Commissioner for Mine Safety and Health

Annual performance report 2019–20

Commissioner for
Resources Safety & Health

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29 October 2020

The Honourable Dr Anthony Lynham MP
Minister for Natural Resources, Mines and Energy
1 William Street
Brisbane Qld 4000

Dear Minister

In accordance with section 73E(1) of the *Coal Mining Safety and Health Act 1999*[1], I am pleased to submit to you the Commissioner for Mine Safety and Health's annual report on the performance of the Department of Natural Resources, Mines and Energy in regulating mine safety for the year ending 30 June 2020.

Yours sincerely

Kate du Preez
Commissioner for Resources Safety and Health[2]

[1] As current on 30 June 2020.

[2] The *Coal Mining Safety and Health Act 1999* was amended on 1 July 2020. The role of Commissioner for Mine Safety and Health ceased and the role of Commissioner for Resources Safety and Health commenced.

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BACKGROUND

The office of the Commissioner for Mine Safety and Health was established under the *Coal Mining Safety and Health Act 1999* and the relevant provisions commenced under this Act and the *Mining and Quarrying Safety and Health Act 1999* on 1 July 2009.

The functions of the Commissioner for Mine Safety and Health were to:

- advise the Minister for Natural Resources, Mines and Energy on mine safety and health matters generally
- fulfil the roles of chair of the Coal Mining Safety and Health Advisory Committee under the *Coal Mining Safety and Health Act 1999* and chair of the Mining Safety and Health Advisory Committee under the *Mining and Quarrying Safety and Health Act 1999*
- monitor and report to the Minister for Natural Resources, Mines and Energy and to the Queensland Parliament on the administration of provisions about safety and health under the *Coal Mining Safety and Health Act 1999* and the *Mining and Quarrying Safety and Health Act 1999*
- perform the functions given to the Commissioner under the provisions of the *Coal Mining Safety and Health Act 1999* and the *Mining and Quarrying Safety and Health Act 1999*.

In addition, the Commissioner was required under section 73E(1) of the *Coal Mining Safety and Health Act 1999* to provide a report to the Minister for Natural Resources, Mines and Energy on the performance of the Department of Natural Resources, Mines and Energy in regulating mine safety.[3]

The Queensland Mines Inspectorate formed part of the Resources Safety and Health division of the department and was primarily responsible for enforcing the provisions of the *Coal Mining Safety and Health Act 1999*, Coal Mining Safety and Health Regulation 2017,[4] *Mining and Quarrying Safety and Health Act 1999* and Mining and Quarrying Safety and Health Regulation 2017.[5] The inspectorate also advised, mentored and educated the mining industry about safety and health. The Occupational Health and Hygiene and Simtars business units of Resources Safety and Health were also responsible for enforcing certain aspects of the mine safety and health legislative framework.

The activities of the department in the regulation of safety and health in the mining industry for 2019–20 are summarised in the body of this report. In addition, information on the operations of the Board of Examiners, the advisory committees and more comprehensive mining industry safety and health information can be obtained in the following reports:

- Board of Examiners annual report
- Coal Mining Safety and Health Advisory Committee annual report
- Mining Safety and Health Advisory Committee annual report
- Queensland Mines and Quarries Safety Performance and Health report
- Department of Natural Resources, Mines and Energy annual report.

[3] Although the role of Commissioner for Mine Safety and Health has ceased, and the responsibility for providing an annual report on the performance of the department in regulating mine safety and health is not a responsibility of the Commissioner for Resources Safety and Health, the commissioner decided it was necessary to complete an annual report to maintain accountability and inform the Parliament about the performance of the department in 2019–20 as per the legislative requirement prior to 1 July 2020.

[4] Including the 21 recognised standards published on the Business Queensland website at www.business.qld.gov.au

[5] Including the 3 guidelines published on the Business Queensland website at www.business.qld.gov.au

These reports can be downloaded from the Queensland Government publications website at www.publications.qld.gov.au.

From 1 July 2020 under the *Resources Safety and Health Queensland Act 2020*, the Commissioner for Mine Safety and Health ceased and the role of Commissioner for Resources Safety and Health commenced. In addition, the regulator has moved from a part of the Department of Natural Resources, Mines and Energy into a fully independent statutory body—Resources Safety and Health Queensland.

Data used in this report

The information in this report is sourced primarily from data returns submitted by mine and quarry operators. Data is collected in accordance with sections 198 and 279 of the *Coal Mining Safety and Health Act 1999* and the *Mining and Quarrying Safety and Health Act 1999*. The data collection is approved by the Chief Inspector of Mines under section 281 and 261 of the legislation. Due to publication deadlines, information received by Resources Safety and Health Queensland on or before 31 August 2020 is included in the report. As a result, there may be minor changes in data reported for previous years.

FROM THE COMMISSIONER

In 2019–20, the Queensland mining community was once again in mourning. Three men went to work at coal mines in Queensland and did not come home. I would like to express my most sincere sympathies to the families, friends and colleagues of these men. Every person who goes to work should be able to return home in the same condition in which they left.

The coal mining industry also came the closest to a major disaster since Moura No. 2 in 1994 when, on 6 May 2020, five men at Grosvenor mine experienced significant burns as a result of a methane gas ignition.

This incident was preceded by multiple methane management incidents at Grosvenor mine and other Queensland mines and led the Minister for Natural Resources, Mines and Energy to establish a Board of Inquiry to investigate why these incidents occurred.

I wish I could say that these were isolated, one-off incidents which could not have been predicted or prevented. However, as explained by Dr Sean Brady in his recent *Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019*,[6] this is not the case.

According to Dr Brady:

> *…unless the mining industry makes significant changes to how it operates, the fatality and serious accident frequency rates are likely to continue at, or exceed, current levels.*

One of the most concerning findings of Dr Brady's report was the number of incidents which involved identified hazards with inadequate or non-existent critical controls, and the number of incidents which happened after previous near misses; where warning signs appear to have been missed or not communicated effectively.

In addition, the recommendations about improving access to mine safety information and actively seeking information on how well critical controls are working are not new concepts. In fact, they build on recommendations from many previous incidents which have been explored and discussed at industry conferences, seminars and workshops for decades.

This should not be happening.

Mine fatalities

I am deeply saddened to report that three coal mine workers lost their lives while working at a Queensland coal mine in 2019–20. This comes after five men lost their lives in 2018–19.

On 7 July 2019, Mr Jack Gerdes, a 27 year old excavator operator, was fatally injured at Baralaba coal mine when he became entangled in the stairs of the excavator he was operating.

On 25 November 2019, Mr Bradley Duxