Performance Indicator
KRA	Key Results Area
LEL	Lower explosive limit
LFI	Learning from Incidents (Anglo)
LPI	Lead (or Leading) performance indicator
LTI	Lost Time Injuries
LTIFR	Lost Time Injury Frequency Rate
LW	Longwall
MRE	Mine record entry
ORM	Operational Risk Management
PHMP	Principal Hazard Management Plan
PRS	Powered Roof Support
MG	Maingate
MSHA	Mine Safety and Health Administration, United State Department of Labor

Acronym	Meaning
MSO	Mine Senior Official
MTI	Medical Treatment Injuries
MUE	Material Unwanted Event
NERZ	Negligible Explosion Risk Zone
PGD	Personal Gas Detector
PMC	Potential maximum consequence
PUE	Priority Unwanted Event
PUR	Polyurethane Resin
RIOM	Regional Inspector of Mines
RSHQ	Resources Safety and Health Queensland
RWI	Restricted Work Injuries
SCP	Substandard Condition or Practice
SHE	Safety Health and Environment
SIS	Surface to in seam
SHMS	Safety and Health Management System
SIMTARS	Safety In Mining Testing and Research Station
SLAM	Stop Look Assess and Manage (Personal risk assessment tool)
SOP	Standard Operating Procedure
SRB	Shearer Random Batch (mode)
S&SD	Safety & Sustainable Development (Anglo)
SSE	Site Senior Executive
STD	Standard
STIP	Short Term Incentive Plan
TARP	Trigger Action Response Plan
TG	Tailgate
ToR	Terms of Reference
TRIFR	Total Recordable Injury Frequency Rate
UIS	Underground in seam
UMM	Underground Mine Manager
VFL	Visible Felt Leadership

Acronym	Meaning
VO	Ventilation Officer
WHS	Workplace Health and Safety

Appendix 1 – Terms of Reference

On 22 May 2020, the Minister for Natural Resources, Mines and Energy established the Board of Inquiry under section 202(1) of the Act by gazette notice.

The gazette notice specified the membership of the Board and its Terms of Reference.

The Board of Inquiry was initially comprised of retired District Court Judge Terry Martin SC as the Chairperson of the Board, and Professor Andrew Hopkins AO as a Member.

Mr Andrew Clough, retired Chief Inspector of Coal Mines, replaced Professor Hopkins as a Member of the Board on 23 June 2020.

An extraordinary gazette regarding the change in Board's membership was subsequently published on 23 June 2020.

A further extraordinary gazette extending the Board's reporting date from 30 November 2020 to 31 May 2021, was published on 17 September 2020.

The Board's Terms of Reference are extracted below.[703]

Terms of Reference of Board of Inquiry

2.1 In accordance with part 12 of the Act, the board is to:

I. inquire into the incidents described in subparagraphs a. to e.:

a. the serious accident that occurred at Grosvenor mine (operated by Anglo Coal (Grosvenor Management) Pty Ltd) on 6 May 2020, which resulted in serious injuries to five coal mine workers;

b. the 27 high potential incidents that occurred at Grosvenor mine (operated by Anglo Coal (Grosvenor Management) Pty Ltd) involving exceedances of methane (>2.5%) in and around the longwall on various dates between 1 July 2019 and 5 May 2020;

c. the 11 high potential incidents that occurred at Grasstree mine (operated by Anglo Coal (Capcoal Management) Pty Ltd) involving exceedances of methane (>2.5%) in and around the longwall on various dates between 1 July 2019 and 5 May 2020;

d. the single high potential incident that occurred at Moranbah North mine (operated by Anglo Coal (Moranbah North Management) Pty Ltd) involving an exceedance (>2.5%) of methane in and around the longwall between 1 July 2019 and 5 May 2020;

e. the single high potential incident that occurred at Oaky North mine (operated by Oaky Creek Holdings Pty Limited) involving an exceedance of methane (>2.5%) in and around the longwall between 1 July 2019 and 5 May 2020.

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[703] *Establishment of a Board of Inquiry Notice (No 01) 2020* in Queensland, *Government Gazette: Extraordinary,* No. 25, 22 May 2020, Volume 384, pages 173-174.

(the incidents)

II. determine the nature and cause of the serious accident and, in doing so, make findings of fact about any factors that, in the board's view, contributed materially to the cause of the serious accident;

III. assess and determine whether the operational practices and management systems in existence at each of the mines or at corporate levels above them at the time the incidents occurred were adequate and effective to achieve compliance with the relevant safety laws and standards;

IV. make recommendations for mine operators, relevant obligation-holders and other relevant parties for improving safety and health practices and procedures for mitigating against the risk of similar incidents occurring in the future, including, where relevant, recommendations directed to the nature of any particular employment arrangements which may be better apt to ensure acceptable risk levels to workers;

V. make any other recommendations that the board considers appropriate having regard to its findings;

VI. provide the Minister with an interim report, by 31 August 2020;

VII. provide the Minister with a report, suitable for publication, about its findings and recommendations, by 30 November 2020.

2.2 Subject to section 215 of the Act, the board is to conduct its inquiry and deal with any evidence it may receive in such a way as to minimise the likelihood of prejudicing any contemporaneous investigations or any current or future proceedings, including investigations and proceedings for offences under the Act.

2.3 The board is to conduct its inquiry and deal with any evidence it may receive in such a way as to minimise, so far as possible, a person's exposure to reprisal of the kind mentioned in section 275AA of the Act, where the person is giving evidence to the board and has identified that they fear reprisal as a result of giving evidence to the board, including conducting private hearings where considered appropriate and as permitted by s 208 of the Act.

2.4 The board may, if it considers it appropriate, provide the Minister with a separate report to that mentioned in 2.1(vi) or 2.1(vii), about any matters it considers are not suitable for publication, because publication might reasonably prejudice other investigations or proceedings, or if for other reasons the board considers the contents of the separate report should not be made public pursuant to section 203 of the Act.

2.5 However, if the board provides the Minister with a separate report under 2.4, any report provided under 2.1(vi) or 2.1(vii) must contain a statement that the board has provided the Minister with a separate report and the reasons for providing a separate report.

2.6 The board may hold hearings at times and in places, and in a manner, it considers appropriate, including holding hearings by way of audio or visual link.

2.7 The board may inspect or conduct a viewing of a place as reasonably necessary to inform its proceedings.

2.8 The board may, where it considers it appropriate, collaborate and share information with any investigative authorities in order to assist any investigations into the incidents.

2.9 Nothing in these terms of reference shall be taken to limit the board's powers and functions under part 12 of the Act.

Appendix 2 – Opening remarks

Chairperson

Terry Martin SC

Ladies and gentlemen, I am Terry Martin, Chairperson and Board Member. Mr Andrew Clough and I comprise the Board of Inquiry.

The full terms of reference are available on the Board's website. I will refer to them in abbreviated form only.

The Board is to inquire into the serious accident at Grosvenor mine on 6 May 2020, determine the nature and cause of that accident and make findings about any factors that contributed materially to the cause of the serious accident.

The Board is also to inquire into various methane exceedances at Grosvenor and Grasstree mines and a single exceedance at each of Moranbah North and Oaky North mines.

The investigation into the serious accident at Grosvenor continues, and expert reports are still being completed. The Board has decided that it would be premature to hold public hearings into the cause of the accident at this stage. Consequently, it is expected that both the accident and the methane exceedances at Grosvenor mine will be the subject of public hearings a little later in the year but hopefully next month.

Counsel assisting will outline the nature of this first tranche of public hearings in a moment. Before he does, I wish to say something to all of the parties who have been given leave to appear at the Inquiry and to the mining community generally.

Whilst the evidence of parties and individuals is to be scrutinised and witnesses asked difficult questions, this Inquiry is not a prosecution nor a witch-hunt.

The Board is to determine whether management systems in existence at the mines or at corporate levels are adequate to comply with relevant safety laws and standards and to make recommendations directed to *all* relevant parties for improving safety and health practices to mitigate against the risk of similar incidents, including recommendations in relation to employment arrangements which may better ensure acceptable risk levels to workers.

The success of this Inquiry will be judged by the community is on what comes out of it by way of recommendations to improve safety in the coal mining industry.

Undoubtedly, this Inquiry was prompted by the serious accident on 6 May.

Whilst mine safety is in everyone's interest, the best thing that all of us here can do for the injured men and their family and friends is to do our very best to achieve meaningful improvement in coal mine safety.

I respectfully urge all parties with leave to appear, but particularly the inspectorate, the mining companies, the labour hire companies and the CFMMEU to scrutinise your own positions, look within your own systems and practices for improvement to safety, and then put forward recommendations to that end.

No system is perfect. No matter how well you might believe you are doing things, please have another critical in-depth look.

With the money and effort put into this Inquiry and the combination of experience, expertise and knowledge here concerned in the Inquiry, it would be shameful if we could not recommend real improvements in safety for coal miners.

Senior Counsel Assisting

Jeffrey Hunter QC

May it please the Board.

On 6 May 2020 a methane explosion enveloped the longwall face at panel 104 at the Grosvenor mine near Moranbah. Five miners were injured and hospitalised, four of them with very serious burns. That explosion, or "serious accident" as it is called pursuant to the Coal Mining Safety and Health Act, followed a series of 14 high potential incidents involving exceedances of 2.5 per cent methane that had occurred on the same longwall panel since 18 March 2020.

An exceedance of 2.5 per cent methane in the general body is significant, because at a concentration of 5 per cent in air, methane becomes explosive.

Those 14 HPIs on longwall 104 at Grosvenor were preceded by another 13 events involving methane exceedances on longwall 103 that occurred between 2 July and 17 November 2019. There had been a history of similar events at Grosvenor since at least 2016, and it is expected that evidence will show that both Anglo American and mine inspectors had recognised gas management as being a problem at Grosvenor.

This Inquiry's terms of reference require it, amongst other things, to inquire into the operations of not only Grosvenor but also another three underground mines –

- Grasstree, operated by Anglo Coal (Capcoal Management) Pty Ltd;
- Moranbah North, operated by Anglo Coal (Moranbah North Management) Pty Ltd; and
- Oaky Creek, operated by Oaky Creek Holdings Pty Limited.

Those terms of reference require the investigation of those mines because Grasstree also had a series of 11 HPIs involving methane on the longwall between 28 July 2019 and 11 April 2020, and there were single HPIs of the same character at Moranbah North and Oaky Creek on 20 July 2019 and 6 December 2019 respectively.

The issues for consideration by the Board include assessment of the probable cause of these incidents, of the mines' response to them and of the oversight given to them by inspectors under the Act.

As foreshadowed, it is expected that the public hearings of the Board will take place in two stages.The first, commencing today, will involve gaining an understanding of the work of the inspectorate now known as Resources Safety and Health Queensland, including workload, experience, information management. To that end, the Acting CEO of Resources Safety and Health Queensland, Mark Stone, will give evidence as the first witness; he will be followed by Chief Inspector Peter Newman.

The hearings will also involve taking evidence from senior executives of each of the companies involved in the operations of the mines in question about matters that include corporate management and governance, safety systems and strategies, workforce

engagement, including the use of labour hire workers, and the payment of incentives to both executives and workers.

There will also be evidence that is specifically about the HPIs that occurred at Oaky Creek, Moranbah North and Grasstree, and it is expected that the Board will hear evidence from the regional inspector for the north region, Stephen Smith, who has reviewed the mines' reports to the inspectorate for each of the HPIs at those three mines - that is, the mines, excluding Grosvenor.

The second stage of hearings will occur once more evidence, including expert opinion, is available concerning the HPIs and serious accident at Grosvenor. It is expected that Mr Smith will be recalled at that point to speak about the Grosvenor HPIs and other matters concerning gas management at the mine.

The terms of reference require the Board to inquire into the HPIs, to report on the nature and cause of the serious accident, and report on whether the operational practices or management systems in place at the time were adequate and effective to achieve compliance with the law and safety standards, and make recommendations for the improvement of mine health and safety.

Determination of the nature and cause of the serious accident must await the gathering and analysis of evidence, but the other matters can, however, be the subject of evidence now.

Because it has the potential to cause a serious adverse effect on the safety or health of a person, a single high potential incident is necessarily a serious event; an HPI involving methane, acutely so. Worldwide, methane explosions have killed many miners. Here in Queensland, since 1972 there have been four coal mining disasters in which a total of 53 miners died. Each involved methane explosions.

Common themes of investigative reports into coal mine methane explosions are a failure of the industry to either remember or learn from past events and an apparent inability to recognise the warning signs of impending disaster.

One question for the Board will be what should have been made of not one methane HPI but a series of them. Whilst it might be argued that an isolated exceedance of 2.5 per cent methane is simply something that will inevitably happen from time to time in an underground coal mine, a question for the Board will be whether the repeated methane exceedances, particularly at Grosvenor, presaged the explosion of 6 May or were in fact entirely unrelated to it. A question should be raised as to whether similar concerns ought to have been raised with respect to the series of exceedances at Grasstree.

There can be little doubt that there was an explosive mixture of methane and air present on the longwall face at Grosvenor immediately prior to the explosion, but the critical questions are how it got there and what ignited it.

Other questions that more immediately arise are, well, even if the explosion occurred independently of the HPIs, what did the recurrent methane exceedances say about gas management at the mine? Is there a need to rethink mine ventilation and to take a different approach to managing methane? Is there a risk of normalisation when repeated methane exceedances occur? Do workers have the necessary competencies? Is there a need for better training? What are the potential impacts of employee incentive schemes that reward production and penalise safety incidents? What are the potential impacts on mine safety culture when workers are employed not by the mine operator but by a labour hire company?

Further, given that each of the HPIs with which the Board is concerned was reported to the regulator, was there appropriate oversight?

Now, no recommendations can be made that will improve mine safety without an understanding of these issues, and it is hoped that the evidence to be adduced before the Board will enable such an understanding and those recommendations.

Appendix 3 – Board of Inquiry team and subject matter experts

Board Members	
Terry Martin SC	Chairperson and Board Member
Professor Andrew Hopkins	Board Member (25 May 2020 – 18 June 2020)
Andrew Clough	Board Member (from 23 June 2020)

Operations Team	
Suzanne Stone	Executive Director (until 11 October 2020)
Rachel Scalongne	Director (Acting Executive Director from 12 October 2020 – 30 November 2020)
Letitia Farrell	Executive Manager
Kirsten Crook	Communication and Engagement Officer (until 18 October 2020)
Megan Lutz	Communication and Engagement Officer (from 20 October 2020)
Monique Newman	Project Officer
Tina Kloiber	Records Officer (until 31 July 2020)

Legal Team	
Jeffrey Hunter QC	Senior Counsel Assisting
Glen Rice QC	Senior Counsel Assisting
Ruth O'Gorman	Counsel Assisting
Renae Kirk	Special Counsel
Laura Dawson	Law Clerk (from 29 June 2020) Lawyer (from 23 November 2020)

A number of subject matter experts have provided their services to the Board during the Inquiry to date:

Subject Matter Experts	Expertise
Andrew Clough (until 22 June 2020)	Mining Engineering
Emeritus Professor Michael Quinlan	Industrial Relations and Occupational Health and Safety

Mark Parcell	Legislative Compliance and Mine Safety
Jim Joy	Risk Management

Appendix 4 – Leave to appear

Pursuant to section 207(a) and (b) of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act), the Chairperson gave the following parties leave to appear at the public hearings:

Organisation	Counsel	Solicitors
Resources Safety and Health Queensland	Deborah Holliday Liam Dollar Rachael Taylor	RSHQ Corporate
Anglo American • **Anglo American Metallurgical Coal Pty Ltd** • **Anglo Coal (Capcoal Management) Pty Ltd** • **Anglo Coal (Moranbah North Management) Pty Ltd** • **Anglo Coal (Grosvenor Management) Pty Ltd**	Saul Holt SC April Freeman Geraldine Dann (until August 2020) Angus Scott Benjamin Dighton	Ashurst Australia
Oaky Creek Holdings Pty Ltd	Damian Clothier QC John Bremhorst	Allens
One Key Resources Pty Ltd	Peter Roney QC	DLA Piper Australia
Construction, Forestry, Maritime, Mining and Energy Union (CFMMEU)	Steven Crawshaw SC	CFMMEU Legal
Injured Coal Mine Worker – ***Redacted***	Richard Lynch Jeremy Trost	Kartelo Law
Injured Coal Mine Workers – ***Redacted*** ***Redacted***	Andrew Luchich (until August 2020) Claire Grant	Rees R & Sydney Jones
Industry and Site Safety and Health Representatives	Steven Crawshaw SC	Hall Payne Lawyers
Queensland Resources Council		Mills Oakley (until August 2020)
Komatsu Mining Corporation Group		Clyde & Co

Appendix 5 – Conduct of Inquiry

Pursuant to section 206 of the *Coal Mining Safety and Health Act 1999* (Qld) (the Act), the Board established procedures for the efficient and effective operation of the Inquiry.

The Board of Inquiry established a website: www.coalminesinquiry.qld.gov.au.

Practice Guidelines were published on the Board's website outlining how the Board wished key aspects be undertaken:

- Practice Guideline No.1 issued on 15 June 2020 and amended on 30 June and 9 November 2020 covered leave to appear, communicating with the Board, public hearings, witness statements and confidentiality requests (**Appendix 6**).
- Practice Guideline No.2 issued on 17 July 2020 covered public hearings, witnesses, witness statements and evidentiary material and procedural matters (**Appendix 6**).

Evidence Collection and Management

The Board relied on its powers under the Act to seek information and documents from organisations and individuals. Notices issued to date are identified in **Appendix 7**.

A Document Management Protocol, published with Practice Guideline No.1, outlined the Board's intention to receive all materials electronically. The Protocol explained how material was required to be collected, digitised and provided to the Board (**Appendix 6**).

Since its establishment the Board has received and considered approximately 9,000 documents.

Hearings

Public hearings commenced on 4 August 2020 at the Brisbane Magistrates Court and were also available to be viewed via livestream, with access available through the website.

The first tranche of hearings concerned the role of the Inspectorate, the role of industry and site safety and health representatives, how the management structure and employment arrangements of mining companies may impact on mine safety, as well as the methane exceedances at Grasstree mine, Moranbah North mine and Oaky North mines.

Hearings were undertaken in accordance with government restrictions and guidelines in relation to the COVID-19 pandemic, including travel and social distancing requirements.

Further public hearings are planned for early 2021, during which the Board anticipates hearing evidence about continuous inertisation of the goaf as a safety measure, the serious accident at Grosvenor Mine on 6 May 2020 and the methane exceedances at that mine.

Trip to Moranbah and Mackay

The Board and Counsel Assisting visited the surface facilities and installations at Grosvenor mine, and visited the longwall and development area at Moranbah North. Other Inquiry team members visited the longwall at Oaky North mine.

As part of its visit to Moranbah, the Board met with Isaac Regional Council Mayor, Anne Baker and also paid its respects at the Moranbah Miners Memorial.

The Board and Inquiry team members also inspected the substantial facilities at the Resources Centre of Excellence in Mackay.

Natural Justice

In accordance with the obligations to observe natural justice, the Board invited submissions from the parties to address the evidence presented during the first tranche of hearings. Further, the parties and other relevant individuals and organisations were afforded the opportunity to respond to the Board's provisional views, findings and recommendations. Responses were considered by the Board prior to finalising this report.

Engagement and Communication with Stakeholders and the Public

Pursuant to section 208 of the Act, the Board has openly conducted its inquiry in public and provided opportunities for all stakeholders and the public to participate in the Inquiry process.

Targeted engagement has been established with national, local and regional media. Since the start of the Inquiry, more than 210 continuous media engagement touchpoints have occurred, including the proactive provision of media releases/statements and articles, and responding to requests and general enquiries.

Opportunities to provide relevant information to the Board were advertised in The Australian and The Courier Mail newspapers. Radio advertising occurred for two weeks through Triple M Mackay and Airlie Beach, and 4RFM Moranbah. Advertisements were aligned with mining shift patterns in local and mining source communities, and surrounding communities.

To further support engagement opportunities, the Board enabled a 'Register Your Interest' option on the website, for stakeholders to receive ongoing information and indicate their interest in the public hearings. To date, more than 330 stakeholders have registered. Throughout the Inquiry, regular emails have been distributed to these stakeholders providing timely and relevant information.

A live stream of the first tranche of hearings was available from the Board's website enabling access from any internet-enabled device. Recordings and transcripts of evidence given at the hearings, together with exhibits tendered into evidence, have also been published on the Board's website. More than 12,400 unique viewers from 17 countries watched the live stream during the first tranche of hearings; 98% of viewers originated from Australia.

The website has had more than 116,800 visits since its creation.

Public Submissions

The Board actively called for information from the general public and interested persons.

The majority of submissions addressed the terms of reference or otherwise provided relevant information.

Public submissions received by the Board are listed in **Appendix 8**.

Publication and Confidentiality

Every effort has been made to keep the public informed of the Board's progress. Several claims of confidentiality by parties have been received in response to the Board's interest in publishing relevant materials. With the exception of material relevant to the Board's work next year, the confidentiality applications made thus far have been addressed and resolved.

As a result, some of the documents on the website have had material redacted in order to remove information in relation to which confidentiality claims were made and accepted by the Board. All statements, affidavits and statutory declarations have also had personal information redacted in order to appropriately protect the privacy of individuals.

Assignment of Custodianship of Records

Pursuant to section 210 of the Act, records are being managed in accordance with the *Public Records Act 2002* (Qld). In consultation with the Queensland State Archivist, Resources Safety and Health Queensland will receive all records of the Inquiry and be designated as the Responsible Public Authority by Queensland State Archives in accordance with the *Public Records Act 2002* (Qld).

Appendix 6 – Practice Guidelines and Protocols

Practice Guideline No.1

Providing information, seeking leave to appear, conduct of public hearings, communication with the Board, witness statements and confidentiality requests.

Part A. Providing information to assist the inquiry

1. The Board of Inquiry ("the Board") invites any person with information relevant to the inquiry's Terms of Reference (available here) to submit that material to the Board by 26 June 2020.
2. The material is to be provided, in writing, by email or post.
3. If the material is to be emailed, it can be sent to the Executive Director at info@coalminesinquiry.qld.gov.au.
4. If the material is to be posted, it can be sent to

   Executive Director

   Queensland Coal Mining Board of Inquiry

   GPO 1321 Brisbane 4001

Part B. Leave to appear at public hearings

5. The Board will hold public hearings as part of the inquiry. This part deals with applications for leave to appear at public hearings.
6. By applying for leave to appear at public hearings, a person is asking permission to present evidence or ask questions of a witness, or present arguments/submissions about the evidence. If a person is granted leave to appear at public hearings, that person must comply with all terms of Practice Guideline No.1, including any amended terms.
7. "Leave to appear" is not to be confused with attending public hearings of the Inquiry as an observer. Subject to social distancing obligations, any person is permitted to attend and observe the public hearings.

<u>People who do not need to seek leave to appear at public hearings</u>

8. A person given notice by the Chairperson of the Board ("the Chairperson") pursuant to section 207 of the Coal Mining Safety and Health Act 1999 ("the Act") does not need to seek leave to appear.
9. A person given an attendance notice by the Chairperson pursuant to section 213 of the Act does not need to seek leave to appear whilst giving evidence in compliance with the attendance notice.
10. A person giving evidence at the public hearings in compliance with an attendance notice may be represented by a lawyer or agent.

People who do need to seek leave to appear at public hearings

11. A person who has not received a notice pursuant to section 207 of the Act or an attendance notice pursuant to section 213 of the Act but who wants to appear at public hearings will require the leave of the Chairperson to do so.

12. A person who is given leave to appear at the public hearings may be represented by a lawyer or agent.

How to apply for leave to appear at public hearings

13. A person seeking leave to appear at public hearings should send a brief written application by email to the Executive Director at board@coalminesinquiry.qld.gov.au as soon as possible, but no later than 4.00PM 3 July 2020.

14. The application for leave to appear should identify:

    (a) the name of the person wanting leave to appear and an email address and contact telephone number for that person;

    (b) the parts of the Terms of Reference in which the person is interested or in respect of which their interests may be materially affected by the inquiry and the grounds on which those interests exist or may be materially affected;

    (c) the parts of the Terms of Reference in which the person has particular knowledge or expertise enabling that person to assist the inquiry, together with the sources of that knowledge and the extent of that expertise;

    (d) the subject matter of any submissions the person proposes to make.

15. Leave to appear may be determined on the basis of the material contained in the application. In such cases, the person seeking leave to appear will receive written notification that their application has been granted or refused.

16. In some cases, the Chairperson may require further information about why the application for leave to appear should be granted. In such cases, the person seeking leave to appear will receive written notification that further written information is required or that the application will be heard and considered at the commencement of the public hearings, or at some other specified time.

17. Nothing in this Guideline prevents a person from seeking leave to appear at any time after the public hearings have commenced. If a person wants to seek leave to appear after the public hearings have commenced, the person should contact the Executive Director on 0475 985 817 to arrange for their application to be received and considered.

Leave to appear may be subject to conditions

18. Leave to appear may, in the Chairperson's discretion, be limited by conditions including conditions that:

(a) the evidence sought to be adduced or tendered by the person must be in the form of a witness statement provided to counsel assisting the inquiry in advance of the public hearings; and

(b) examination of any witness or witnesses, or the making of submissions, be restricted to a particular topic or topics.

19. Any leave to appear may be varied or withdrawn or made subject to additional conditions at any time in the discretion of the Chairperson

Part C. Conduct of Public Hearings

20. The Board may direct that certain hearings, or parts of a particular hearing, be held in private. In all other cases, the hearings will be open to the public and live-streamed via the Board's website.

Initial public hearing

21. The Board will convene an initial public hearing in due course:

(a) the Chairperson and counsel assisting will make general introductory remarks concerning the nature and scope of the inquiry;

(b) applications for leave to appear at public hearings which have not already been determined will be heard and considered; and

(c) information about the conduct of the inquiry, including likely public hearing dates, will be provided.

Public hearings generally

22. The procedure to be followed at the public hearings will be subject to the direction of the Chairperson.

23. Generally, and subject to the Chairperson's discretion:

(a) all witnesses giving evidence at the public hearings will be called and examined by counsel assisting the inquiry. A witness' examination-in-chief will usually involve the tendering of a statement provided by the witness to counsel assisting in advance of the hearing. In some cases, the witness' examination-in-chief may be taken orally;

(b) the order of further examination of each witness will usually be:

i. examination by the parties given leave to appear;

ii. examination by the lawyer or agent (if any) representing the witness; and

iii. re-examination by counsel assisting.

24. The Chairperson may limit the issues about which a witness may be examined and limit the time available for examination by any person.

25. At the completion of the examination of a witness, the witness shall, unless excused from further attendance, be taken to have been stood down only and to be subject to recall at the direction of the Chairperson.

Part D. Communicating with the Board

26. The Board will provide general notice of procedural matters via the Board's website.
27. Any person communicating with the Board should do so initially by email to the Executive Director at board@coalminesinquiry.qld.gov.au.
28. Unless otherwise specified by the Board, submission of any electronic documents (including witness statements and their exhibits, submissions, and all other information) to the Board is to be in accordance with the Document Management Protocol published on the Board's website.
29. Where possible, all written material submitted to the Board should be in fully text-searchable, multi-page PDF/A format.
30. [Paragraph number not used]
31. If any person is unable to provide their written material to the Board in that way, alternative arrangements can be made by telephoning the Executive Director on 0475 985 817.

Part E. Witness statements

32. Where possible, any person who gives evidence at a public hearing should first provide a witness statement to counsel assisting the inquiry.
33. Where possible, witness statements should be in the form of an affidavit or statutory declaration.
34. Witness statements:
    (a) should clearly and concisely set out the relevant evidence the witness can give;
    (b) must contain only statements of factual matters within the direct knowledge of the witness, unless (c) or (d) apply;
    (c) may contain statements of factual matters of which the witness has been informed, or believes, if the source of the information or the basis for the belief is clearly identified in the witness statement;
    (d) may contain statements of opinion, provided the witness possesses specialised knowledge in a field relevant to the inquiry and attaches a copy of his or her curriculum vitae to the statement;
    (e) must have exhibited to them (by attachment or accompanying presentation) all documents or true copies of documents relating to the evidence given by the witness which are in the witness's possession or control, or describe as precisely as possible any such documents which are not in the witness's possession or control and, in that case, state where the witness believes the documents to be located;
    (f) must present those exhibits in a way that will facilitate the Board's efficient and expeditious reference to them, and in particular –
        i. where possible, in electronic form, by providing them in fully text searchable, multi-page PDF/A format;

ii. alternatively, with respect to hard copies, by placing a letter, number or other identifying mark on each exhibit and numbering the pages.

35. [Paragraph number not used]

36. Following receipt of a witness's primary statement, the Board may request the witness to:

    (a) attend an interview with counsel assisting the inquiry to discuss the statement; and/or

    (b) [Paragraph number not used]

    (c) provide a supplementary statement.

37. If the person attends an interview with counsel assisting, the person may be represented by a lawyer or agent.

Part F. Publication and confidentiality

38. Subject to the Chairperson's determination of any application for confidentiality, all information, witness statements (including attachments), documents or submissions provided to the Board may be published on the Board's website or otherwise made publicly available.

39. Any person who provides a witness statement or any other information to the Board, and who wishes to apply for confidentiality or non-publication orders in relation to the fact of the material being provided or in relation to the whole or any part of the material should:

    (a) if it is considered necessary to make any such order before providing any material, contact the Executive Director by email at board@coalminesinquiry.qld.gov.au to discuss arrangements; or

    (b) provide the material to the Board under cover of a written notice stating:

        i. the part of the information or material in respect of which confidentiality is sought;

        ii. whether confidentiality is sought in respect of the world at large or subject to acceptance of publication to some person or categories of persons; and

        iii. the grounds on which such confidentiality is asserted to be necessary and appropriate despite the public nature of the inquiry.

40. [Paragraph number not used]

41. Where confidentiality is applied for in relation to material provided to the Board, either:

    (a) the Chairperson shall decide the application on the papers and notify the person or their nominated representative accordingly. If confidentiality is refused, the material or information in question will nevertheless be kept confidential for seven days from notification of the decision; or

(b) the Board shall notify the person or their nominated representative that they will be required to appear before the Chairperson on a date to be advised for further consideration of the application. The material or information in question will be kept confidential until (and in accordance with) the Chairperson's decision following that appearance.

42. Nothing in this Guideline should be taken as limiting the Chairperson's powers, whether at the request of any person or on his own initiative, to treat any material or information as confidential and to take any steps appropriate for the preservation of that confidentiality

TERRY MARTIN SC

Chairperson and Board Member

9 November 2020

Practice Guideline No.2

Public Hearings – practical matters and witness arrangements

Public Hearings

1. The conduct of public hearings will comply at all times with restrictions and guidelines published by the Commonwealth and Queensland State Government with respect to the management of the COVID-19 pandemic, including with respect to:

   (c) Restrictions on travel;

   (d) Social distancing requirements.

2. The Board will hold public hearings in Brisbane and may hold public hearings in other locations, subject to practical considerations including compliance with COVID-19 restrictions and guidelines.

3. Subject to any orders the Chairperson may make and paragraph 1. above, and in addition to Part C. of Practice Guideline No. 1:

   (a) All public hearings will be available for viewing by live stream accessible on the Board's website www.coalminesinquiry.qld.gov.au;

   (b) Members of the public may attend public hearings in person and view the hearings from designated seating, observing social distancing; and

   (c) Where interest is raised, the Board may arrange viewing facilities at other locations for members of the public to view the live stream of the hearings.

First Public Hearing

4. The first public hearing of the Board will commence on 4 August 2020 at Court 17, Brisbane Magistrates Court, Level 4, 363 George Street, Brisbane, Queensland.

5. By 5:00pm on 27 July 2020, Counsel Assisting will provide all parties or their legal representatives with a document setting out the key issues on which the Board intends to focus during the initial hearing.

6. The Chairperson will make opening remarks.

7. Senior Counsel Assisting the Board will make opening submissions.

Witnesses, witness statements and evidentiary material

8. Subject to any orders the Chairperson may make prohibiting publication of any document or information provided to the Board, and in addition to Part E. of Practice Guideline No. 1, while public hearings are on foot:

   (a) Where possible, the Board will publish regularly to the parties and/or on its website a list of the witnesses to be called to give oral evidence and the proposed dates and times of their evidence;

   (b) The published list of witnesses will be updated regularly (and remains, therefore, subject to change);

(c) If a witness statement has not already been made available to the parties, the Board will, where possible, make the witness statement available to the persons with leave to appear at least 2 business days before the witness is called;

(d) Where possible, 4 business days before a witness is called, the Board will give the witness or his or her legal representative notice of the Board's area of interest and a list of the documents to which the witness may be taken (other than those attached to or referred to in the witness's statement) and provide all other parties with an interest in such issues or documents with copies of the notice and the list;

(e) At least 2 business days before the witness is to be called to give evidence, any person with leave to appear who wishes to cross-examine the witness must give notice to the Executive Director by email to board@coalminesinquiry.qld.gov.au specifying -

i. The name of the witness proposed to be cross-examined;

ii. A considered estimate of the time which will be required for the cross-examination;

(f) If the person giving a notice of proposed cross-examination anticipates showing the witness any document -

i. If the document has already been provided to the Board, it must be identified in the notice;

ii. If the document is not already available on the Board's website (whether as an attachment to a witness statement or otherwise), a copy of it must be provided with the notice, where possible, in accordance with the Document Management Protocol. If that is not possible, the document must be provided in one of the following electronic formats:

1. Text for plain text records;
2. Fully text searchable PDF/A or PDF for formatted document type records;
3. TIFF for images such as plans;
4. JPEG 2000 or JPEG for photos;
5. MPEG4 for videos.

(g) Any person with leave to appear who wishes to have evidence adduced from a witness other than a witness proposed to be called by Counsel Assisting must give notice to the Executive Director by email to board@coalminesinquiry.qld.gov.au accompanied by a witness statement from the witness;

9. Generally, and subject to the Chairperson's discretion:

(a) All witnesses giving evidence at the public hearings will be called and examined by Counsel Assisting the Inquiry. The examination-in-chief of a witness will usually involve the tendering of a statement provided by the witness to Counsel Assisting in advance of the hearing. In some cases, the examination-in-chief may be taken orally;

(b) The order of further examination of each witness will usually be:

i. Examination by the parties given leave to appear;

ii. Examination by the lawyer or agent (if any) representing the witness; and

iii. Re-examination by Counsel Assisting.

10. The Chairperson may limit the issues about which a witness may be examined and limit the time available for examination by any person.

11. At the completion of the examination of a witness, the witness shall, unless excused from further attendance, be taken to have been stood down only and to be subject to recall at the direction of the Chairperson.

12. Nothing in this Guideline prevents a person seeking leave from the Chairperson to cross-examine a witness at any time during the Inquiry if something occurs during the Inquiry which leads that person to believe that his or her interests may be adversely affected.

Procedural matters

13. Any person with leave to appear who wishes to raise a procedural matter must give notice to the Executive Director by email to board@coalminesinquiry.qld.gov.au identifying the matter, stating the outcome sought, and summarising the submissions to be advanced in support of that outcome.

TERRY MARTIN SC

Chairperson and Board Member

17 July 2020

Document Management Protocol

Purpose of this Protocol

1. This Protocol sets out the means and format in which electronic documents are to be produced to the Queensland Coal Mining Board of Inquiry (the Board).
2. To facilitate the expeditious conduct of the Inquiry, the Board intends, as much as possible, to receive, manage and consider, materials in electronic form.
3. The Protocol should be read in conjunction with Practice Guideline No. 1, which is available on the Board's website at www.coalminesinquiry.qld.gov.au.
4. Where the Board thinks it appropriate, this Protocol may be varied, changed or replaced at any time.
5. Pursuant to this Protocol, a person is expected not to convert electronic documents to hard copy for the purposes of providing documents to the Board. Unless otherwise agreed with the Board, a person is expected to convert hard copy documents to electronic form for the purposes of production to the Board in accordance with this Protocol.
6. The Protocol applies to:

   (a) all witness statements (including exhibits to witness statements); and

   (b) unless otherwise specified by the Board, all other information, relevant documents and submissions referred to in Practice Guideline No. 1.

General Principles

Identification of documents

1. Document identifiers (Document IDs) and page numbers will be unique to each page and will be the primary means by which documents will be referenced.
2. A person will identify documents for the purpose of production using unique Document ID. A Document ID will be in the following format:

   PPP.BBB.FFF.NNNN

   Where:

Level	Description
PPP	The producing party code is a three alpha code unique to each producing. The Board will liaise with producing parties and advise the producing party code to be used by each party.
BBB	The box number identifies a specific physical archive box or email mailbox or any other physical or virtual container. The box number is padded with zeros to consistently result in a 3 digit structure.
FFF	The folder number identifies a unique folder number allocated by each party in its own document collection. The

	folder number is padded with zeros to consistently result in a 3 digit structure.
NNNN	This refers to each individual page of each document. The page number is padded with zeros to consistently result in a 4 digit structure.

An example of the Document ID structure is XYZ.001.001.0001

where:

XYZ	Party Code
001	Unique box number allocated by person
001	Unique folder or container number allocated by person
0001	Sequential page or document number

Note: If a different number is required, please contact the Board to discuss.

2.1 It is understood and accepted that Document IDs may not be consecutive as a result of the removal of irrelevant documents during review. Host and attachment documents must, however, be identified and be given consecutive Document IDs.

2.2 A document filename is to be adopted according to its corresponding Document ID upon electronic production.

Document Management

Document metadata

3.1 Wherever possible, a person is to rely on the automatically identified metadata of electronic documents. Automatically identified metadata should be used when:

(a) searching for documents;

(b) itemising documents in a list;

(c) producing documents in accordance with the Production Specification at Schedule 1 of this Protocol.

3.2 A person should take reasonable steps to ensure that all appropriate document metadata is not modified or corrupted during collection and preparation of electronic documents for review and production.

3.3 The Board accepts that complete document metadata may not be available for all electronic documents. A person should attempt to provide complete metadata where practicable.

De-duplication of documents

4.1 A person must take reasonable steps to ensure that duplicate documents are removed from the exchanged material (de-duplication).

4.2 Duplication will be considered at a document group level. That is, all documents within a group comprising a host document and its attachments, will be treated as a duplicate only if the entire group of documents is duplicated elsewhere.

Exclusion of unusable file types

5.1 Files with no user-generated content, such as system files and executable files, are to be excluded from the disclosure process (to the extent possible).

5.2 Temporary internet files and cookies are to be excluded from the disclosure process.

Document Production

Production of documents to the Board

6.1 All documents will:

(a) be accompanied by an excel spreadsheet as detailed at Schedule 1;

(b) be provided in electronic format in accordance with paragraphs 7, 8 and 9;

(c) include all requested metadata and files responsive to the production or tranche in their entirety.

Document format and naming

7.1 All documents will be provided as fully text-searchable images as multi-page PDF/A files.

7.2 Electronic documents that do not lend themselves to conversion to PDF (for example, complex spreadsheets or databases) may be provided to the Board as native electronic documents or in another form as agreed by the producing party and the Board.

7.3 Each file provided by a producing party to the Board will be stored in the folder structure that matches the Document ID structure. Further information is contained in Schedule 2 to this Protocol.

7.4 A unique page number label in the format described in paragraph 2.2 will be electronically stamped on the top right hand corner of each page of every document. Such page numbering can be readily achieved using commercial off the shelf products such as Adobe Acrobat Professional or Nitro PDF, however, any similar method will suffice.

7.5 The page number assigned to the first page of a document will be the Document ID for that document.

Format for witness statements and submissions

8.1 To enable hyperlinking to exhibits referred to within witness statements or submissions:

(a) witness statements and submissions should be provided as both –

i. Microsoft Word documents; and

ii. fully text-searchable images as multi-page PDF/A files;

(b) where a document is referred to in a submission or witness statement, the reference must be to the Document ID for the document; and

(c) each reference to an exhibit's Document ID should be made enclosed in double square brackets, for example [[ABC.001.001.0345]].

Completeness of documents

9.1 Where documents are produced, all parts of the document should be produced. For example, for an email chain the final instance of that chain, showing all parts of that chain, is to be produced along with every attachment.

Production media

10.1 Documents and accompanying metadata should be provided to the Board on a solid state universal serial bus storage (USB stick) or a portable hard drive or read-only optical media (e.g. CD-ROM, DVD-ROM), and delivered to the Board at Level 23, 50 Ann St, Brisbane.

Data security

11.1 Producing parties will take reasonable steps to ensure that the data is useable and is not infected by malicious software.

11.2 If data is found to be corrupted, infected by malicious software or is otherwise unusable, the producing party will, within 2 working days of receipt of a written request from the Board, provide a copy of the data that is not corrupted, infected by malicious software or otherwise unusable (as the case may be).

Schedule 1 – Production specification

Excel index

1.1 All documents to be produced will be itemised in an excel index containing the following information for each document, where available:

(d) Document ID (see paragraph 2.2 of the Protocol);

(e) host Document ID (see below "Document hosts and attachment relationships");

(f) document date;

(g) document type (see tab "DocType List" in the sample spreadsheet referred to in paragraph 1.2 of this Schedule);

(h) document title;

(i) author;

(j) author organisation;

(k) recipient;

(l) recipient organisation;

(m) confidential – yes/no/part and, if partly confidential, identifying the relevant part (refer to Practice Guideline No. 1 at paragraph 29(b)(i));

(n) confidential – scope (refer to Practice Guideline No. 1 at paragraph 29(b)(ii));

(o) confidential – grounds (refer to Practice Guideline No. 1 at paragraph 29(b)(iii)).

1.2 A sample spreadsheet is available from the Board's website www.coalminesinquiry.qld.gov.au.

Document hosts and attachment relationships

1.3 Every document that is attached to another document will be called an attached document.

1.4 Attached documents will have the Document ID of their host document in the metadata field called 'Host Document ID'.

1.5 Host documents and attached documents are jointly referred to as a 'Document Group'.

1.6 In a Document Group, the host document will be immediately followed by each attached document in the order of their Document IDs.

1.7 Annexures, attachments and schedules to an agreement, report, legal document or minutes of a meeting may be described as separate attached documents associated with the relevant host document.

Schedule 2 – Folder structure and naming of files

2.1 This schedule specifies how electronic documents and images are to be located and named for the purposes of production to the Board.

2.2 The folder containing all documents will be named either '\Documents\' or '\Images\'.

2.3 Documents produced as searchable images will be named 'Document ID.pdf'. Only the final full stop between the Document ID and the file extension will be used (e.g. 'ABC0010020312.pdf').

2.4 Documents produced as native electronic documents will be named 'DocumentID.xxx(x)' where 'xxx(x)' is the original default file extension typically assigned to source native electronic files of that type (for example, 'ABC0010020312.docx').

2.5 Folders containing documents will be structured in accordance with the Document ID hierarchy. For example, the document produced as a searchable image called 'ABC0010020312.pdf' would be located in the folder called 'Documents\ABC\001\002\'. That document will appear in the directory listing as 'Documents\ABC\OO1\002\ABC0010020312.pdf'. Where this same document has been produced as a Word document, it would be called 'ABCOO10020312.doc' and will be located in the folder called 'Documents\ABC\001\002\'. It will appear in the directory listing as 'Documents\ABC\001\002\ABC0010020312.doc

Appendix 7 – Notices

Section 207 Notice of Inquiry

Name	Organisation/Individual	Issue Date
The Chief Executive	Department of Natural Resources, Mines and Energy	8 June 2020 10 July 2020
Peter Newman **The Chief Inspector**	Resources Safety and Health Queensland - formerly part of the Department of Natural Resources, Mines and Energy	8 June 2020 10 July 2020
Stephen Smyth **District President**	Construction, Forestry, Maritime, Mining and Energy Union	8 June 2020 10 July 2020
The Chief Executive	Anglo Coal (Grosvenor Management) Pty Ltd	8 June 2020 10 July 2020
The Chief Executive	Anglo Coal (Capcoal Management) Pty Ltd	8 June 2020 10 July 2020
The Chief Executive	Anglo Coal (Moranbah North Management) Pty Ltd	8 June 2020 10 July 2020
The Company Secretary	Oaky Creek Holdings Pty Ltd	8 June 2020 10 July 2020
Redacted	Injured Coal Mine Worker	12 June 2020 10 July 2020
The Chief Executive Officer	Resources Safety and Health Queensland - formerly part of the Department of Natural Resources, Mines and Energy	10 July 2020
Redacted	Injured Coal Mine Worker	14 July 2020
Redacted	Injured Coal Mine Worker	14 July 2020
The Chief Executive	One Key Resources Pty Ltd	22 July 2020
Jason Hill	ISHR, Construction, Forestry, Maritime, Mining and Energy Union	5 August 2020

Name	Organisation/Individual	Issue Date
Stephen Woods	ISHR, Construction, Forestry, Maritime, Mining and Energy Union	5 August 2020
Joe Barber	SSHR, Oaky North Mine Oaky Creek Holdings Pty Ltd	6 August 2020
Richard Harris	SSHR, Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	6 August 2020
James Hoare	SSHR, Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	6 August 2020
Luke Shackleton	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	6 August 2020
Shaun Stingle	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	6 August 2020
Peter Noton	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	6 August 2020
Graeme Read	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	6 August 2020
The Company Secretary	Komatsu Mining Corporation Group	7 August 2020
The Chief Executive	Queensland Resources Council	1 September 2020

Section 213 Attendance Notice (Notice to give evidence before the Board)

Name	Organisation	Issue Date
Peter Newman	Resources Safety and Health Queensland	20 July 2020
Mark Stone	Resources Safety and Health Queensland	20 July 2020

Name	Organisation	Issue Date
Scott Fraser	Moranbah North Mine Anglo Coal (Moranbah North Management) Pty Ltd	20 July 2020
Michael Lerch	Moranbah North Mine Anglo Coal (Moranbah North Management) Pty Ltd	20 July 2020
Kelvin Sloan	Moranbah North Mine Anglo Coal (Moranbah North Management) Pty Ltd	20 July 2020
Tim McNally	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020
Peter Noton	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	28 July 2020
Graeme Read	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020 3 August 2020 (reissue)
Braedon Smith	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020
Kelvin Schiefelbein	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020
Luke Shackleton	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020
Shaun Stingle	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020
Damien Wynn	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020
Josh Smith	Grasstree Mine	20 July 2020

Name	Organisation	Issue Date
	Anglo Coal (Capcoal Management) Pty Ltd	
James Hoare	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	20 July 2020 28 July 2020 (reissue)
Richard Harris	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	21 July 2020
Joe Barber	Oaky North Mine Oaky Creek Holdings Pty Ltd	21 July 2020
Gus Wilson	Oaky North Mine Oaky Creek Holdings Pty Ltd	21 July 2020
Luca Pantano	Oaky North Mine Oaky Creek Holdings Pty Ltd	21 July 2020
Michael Downs	Oaky North Mine Oaky Creek Holdings Pty Ltd	21 July 2020
Ben Millar	Grasstree Mine Anglo Coal (Capcoal Management) Pty Ltd	24 July 2020
Jason Hill	Construction, Forestry, Maritime, Mining and Energy Union	24 July 2020
Stephen Woods	Construction, Forestry, Maritime, Mining and Energy Union	24 July 2020
Paul Brown	Resources Safety and Health Queensland	24 July 2020
Mark Lydon	Resources Safety and Health Queensland	24 July 2020
Kylie Ah Wong	Glencore Coal Assets Australia Pty Ltd	10 August 2020

Name	Organisation	Issue Date
Gavin Taylor	Anglo American Metallurgical Coal Pty Ltd	11 August 2020
John Sleigh	Mine Managers' Association of Australia	12 August 2020
Tyler Mitchelson	Anglo American Metallurgical Coal Pty Ltd	11 August 2020
Warwick Jones	Anglo American plc	11 August 2020
Ben Lewis	One Key Resources Pty Ltd	12 August 2020
Greg Dalliston	Retired District Union Inspector (CFMMEU)	13 August 2020

In early September 2020, the Chairperson also issued Attendance Notices to various persons to give evidence before the Board about the incidents at Grosvenor mine. As the public hearings in relation to Grosvenor have been deferred to 2021, it is the Board's intention to reissue these notices at the appropriate time.

Section 213 Attendance Notice (Notice to produce documents)

Name	Organisation	Issue Date
The Chief Executive	Department of Natural Resources, Mines and Energy (for Resources Safety and Health Queensland)	3 June 2020 8 June 2020
Chief Inspector of Coal Mines	Resources Safety and Health Queensland	30 June 2020 2 July 2020 3 July 2020 8 July 2020 9 July 2020 13 July 2020 20 July 2020 31 July 2020 20 August 2020 21 August 2020 7 September 2020 15 September 2020

Name	Organisation	Issue Date
		16 September 2020 20 October 2020 28 October 2020
The Chief Executive	Anglo Coal (Grosvenor Management) Pty Ltd	3 June 2020 15 June 2020 29 June 2020 30 June 2020 15 July 2020 21 July 2020 23 July 2020 24 August 2020 27 August 2020 8 September 2020
The Chief Executive	Anglo Coal (Capcoal Management) Pty Ltd	3 June 2020 15 June 2020 30 June 2020 2 July 2020 14 July 2020 23 July 2020
The Chief Executive	Anglo Coal (Moranbah North Management) Pty Ltd	3 June 2020 15 June 2020 2 July 2020 14 July 2020 23 July 2020
The Chief Executive	Anglo American Metallurgical Coal Holdings Ltd	15 July 2020 20 August 2020 8 September 2020 15 September 2020
The Company Secretary	Oaky Creek Holdings Pty Ltd	4 June 2020 15 June 2020 10 July 2020 23 July 2020

Name	Organisation	Issue Date
The Chief Executive	One Key Resources Pty Ltd	15 June 2020 22 July 2020 22 July 2020

Appendix 8 – Interviews, Statements and Submissions

Interviews

Interviews have so far been conducted with the following persons.

Name	Method of Interview	Date/s
Peter Newman – Chief Inspector of Coal Mines, RSHQ	Video Conference Physical Attendance Physical Attendance	1 June 2020 10 June 2020 29 July 2020
Stephen Smyth – District President, CFMMEU	Video Conference	9 June 2020
Chief Inspector Newman **Gareth Kennedy – SIMTARS** **Mark Kleinhans – SIMTARS**	Physical Attendance	16 June 2020
Andrew Clough	Physical Attendance	17 June 2020
Professor Michael Quinlan	Video Conference	29 June 2020
Wade Rothery	Video Conference	30 June 2020
John Dallas Mining	Physical Attendance	3 July 2020
Mark Parcell	Physical Attendance	8 July 2020
Martin Watkinson – SIMTARS	Physical Attendance	10 July 2020
Craig Thomas – Electrical Trades Union (ETU)	Video Conference	23 July 2020
Shaun Dobson – Deputy Chief Inspector of Coal Mines, RSHQ	Physical Attendance	26 August 2020

Witness Statements

Statements, Affidavits and Statutory Declarations were provided by the following witnesses who were also called to give oral evidence at the Board's hearings. Witness statements for select persons are available on the website: https://coalminesinquiry.qld.gov.au/exhibits/.

Name	Statement Date
Mark Stone	31 July 2020
Peter Newman	20 August 2020
Stephen Smith	29 July 2020
Braedon Smith	1 September 2020 *(addendum statement clarifying oral evidence given at the hearing)*
Peter Noton	5 August 2020
Stephen Woods	24 July 2020
Jason Hill	24 July 2020
Luca Pantano	6 August 2020
Michael Downs	7 August 2020
Joe Barber	28 July 2020
James Hoare	10 August 2020
Richard Harris	28 July 2020
Paul Brown	27 July 2020
Mark Lydon	20 July 2020
Kylie Ah Wong	12 August 2020
Tyler Mitchelson	28 July 2020
Warwick Jones	28 July 2020
Professor Michael Quinlan	18 August 2020
Gavin Taylor	30 July 2020 *(report commissioned by Anglo)* 24 August 2020 *(addendum statement clarifying oral evidence given at the hearing)*
John Sleigh	9 August 2020
Greg Dalliston	16 August 2020
Ben Lewis	20 August 2020

Statements, Affidavits and Statutory Declarations were provided by the following witnesses who were not required to give oral evidence at the Board's hearings.

Name	Mine	Statement Date
Graeme Read	Grasstree Mine	5 August 2020 (unsigned)
Luke Shackleton	Grasstree Mine	4 August 2020 (unsigned)
Shaun Stingle	Grasstree Mine	5 August 2020
Gus Wilson	Oaky North Mine	4 August 2020

Submissions

Public submissions were received by the Board of Inquiry from the following organisations and individuals.

Name	Statement Date
Lyle Brown	15 July 2020
Bernard Corden	24 June 2020 5 August 2020
Electrical Trades Union (ETU)	17 July 2020
Adam Lines	28 July 2020
Mine Managers Association of Australia Incorporated (MMAA)	17 July 2020
Queensland Resources Council (QRC)	28 July 2020
Senator Malcolm Roberts	17 July 2020
Stuart Vaccaneo	10 July 2020 Various
Dr Ian Webster	13 August 2020 29 August 2020
Scott Leggett	17 August 2020
Robert Marshall	22 August 2020
Bruce Robertson	3 September 2020
Bill (William) Koppe	11 September 2020
Minova Australia Pty Ltd	14 September 2020

A number of individuals who asked to remain anonymous or have their name withheld from publication made submissions or provided information to the Board. To date, the Board has received approximately 13 submissions of this kind.

Appendix 9 – Witnesses

Persons who gave oral evidence at the Inquiry's first tranche of hearings were:

Week 1

Name	Organisation/Mine	Date
Mark Stone Chief Executive Officer	Resources Safety and Health Queensland	4 August 2020
Peter Newman Chief Inspector of Coal Mines	Resources Safety and Health Queensland	4 August 2020 5 August 2020
Stephen Smith Regional Inspector of Mines	Resources Safety and Health Queensland	4 August 2020 5 August 2020
Kelvin Schiefelbein Underground Mine Manager	Grasstree Mine	5 August 2020 6 August 2020
Braedon Smith Ventilation Officer	Grasstree Mine	6 August 2020
Tim McNally Operations Manager	Grasstree Mine	6 August 2020
Peter Noton Explosion Risk Zone Controller	Grasstree Mine	6 August 2020
Josh Smith Explosion Risk Zone Controller	Grasstree Mine	6 August 2020
Stephen Woods Industry Safety and Health Representative	Construction, Forestry, Maritime, Mining and Energy Union	7 August 2020
Jason Hill Industry Safety and Health Representative	Construction, Forestry, Maritime, Mining and Energy Union	7 August 2020
Michael Lerch Underground Mine Manager	Moranbah North Mine	7 August 2020

Kelvin Sloan Longwall Coordinator	Moranbah North Mine	7 August 2020

Week 2

Name	Organisation/Mine	Date
Luca Pantano Ventilation Officer	Oaky North Mine	10 August 2020
Michael Downs Underground Mine Manager	Oaky North Mine	10 August 2020
Joe Barber Site Safety and Health Representative	Oaky North Mine	10 August 2020
James Hoare Site Safety and Health Representative	Grasstree Mine	11 August 2020
Richard Harris Site Safety and Health Representative	Grasstree Mine	11 August 2020
Paul Brown Inspector of Mines	Resources Safety and Health Queensland	12 August 2020
Mark Lydon Inspector of Mines	Resources Safety and Health Queensland	12 August 2020
Kylie Ah Wong General Manager (Health, Safety and Training)	Glencore Coal Assets Australia Pty Ltd	13 August 2020

Week 3

Name	Organisation/Mine	Date
Tyler Mitchelson Head of Metallurgical Coal Chief Executive Officer	Anglo American plc Anglo American Metallurgical Coal Pty Ltd	17 August 2020 18 August 2020
Warwick Jones Head of Human Resources	Anglo American plc – Bulk Commodities Metallurgical Coal	18 August 2020
Damien Wynn Site Senior Executive	Grasstree Mine	19 August 2020
Professor Michael Quinlan Emeritus Professor of Industrial Relations	University of New South Wales – Business School	19 August 2020
Gavin Taylor Consultant Retired Chief Inspector of Coal Mines	Commissioned by Anglo American	19 August 2020 20 August 2020
John Sleigh Vice President Northern Region	Mine Managers' Association of Australia Incorporated (MMAA)	20 August 2020
Greg Dalliston Retired Industry Safety and Health Representative		21 August 2020
Ben Lewis Regional Director	One Key Resources Pty Ltd	21 August 2020

Appendix 10 – Exhibits

The following documents were tendered as exhibits lists during the first tranche of public hearings, held between 4 August and 21 August 2020. Selected exhibits are available on the Board's website https://coalminesinquiry.qld.gov.au/exhibits/.

Documents received or created by the Board were assigned a unique document identifier (called a Document ID), which supports identification and retrieval of the documents in the electronic document management system. The Document ID follows a standard format (e.g. XYZ.001.001.0001), starting with a three or four letter Party Code. The Party Code identifies the party who was the source for the document.

Transcripts of the hearings are identified with the code: TRA. The Document ID includes reference to the day of hearing to which the transcript relates (e.g. TRA.500.001.xxxx relates to Day 1 of the hearing. An index of relevant Party Codes is available at the end of the exhibit lists.

Where a document was admitted as an exhibit in the hearings, the Document ID became the Exhibit Number for that document.

Exhibit Lists

Day One 4 August 2020 Exhibit List A	
DOCUMENT	**EXHIBIT NUMBER**
Table - High Potential Incidents referred to in the Terms of Reference	BOI.001.001.0001
Mark Stone Statutory Declaration	SMA.001.001.0001
RSHQ Information in graphical and Excel format in relation to High Potential Incidents	RSH.002.278.0001
Anglo American Integrated Risk Management Risk Rating Matrix Guideline - Anglo American plc Risk Matrix	AAMC.001.015.0010
Incident reporting standard – Anglo American	AAMC.001.004.0002
One Key Resources – Safety Management Plan – Contractor Obligations under s43	OKR.003.003.0001
Statutory Declaration by Peter Newman dated 24 June 2020	NPE.001.001.0001
Letter from Russell Albury CICM to all Coal Underground SSEs and UMMs 30/01/2017	RSH.002.289.0001
Letter from Russell Albury CICM to all Coal Underground SSEs and UMMs 27/02/2017	RSH.002.347.0001
Methane Management in Underground Coal Mines – Best Practice and Recommendations June 2019	RSH.002.415.0001
Queensland Mines and Quarries Safety Performance and Health Report 2018-2019	RSH.002.416.0001
Witness Statement of Stephen Smith dated 29 July 2020	SST.001.002.0001

Day One 4 August 2020 Exhibit List A	
Lotus Notes Incident Notification for Grasstree HPI 28/07/2019	RSH.002.070.0001
Form 5A for Grasstree HPI 28/07/2019	AAMC.001.006.0463
Lotus Notes Incident Notification for Grasstree HPI 25/10/2019	RSH.002.071.0001
Form 1A for Grasstree HPI 25/10/2019	AAMC.001.006.0437
Form 5A for Grasstree HPI 25/10/2019	AAMC.001.006.0442
Lotus Notes Incident Notification for Grasstree HPI 11/01/2020	RSH.002.073.0001
Form 1A for Grasstree HPI 11/01/2020	AAMC.001.006.0162
Form 5A for Grasstree HPI 11/01/2020	AAMC.001.006.0169
Lotus Notes Incident Notification for Grasstree HPI 11/01/2020	RSH.002.074.0001
Form 1A for Grasstree HPI 22/02/2020	AAMC.001.008.0013
Form 5A for Grasstree HPI 22/02/2020	AAMC.001.008.0009
Lotus Notes Incident Notification for Grasstree HPI 20/03/2020 1 of 3	RSH.002.075.0001
Form 1A for Grasstree HPI 20/03/2020 1 of 3	AAMC.001.006.0239
Form 5A for Grasstree HPI 20/03/2020 1 of 3	AAMC.001.006.0219
Lotus Notes Incident Notification for Grasstree HPI 20/03/2020 2 of 3	RSH.002.077.0001
Form 1A for Grasstree HPI 20/03/2020 2 of 3	AAMC.001.006.0259
Form 5A for Grasstree HPI 20/03/2020 2 of 3	AAMC.001.006.0248
Lotus Notes Incident Notification for Grasstree HPI 20/03/2020 3 of 3	RSH.002.076.0001
Form 1A for Grasstree HPI 20/03/2020 3 of 3	AAMC.001.006.0285
Form 5A for Grasstree HPI 20/03/2020 3 of 3	AAMC.001.006.0268
Lotus Notes Incident Notification for Grasstree HPI 24/03/2020	RSH.002.078.0001
Form 1A for Grasstree HPI 24/03/2020	AAMC.001.006.0290
Form 5A for Grasstree HPI 24/03/2020	AAMC.001.006.0299
Lotus Notes Incident Notification for Grasstree HPI 25/03/2020	RSH.002.079.0001

Day One 4 August 2020 Exhibit List A	
Form 1A for Grasstree HPI 25/03/2020	AAMC.001.006.0318
Form 5A for Grasstree HPI 25/03/2020	AAMC.001.006.0324
Lotus Notes Incident Notification for Grasstree HPI 06/04/2020	RSH.002.080.0001
Form 1A for Grasstree HPI 06/04/2020	AAMC.001.006.0340
Form 5A for Grasstree HPI 06/04/2020	AAMC.001.006.0346
Lotus Notes Incident Notification for Grasstree HPI 11/04/2020	RSH.002.081.0001
Form 1A for Grasstree HPI 11/04/2020	AAMC.001.008.0018
Form 5A for Grasstree HPI 11/04/2020	AAMC.001.006.0390
Lotus Notes Incident Notification for Oaky North HPI 06/12/2019	RSH.002.419.0001
Form 1A for Oaky North HPI 06/12/2019	RSH.002.418.0001
Form 5A for Oaky North HPI 06/12/2019	RSH.002.417.0001
Lotus Notes Incident Notification for Moranbah North HPI 20/07/2019	RSH.002.166.0001
Form 1A for Moranbah North HPI 20/07/2019	AAMC.001.001.0857
Form 5A for Moranbah North HPI 20/07/2019	AAMC.001.001.0861
MRE 14/04/2020 - DIRECTIVE by IOM Smith to Grasstree 14/04/2020 - Satisfied	RSH.002.012.0001
MRE 14/04/2020 - DIRECTIVE by IOM Smith to Grasstree - Suspend operation of LW808 - methane monitoring system non-compliance with s243A CMSHR	RSH.002.013.0001
MRE 16/04/2020 - DIRECTIVE by IOM Smith to Grasstree - Suspend operation of LW808 - methane monitoring system non-compliance with s243 & s243A CMSHR	RSH.002.020.0001
MRE 16/04/2020 - DIRECTIVE by IOM Smith to Grasstree 16/04/2020 - Satisfied	RSH.002.021.0001
MRE 16/04/2020 - DIRECTIVE by IOM Smith to Grasstree - Suspend operation of LW808 - methane monitoring system non-compliance with s243 & s243A CMSHR	RSH.002.022.0001

Day Two – 5 August 2020 Exhibit List B	
DOCUMENT	**EXHIBIT NUMBER**
Affidavit of Jason Hill	HLJ.001.001.0001
Affidavit of Stephen Woods	WST.001.001.0001
Learning From Incidents (LFI) Report for Grasstree HPIs 20/03/2020 (3), 24/03/2020, 26/03/2020, 06/04/2020 and 11/04/2020	AAMC.001.006.0080
Form 1A for Grasstree HPI 20/03/2020 (2 of 3)	AAMC.001.006.0244
Grasstree Mine Management Structure Version 69 10/03/2020	ACM.002.001.0001
Grasstree Mine Management Structure Version 68 24/01/2020	ACM.002.001.0037
Grasstree Mine Management Structure Version 67 12/08/2019	ACM.002.001.0099
Grasstree Mine Management Structure Version 66 19/06/2019	ACM.002.001.0068
PHMP.GTM.005.1 Gas Principal Hazard Management Plan	ACM.002.001.0202
PHMP.GTM.005.3 Methane Drainage Principal Hazard Management Plan	ACM.002.001.0378
PHMP.GTM.006 Mine Ventilation Principal Hazard Management Plan	ACM.002.001.0420
SOP.GTM.409 Second Workings LW808	ACM.002.001.0736
SOP.GTM.317 Second Workings LW 909	ACM.002.001.0775
Grasstree Mine Post Drainage Operating Plan 26/05/2020	ACM.002.001.0844
Notice of Appointment of Underground Mine Manager - Schiefelbein, Kelvin 18/09/2017	ACM.002.001.0994
TARP.001.PHMP.GTM.005.1 Gas Management TARP Version 14	ACM.002.001.0244
TARP.001.PHMP.GTM.005.1 Gas Management TARP Version 14	ACM.002.001.0249
PHMP.GTM.005.1 Gas Principal Hazard Management Plan Version 13	ACM.002.001.0253
PHMP.GTM.005.1 Gas Principal Hazard Management Plan Version 14	ACM.002.001.0293
PHMP.GTM.005.1 Gas Principal Hazard Management Plan Version 15	ACM.002.001.0333
Email from Paul Brown to Kelvin Schiefelbein and others on 21/03/2020 about Grasstree HPI 20/03/2020 (3 of 3)	RSH.002.059.0001
Email from Paul Brown to Damien Wynn on 23/03/2020 about Grasstree HPIs	RSH.002.060.0001
Email from Paul Brown to Shaun Dobson on 23/03/2020 about Grasstree HPIs	RSH.002.061.0001

Day Two – 5 August 2020 Exhibit List B	
DOCUMENT	**EXHIBIT NUMBER**
Learning From Incidents (LFI) Report for Grasstree HPI on 11/01/2020	AAMC.001.001.0691
Learning From Incidents (LFI) Report for Grasstree HPI on 25/10/2020	AAMC.001.001.0810
Initial Incident Report for Grasstree HPI 22/02/2020	ACM.004.001.0028
Involved Person or Witness Statement by Machan Downing for Grasstree HPI 20/03/2020 1 of 3 (statement says 19/03/2020)	ACM.004.001.0030
Initial Incident Report for Grasstree HPI 20/03/2020 (1 of 3)	ACM.004.001.0034
Initial Incident Report for Grasstree HPI 20/03/2020 (2 of 3)	ACM.004.001.0036

Day Three – 6 August 2020 Exhibit List C	
DOCUMENT	**EXHIBIT NUMBER**
Involved Person or Witness Statement by Matthew Sellings for Grasstree HPI 20/03/2020 2 of 3 (statement says 19/03/2020)	ACM.004.001.0038
Involved Person or Witness Statement by Shaun Stingle for Grasstree HPIs 20/03/2020 ((1 of 3) and (2 of 3))	ACM.004.001.0040
Initial Incident Report for Grasstree HPI 20/03/2020 (3 of 3)	ACM.004.001.0044
Involved Person or Witness Statement by Peter Wilson for Grasstree HPI 20/03/2020 (3 of 3) (statement says 21/03/2020)	ACM.004.001.0046
Involved Person or Witness Statement by Ashley King for Grasstree HPI 20/03/2020 (3 of 3)	ACM.004.001.0050
Initial Incident Report for Grasstree HPI 24/03/2020	ACM.004.001.0054
Involved Person or Witness Statement by Trevor McDonald for Grasstree HPI 24/3/2020	ACM.004.001.0056
Involved Person or Witness Statement by Matthew Sellings for Grasstree HPI 24/3/2020 (statement says 23/3/2020)	ACM.004.001.0058
Initial Incident Report for Grasstree HPI 25/03/2020	ACM.004.001.0060
Involved Person or Witness Statement by Peter Noton for Grasstree HPI 25/03/2020	ACM.004.001.0062
Involved Person or Witness Statement by Steven Lohrey for Grasstree HPI 06/04/2020	ACM.004.001.0064
Involved Person or Witness Statement by Joshua Smith for Grasstree HPI 06/04/2020	ACM.004.001.0066
Involved Person or Witness Statement by Wayne Brown for Grasstree HPI 06/04/2020	ACM.004.001.0068
Initial Incident Report for Grasstree HPI 06/04/2020	ACM.004.001.0070
Initial Incident Report for Grasstree HPI 11/04/2020	ACM.004.001.0072
Grasstree Enablon Task TS.01313207 started 05/05/2020 - Conduct risk assessment on the longwall tailgate drive to identify further controls around gas management	ACM.004.001.0074
Grasstree Enablon Task TS.01013208 started 05/05/2020 - Review GTM.SWP.914 Maintaining the Sherwood Curtain to include the installation of conveyor belt flaps on Chock #197 as per Ventilation Advice #03-2020.	ACM.004.001.0076
Grasstree Enablon Task TS.01313209 started 05/05/2020 –	ACM.004.001.0078

Day Three – 6 August 2020 Exhibit List C	
Alter Longwall automation sequence	
Involved Person or Witness Statement by Matthew Sellings for Grasstree HPI 22/02/2020 (statement says 23/02/2020)	ACM.004.002.0001
Involved Person or Witness Statement by Shaun Stingle for Grasstree HPI 22/02/2020	ACM.004.002.0003
Grasstree SWP Constructing and Maintaining the Sherwood Curtain SWP.GTM.614	ACM.004.003.0002
Grasstree WRAC Risk Assessment: Longwall Tailgate Gas Monitoring RA	ACM.004.003.0019
Grasstree Enablon Task TS.01306660 started 21/04/2020 - Review monitoring of '0m CH4 sensor' for LW808 with respect to production rate, other airstream sensor trends and trip events. Determine if sensor is representative of general body atmosphere in TG.	ACM.004.004.0001
Email from Damien Wynn SSE to Marree Briese approving extensions to Enablon tasks TS.01306660 and TS.01307263	ACM.004.004.0003
Email from James Moreby to Aaron Fielding and others on 12/04/2020 about Grasstree HPI on 11/04/2020	ACM.004.004.0004
LFI for Grasstree HPI 28/07/2019	AAMC.001.001.0675
Learning From Incidents (LFI) Report for Grasstree HPI 22/02/2020	AAMC.001.001.0703
Grasstree Enablon Task TS.01076449 started 31/07/2019 - from HPI 28/07/2019 - Review and implement access rights to remotely monitor goaf well performance for VO, UMM, CRO and MSO	ACM.004.001.0001
Grasstree Enablon Task TS.01076450 started 31/07/2019 - from HPI 28/07/2019 - Review and implement compressor and goaf drainage critical spare list and stock store	ACM.004.001.0003
Grasstree Enablon Task TS.01076451 started 31/07/2019 - from HPI 28/07/2019 - Set up 17ct hammer hole extract	ACM.004.001.0005
Grasstree Enablon Task TS.01076452 started 31/07/2019 - from HPI 28/07/2019 - Review and implement total goaf extraction capacity and increase total availability	ACM.004.001.0009
Grasstree Enablon Task TS.01076453 started 31/07/2019 - from HPI 28/07/2019 - Implement an alarming system to the control room with hole performance	ACM.004.001.0011

Day Three – 6 August 2020 Exhibit List C	
Grasstree Enablon Task TS.01092459 started 31/07/2019 - from HPI 28/07/2019 - Source additional fixed plant capacity to minimise use of compressors	ACM.004.001.0013
Grasstree Enablon Task TS.01092460 started 31/07/2019 - from HPI 28/07/2019 - Investigate and implement real time citect monitoring of goaf drainage borehole flow and composition, if it is practical to do so within current life of mine	ACM.004.001.0015
Grasstree Enablon Task TS.01092461 started 31/07/2019 - from HPI 28/07/2019 - Holes identified as critical to the goaf drainage infrastructure to be set up to plant, not compressors	ACM.004.001.0017
Email from CS Gas Pty Ltd to David Holt at Grasstree on 16/09/2019 re budget pricing for gas monitoring	ACM.004.001.0019
Quotation from CS Gas Pty Ltd to David Holt at Grasstree dated 09/09/2019	ACM.004.001.0020
Affidavit of Peter Noton	NOP.001.001.0001
Witness Statement - Joshua Smith	ACM.004.001.0066
Anglo American S&SD Group Standard “Learning From Incidents” November 2019	AAMC.001.004.1472
Learning From Incidents (LFI) Report for Grasstree HPI 22/02/2020	AAMC.001.001.0703
Form 1A for Grasstree HPI 28/07/2019	AAMC.001.006.0454
MRE 05/02/2019 - Unannounced Inspection by IOM Nugent and IOM Gouldstone of Grasstree Mine	RSH.002.320.0001
MRE 27/02/2020 - Unannounced Inspection by IOM Brennan of Grasstree Mine	RSH.002.362.0001
MRE 15/10/2019 - Unannounced Inspection by IOM Poynter of Oaky North Mine	RSH.002.350.0001
RSHQ Information in graphical and Excel format in relation to Fatalities	RSH.002.414.0001

Days Four and Five – 7 & 10 August 2020 Exhibit List D	
DOCUMENT	**EXHIBIT NUMBER**
Coal Mining Safety and Health Advisory Committee - Annual Report 2018-19	CMU.001.001.0001
Learning From Incidents (LFI) Report for Moranbah North on 20/07/2020	AAMC.001.001.0824
Form 1A for Moranbah North HPI 20/07/2019 (1 of 1)	AAMC.001.001.0856
Form 1A for Moranbah North HPI 20/7/2019 (1 of 1)	AAMC.001.001.0857
Form 5A for Moranbah North HPI 20/07/2019 (1 of 1)	AAMC.001.001.0861
Moranbah North Mine Management Structure and OHSE Responsibilities Version 71 28/06/2019	AMN.002.001.0001
Moranbah North Mine Principal Hazard Management Plan MNM.50018.3 Ventilation, Gas Management & Toxic Irrespirable Atmosphere Version 1	AMN.002.001.0145
Moranbah North Mine Principal Hazard Management Plan MNM.50018.10 Gas Monitoring [Management]	AMN.002.001.0196
Moranbah North Mine General Body Gas and Atmosphere TARP Version 14	AMN.002.001.0223
Moranbah North Mine Principal Hazard Management Plan MNM.50018.3 Ventilation	AMN.002.001.0269
Moranbah North Mine Principal Hazard Management Plan MNM.50018.8.PHMP Gas Drainage	AMN.002.001.0543
Moranbah North Mine Underground In Seam Gas Drainage TARP Revision 2	AMN.002.001.0611
Moranbah North Mine Management Plan MNM.50018.5 LW604 Goaf Management Procedure	AMN.002.001.0670
Moranbah North Mine Standard Operating Procedure MNM.51137.604 LW604 Second Workings	AMN.002.001.0691
Letter of Appointment for Michael Lerch as Underground Mine Manager on 23/08/2018	AMN.002.001.0839
Hazard & Incident Report Form for Moranbah North HPI 20/07/2019	AMN.003.001.0001
Incident Investigation Initial Witness Statement by Tim Miller for Moranbah North HPI 20/07/2019	AMN.003.001.0003
Incident Investigation Initial Witness Statement by Scott Fraser for Moranbah North HPI 20/07/2019	AMN.003.001.0005
Incident Investigation Initial Witness Statement by J Huff for Moranbah North HPI 20/07/2019	AMN.003.001.0007

Days Four and Five – 7 & 10 August 2020 Exhibit List D	
Moranbah North Enablon Task TS.01096536 Started 24/07/2019 - Revise UIS strategy in similar areas to ensure adequate drainage of the GML	AMN.004.001.0001
Presentation by Moranbah North about Methane Exceedance at TG604 in June 2020	AMN.004.001.0003
Moranbah North Enablon Task TS.01096537 Started 24/07/2019 - Revise the degassing and purging procedure to ensure specific to longwall operations	AMN.004.001.0020
Standard Work Guideline for Moranbah North Mine - Degassing of Electrical Enclosures (draft) 52315.SWG	AMN.004.001.0022
Moranbah North Enablon Task TS.01096538 Started 24/07/2019 - Review geotechnical goaf caving around TG 604 with adjacent goaf	AMN.004.001.0028
Excel spreadsheet – Surveying of LW603 and LW604 – Centreline Subsidence 27/07/2019	AMN.004.001.0030
MRE 07/02/2017 - Inspection by IOM Brennan and IOM Brown of Moranbah North Mine	RSH.002.329.0001
MRE 10/08/2017 - Inspection by IOM Marlborough of Moranbah North Mine	RSH.002.331.0001
Substandard Condition or Practice Notice 16/08/2017 by IOM Marlborough to Moranbah North Mine - Review of TARP1_Gas and Atmosphere Management	RSH.002.323.0001
MRE 12/09/2017 - Inspection by IOM Marlborough of Moranbah North Mine	RSH.002.332.0001
MRE 12/09/2017 - DIRECTIVE by IOM Marlborough to Moranbah North Mine	RSH.002.324.0001
MRE 17/07/2019 - Inspection by IOM Sullivan (IOM Atkinson attended presentation) of Moranbah North Mine	RSH.002.167.0001
MRE 17/09/2019 - Inspection by IOM Brownett and IOM Brennan of Moranbah North Mine	RSH.002.168.0001
MRE 01/11/2019 - ISHR Inspection by Stephen Woods at Grasstree Mine	ACM.004.002.0025
MRE 15/11/2019 - s119 Questions from Stephen Woods for Grasstree Mine	ACM.004.002.0029
MRE 22/11/2019 - Response Kelvin Schiefelbein at Grasstree Mine	ACM.003.001.0128

Days Four and Five – 7 & 10 August 2020 Exhibit List D	
MRE 08/12/2019 - ISHR Inspection by Stephen Woods at Grasstree Mine - Notification of Inadequate Safety and Health Management System	ACM.003.001.0061
MRE 18/12/2019 - Letter from Damien Wynn to ISHR Stephen Woods – Response to ISHR Notification of Inadequate Safety and Health Management System	ACM.003.001.0141
MRE 23/12/2019 - Postal Mine Record Entry by IOM Brennan to Grasstree Mine - Notification by ISHR Stephen Woods of Inadequate Safety and Health Management System	RSH.002.084.0001
MRE 24/12/2019 - DIRECTIVE by IOM Brennan to Grasstree Mine – Suspend Operations in Tailgate 910 face roadway – Unacceptable level of risk	RSH.002.085.0001
MRE 02/01/2020 - Postal Mine Record Entry by IOM Brown to Grasstree Mine – Directive 24/12/2019 met – production can resume in 909-910 face roadway single entry panel	RSH.002.086.0001
Letter to all SSE's, ISHRs and SSHRs from Russell Albury 20/08/2015 - Re Participation by ISHRs in Investigations	RSH.002.420.0001
Form 1A for Grasstree Mine HPI 06/04/2020 (1 of 1)	AAMC.001.006.0335
Form 5A for Grasstree Mine HPI 06/04/2020 (1 of 1)	AAMC.001.006.0346
LFI for Moranbah North Mine HPI 20/01/2019	AAMC.001.001.0824
Grasstree Mine ERZ Controller Appointment of Shaun Stingle on 27/08/2018	ACM.002.001.0919
Moranbah North Mine ERZ Controller Appointment of Scott Fraser on 01/03/2019	AMN.002.001.0808
Initial Incident Report for Grasstree HPI on 25/10/2019	ACM.004.001.0024
Statement of Luca Pantano	PLU.001.002.0001
Form 1A for HPI at Oaky Creek on 06/12/2019	RSH.002.418.0001
Form 5A for HPI at Oaky Creek on 06/12/2019	RSH.002.417.0001
Incident Investigation Report by Glencore into HPI on 06/12/2019 at Oaky North Mine	OCH.500.001.0110
Lotus Notes Notification for HPI at Oaky North Mine on 06/12/2019	RSH.002.419.0001
Statement of Michael Downs	DMI.001.002.0001
MRE 19/10/2017 - Inspection (Unannounced) by IOM Poynter of Oaky North Mine	RSH.002.292.0001

Days Four and Five – 7 & 10 August 2020 Exhibit List D	
MRE 19/09/2018 - Inspection by IOM Randolph of Oaky North Mine	RSH.002.295.0001
MRE 19/09/2018 – Postal Mine Record Entry for Oaky North Mine	RSH.002.294.0001
MRE – 19/09/2018 - DIRECTIVE for Oaky North Mine – Excessive Methane Quantities	RSH.002.290.0001
MRE 15/10/2019 – Inspection (Unannounced) by IOM Poynter of Oaky North Mine	RSH.002.350.0001
Glencore Oaky Creek Coal - Procedure - Incident Reporting and Investigation	OCH.505.002.0001
Statement of Joe Barber	BJO.001.001.0001
Statement of Gus Wilson	WGU.001.001.0001

Day Six – 11 August 2020 Exhibit List E	
DOCUMENT	**EXHIBIT NUMBER**
Statement of Richard Harris	HRI.001.001.0001
Email from Damian Wynn, SSE Grasstree Mine to Richard Harris, SSHR on 18/10/2019 responding to Richard Harris submitting SSHR Report	ACM.004.002.0024
Statement of James Hoare	HJI.001.001.0001
SSHR Monthly Inspection Report for Grasstree Mine – March 2020; SSHR J Hoare	ACM.004.002.0009
Email from Damien Wynn, SSE Grasstree Mine to Jim Hoare, SSHR on 23 March 2020 responding to Jim Hoare submitting SSHR Report	ACM.003.002.0012

Day Seven – 12 August 2020 Exhibit List F	
DOCUMENT	**EXHIBIT NUMBER**
Statement of Paul Brown	BPA.001.001.0001
Email from IOM Brown to Kelvin Schiefelbein, Damien Wynn and IOM Smith on 21/03/2020	RSH.002.059.0001
Email from IOM Brown to DCIOM Dobson and IOM Smith on 23/03/2020	RSH.002.061.0001
Coal Inspectorate Weekly Meeting Minutes - 23 March 2020	RSH.002.182.0001
Statement of Mark Lydon	LMA.001.001.0001
Email from Grasstree Mine to IOM Lydon on 12/04/2020	RSH.002.064.0001
Form 1A for Grasstree Mine on 11/04/2020	RSH.002.065.0001
Email from Tim McNally to IOM Lydon (cc: Damien Wynn, Kelvin Schiefelbein, James Moreby, Richard Harris and IOM Smith) on 14/04/2020	RSH.002.066.0001
Email from IOM Lydon to Tim McNally (cc: Damien Wynn, Kelvin Schiefelbein, James Moreby, Richard Harris and IOM Smith) on 14/04/2020	RSH.002.067.0001
Form 5A for Grasstree Mine on 11/04/2020 - Email from DNRME Admin to IOM Lydon on 25/05/2020	RSH.002.068.0001
IOM Lydon notes of notification of HPI by Tim McNally on 12/04/2020 re Grasstree HPI 11/04/2020	RSH.002.069.0001

Day Eight – 13 August 2020 Exhibit List G	
DOCUMENT	**EXHIBIT NUMBER**
Statutory Declaration of Kylie Ah Wong	OCH.507.002.0001
Emails from Luca Pantano to various persons between 18:56 on 06/12/2019 and 10:15 on 08/12/2019	OCH.500.001.0211
Email from Michael Downs, Underground Mine Manager at Oaky North Mine to Joe Barber and others supplying Form 20 confirmation of Oaky North HPI 06/12/2019	OCH.501.001.0001
Oaky North Underground Mine Ventilation Officer Appointment of Luca Pantano on 26/04/2019	OCH.503.001.0003
Oaky Creek North Mine ERZ Controller Appointment of Gus Wilson on 27/08/2017	OCH.503.001.0052
Glencore Oaky Creek Coal Standard STD0950 Standard for Section 55 Management Structure Effective 01/11/2019	OCH.503.001.0055
Glencore Oaky North Underground Procedure SOP0318 Second Workings LW501 Effective 24/10/2019	OCH.503.001.0104
Glencore Coal Assets Australia TAR0007 Longwall Retreat Effective 02/04/2019	OCH.503.001.0157
Glencore Oaky North Underground TAR0895 LW503 Return Roadway Methane Effective 06/01/2018	OCH.503.001.0194
Glencore Oaky North Underground Principal Hazard Management Plan – Methane PHMP – PHMP0001OCN Issued 15/02/2015	OCH.503.001.0303
Glencore Oaky Creek Coal Principal Hazard Management Plan - PHMP0008 Mine Ventilation Effective 09/10/2017	OCH.503.001.0323
Glencore Oaky Creek Coal Principal Hazard Management Plan - PHMP0009 Gas Management Effective 09/10/2017	OCH.503.001.0345
Health and Safety Planning and Control – Health and Safety KPI Index	OCH.504.001.0003
Glencore Coal Assets Australia Regional Asset HSEC Standard 1.0 Leadership, Culture and Accountability Effective 02/06/2016	OCH.504.001.0005
Glencore Coal Assets Australia Regional Asset HSEC Protocol Targeted Visible Leadership Effective 14/12/2017	OCH.504.001.0044
Decision – Application for approval of a single-enterprise agreement - Oaky Creek Coal Pty Ltd [2018] FWCA 2147 – Oaky Creek North Mine Enterprise Agreement 2018	OCH.504.001.0056
Oaky North 2019 Workforce Profile	OCH.504.001.0084

Day Eight – 13 August 2020 Exhibit List G	
Glencore Performance Appraisal and Development Program	OCH.504.001.0100
Glencore How to Guide – Conducting Effective Performance Reviews	OCH.504.001.0132
Glencore Oaky North Supply Contract – PN3147 Belt Installs and Relocations 29/07/2014	OCH.504.001.0152
Glencore Oaky Creek North Amendment Deed – PN3147 Supply of Underground Mining Labour 01/05/2018	OCH.504.001.0316
Glencore Oaky Creek North Supply Contract – PN3148 Secondary Support & General Underground Works (Including Excavations) 21/08/2014	OCH.504.001.0418
Glencore Oaky Creek North Amendment Deed – PN3148 Supply of Underground Mining Labour 30/05/2018	OCH.504.001.0558
Glencore Oaky North Supply Contract – PN3241 Development – Supplementary Labour 12/10/2016	OCH.504.001.0660
Glencore Oaky Creek North Amendment Deed – PN3293 Supply of Underground Mining Labour 01/05/2018	OCH.504.001.0789
Glencore Oaky Creek North Supply Contract – PN3293 Longwall Move 502 to 503 24/10/2017	OCH.504.001.0893
List of labour hire companies that provided supplementary labour at Oaky North Mine during December 2019	OCH.504.001.1027
Glencore Contract Schedule – Blank – Short Term Incentive Program	OCH.504.001.1028
Safecoal Fatal Hazard Protocols – Fires and Explosion	OCH.507.001.0105
2020 Glencore Coal Assets Australia HST Annual Planner Q2 Review	OCH.507.001.0298
Glencore Coal Assets Australia Fatal Hazard Protocols – Operations and Projects Effective April 2017	OCH.507.001.0107
Glencore Coal Assets Australia Regional Asset Finance Standard – Risk Management Effective 22/05/2017	OCH.507.001.0151
Glencore Coal Assets Australia Guideline for GCAA HS Definition Guideline Effective 04/01/2018	OCH.507.001.0252
Glencore Coal Assets Australia Regional Asset HSEC Protocol – Catastrophic Hazards Effective 15/03/2018	OCH.507.001.0208
Glencore Coal Assets Australia Regional Asset HSEC Standard – 6.0 Incident Effective 18/06/2018	OCH.507.001.0176
Glencore Coal Assets Australia HSEC Procedure – Incident Investigation Effective 27/06/2018	OCH.507.001.0283

Day Eight – 13 August 2020 Exhibit List G	
EM XPAD KRA Summary – 2019 Full Year Scorecard	OCH.504.001.0001

Day Nine – 17 August 2020 Exhibit List H	
DOCUMENT	**EXHIBIT NUMBER**
Tyler Mitchelson Statement dated 28/07/2020	MTY.001.002.0001
Group Technical Standard for the Prevention of Fires – March 2020a	AAMC.001.015.0001
Operation Risk Management Procedure for Baseline or Full Site Risk Assessment Version Three 30/11/2013	AAMC.001.028.0101
MET Coal EOF Plan 2020 and Road Map To 2024 – January 2020	AAMC.001.029.0028
Met Coal - Safety and Health Monthly Report Presentation June 2020	AAMC.001.031.0044
Anglo American Metallurgical Coal - Business Transformation – MCLT Note 04/06/2019	AAMC.001.031.0142
Gas and Strata Management System and Organizational Design for MG Complex	AAMC.001.031.0147
Long Wall Move Optimisation 26/02/2020	AAMC.001.031.0152
Moranbah North and Grosvenor Maintenance Strategy and Tactics 25/02/2020	AAMC.001.031.0155
GRO-8-PHMP Principal Hazard Management Plan (Explosions) Version Five –02/08/2018	AGM.002.001.0385
Grosvenor Coal Mine Underground Operations PLN – Grosvenor Mine Overview Plan 11/11/2015	AGM.002.001.0818
GRO-9637-REG Grosvenor Coal Mine Critical Control Register	AGM.003.001.0830
Met Coal 2019 Bonus Outcomes Scorecard Calibration Dashboard	AGM.003.002.0080
Labour Hire Agreement with One Key	AGM.003.004.0001
Re-imagining Incentives in Support of Our Burning Ambitions – Employee Briefing	AGM.003.004.0985
One Key Resources Performance Incentive Scheme – December 2019	AGM.003.004.1108
Procedure – Incident Reporting and Investigation Version 20 08/07/2020	AGM.005.001.0499
Moranbah North, Grosvenor and Grasstree Gas Management Workshop 01/10/2019	AAMC.001.029.0016
Grosvenor Incentive Scheme – Bonus Spreadsheet February 2020	AGM.003.005.0001
Grosvenor Incentive Scheme – Bonus Spreadsheet April 2020	AGM.003.005.0002

Day Nine – 17 August 2020 Exhibit List H	
Grosvenor Mine Elimination of Fatalities Plan 2020	AAMC.001.017.0023
Form 1A for HPI that occurred at Grasstree Mine on 08/05/2019	RSH.002.422.0001
Anglo American Group Technical Standards – Met Coal Champions	AAMC.001.028.0140
Anglo American Elimination of Fatalities 2020 Plan – Met Coal	AAMC.001.004.1495

Day Ten – 18 August 2020 Exhibit List I	
DOCUMENT	**EXHIBIT NUMBER**
Statement of Tyler Michelson dated 28/07/2020	MTY.001.002.0001
Statement of Warwick Jones dated 28/07/2020	AAMC.001.036.0001
Anglo American Consequence Model	AAMC.001.040.0037
Anglo American Metallurgical Coal Document #5-32 Mine Training and Competence Scheme, Issued 12/09/2018	AAMC.001.039.0119
Individual Training Records dated 14/08/2020	AAMC.001.039.0098
Document supplied by Anglo American showing compiled figures about the number of employees and contractors and their roles and lengths of employment for Grosvenor, Grasstree and Moranbah North Mines as at May 2020	AAMC.001.039.0116

Day Eleven – 19 August 2020 Exhibit List J	
DOCUMENT	**EXHIBIT NUMBER**
Elimination of Fatalities Verification (EOFV) Summary Report – Grasstree Operations (GTR) 04/02/2020	AAMC.001.005.0186
Grasstree Mine Management Operating System	ACM.006.001.0055
Statutory Compliance Audit/Review of the Safety and Health Management System Grasstree Mine November 2019	AAMC.001.005.0505
"Report on a number of matters with regard to the Board of Inquiry Investigation into the methane incident at the Anglo American Grosvenor Mine at Moranbah on 6 May 2020 and related matters" by Emeritus Professor Michael Quinlan	BOI.001.004.0001
Statement of Emeritus Professor Michael Quinlan dated 18/08/2020	QMI.001.001.0001
Report for Ashurst Analysis of Gas Exceedances at Anglo Moranbah North and Grasstree Mines	TGA.001.001.0001
List of documents relied upon by Gavin Taylor	TGA.001.002.0001

Day Twelve – 20 August 2020 Exhibit List K	
DOCUMENT	**EXHIBIT NUMBER**
Statement of John Sleigh dated 09/08/2020	SLJ.001.001.0001
Qualifications of John Sleigh (undated)	SLJ.001.002.0001
Resume of John Sleigh (undated)	SLJ.001.003.0001
Annual Report Board of Examiners 01/07/2018 - 30/06/2019	MMA.001.001.013.0001
Competencies Recognised by the Coal Mining Safety and Health Advisory Committee	MMA.001.001.017.0001
Document prepared by John Sleigh - Example of typical standard 11 questions from recent experience	MMA.001.001.021.0001
Peter Newman - statutory declaration dated 20/08/2020	NPE.001.002.0001

Day Thirteen - 21 August 2020 - Exhibit List L	
DOCUMENT	**EXHIBIT NUMBER**
Statement of Gregory Alan Dalliston dated 16/08/2020	DGR.001.001.0001
Statement of Ben Hudson Lewis dated 20/08/2020	LBE.001.001.0001
FES Coal Greenfield Agreement 2018	AAMC.001.011.0155
Site Safety Audit – One Key Resources	OKR.003.017.0001
Contractor obligations under s43 – One Key Resources	OKR.003.003.0001
RECS (Qld) Pty Ltd Enterprise Agreement 2015	CMU.003.003.0001
Ben Lewis Statement in Fair Work Commission matter dated 22/02/2017	CMU.004.004.0001
Ben Lewis Statement in Fair Work Commission matter dated 21/03/2017	CMU.005.005.0001
Black Coal Mining Industry Award 2010	CMU.006.006.0001

Party Code Index

Party Code	Party Name
Organisations & Entities	
BOI	Board of Inquiry
RSH	Resources Safety and Health Queensland
AAMC	Anglo American Metallurgical Coal
ACM	Anglo Coal (Capcoal Management) Pty Ltd
AMN	Anglo Coal (Moranbah North Management) Pty Ltd
AGM	Anglo Coal (Grosvenor Management) Pty Ltd
OCH	Oaky Creek Holdings Pty Ltd
OKR	One Key Resources
CMU	CFMMEU
MMA	Mine Managers Association of Australia Incorporated (MMAA)
Individuals	
SMA	Mark Stone
NPE	Peter Newman
SST	Stephen Smith
HLJ	Jason Hill
WST	Stephen Woods
NOP	Peter Noton
PLU	Luca Pantano
DMI	Michael Downs
BJO	Joe Barber
WGU	Gus Wilson
HRI	Richard Harris
HJI	James Hoare
BPA	Paul Brown
LMA	Mark Lydon
MTY	Tyler Mitchelson
QMI	Professor Michael Quinlan
TGA	Gavin Taylor

SLJ	John Sleigh
DGR	Greg Dalliston
LBE	Ben Lewis

Appendix 11 – Additional documents referenced

This table contains documents referenced in the Report that were not tendered and admitted as Exhibits in the Inquiry hearings to date.

DOCUMENTS PROVIDED TO THE BOARD	
DOCUMENT NAME	**DOCUMENT ID**
ACILTasman, New Horizon Consulting Pty Ltd, Shaw Idea Pty Ltd – Final Report on the Queensland Mines Inspectorate Review – 2 March 2005	OCH.508.001.0001
Preliminary Briefing Paper from Anglo to Counsel Assisting the Board of Inquiry – 12 July 2020	AAMC.100.002.0001
AngloAmerican Capcoal Underground Grasstree Mine Hazard and Incident Management Plan	ACM.006.001.0012
Regulatory Reform Review – Report for NSW Department of Industry, Mine Safety – December 2016	OCH.508.001.0457
Oaky North Underground Mine CMO Report – Ch4 Spike at MG105 TG Drive 6 December 2019	OCH.500.001.0122
Statutory Declaration of Keith Brennan, Inspector of Mines – 24 July 2020	BKE.001.001.0001
Mine Record Entry – Moranbah North – Inspection by Keith Brennan and Malcolm Brownett - 17 September 2019	RSH.002.168.0001
AngloAmerican Metallurgical Coal Bulks Seminar & Site Visit – Tyler Mitchelson, CEO – 12 November 2019	AAMC.001.006.0504
AngloAmerican Safety, Health and Environment (SHE) Policy	AAMC.001.005.0092
AngloAmerican Safety, Health and Environment (SHE) Way	AAMC.001.005.0093
AngloAmerican Grosvenor Coal Mine – Procedure – Incident Reporting and Investigation	AGM.005.002.0484
AngloAmerican Grasstree Monthly Performance Review – Review of July 2019	AAMC.001.005.1274
Mine Record Entry – Moranbah North – Inspection by Keith Brennan – 18 January 2015	RSH.997.075.0001

SUBMISSIONS BY PARTIES TO THE INQUIRY	
DOCUMENT NAME	**DOCUMENT ID**
Interim Written Submissions on behalf of Resources Safety and Health Queensland – 1 September 2020	RSH.999.001.0001
Submissions of the CFMMEU and ISHRs – First Tranche – 1 September 2020	CMU.008.008.0001
Glencore Coal Assets Australia – Submissions in response to draft chapters 4, 5 and 6	N/A
Anglo American Metallurgical Coal – Submissions in response to draft chapters 2 and 5	N/A
Queensland Mines Rescue Service – Submission in response to partial draft of chapter 5	N/A

Appendix 12 – Acknowledgements

The Board would like to thank the following people whom have assisted in the Inquiry's work to date:

- His Honour Judge Terry Gardiner, Chief Magistrate, for allowing the Board to use the Brisbane Magistrates Court to conduct public hearings.
- Mr James Purtill, Director-General of the Department of Natural Resources, Mines and Energy as head of the former administering agency for the Inquiry.
- Mr Mark Stone, Chief Executive Officer, Resources Safety and Health Queensland and his team as the ongoing administering agency for the Inquiry.
- Ms Trudy Abrahams, Ms Isabella Young, Mr Mijo Brdjanovic and Ms Natalie Coker of Queensland Courts who have supported and continue to support the Board in the provision of courtroom facilities and technologies required during public hearings.
- Those organisations and individuals who responded to the calls for information.
- The chief executive officers and supervisors of government agencies who approved the release of their staff to work in the Inquiry team. These agencies include the Department of Natural Resources, Mines and Energy, Department of Environment and Science and the Department of Justice and Attorney-General.
- Isaac Regional Council Mayor Anne Baker and Chief Executive Officer, Mr Gary Stevenson PSM for meeting with the Board during their Moranbah trip in October 2020.
- Company Secretary, Mr John Fordyce and General Manager Mr Steven Boxall, at the Resources Centre of Excellence in Mackay, for facilitating a tour of the facility for the Board and Inquiry team.
- The service providers and third party vendors that have utilised their experience and knowledge to provide useful services to support the Inquiry to date, include:
    - EPIQ Australia Pty Ltd – Mr Jason Woolridge and his team for the provision of the online document management system and enabling the electronic document display during the hearings. Also, Ms Kathy Robertson and Ms Sally Hicks for their transcription services.
    - Corrivium Pty Ltd – Mr Steve Jones, Mr Mark Cheney and Mr Paul Tierney who enabled the broadcasting of the first tranche of public hearings.
    - Creative Curiosity – for providing web hosting, publishing and creative services.
    - Law Image Services (Aust) Pty Ltd – for printing and copying services.

Queensland Coal Mining

Board of Inquiry

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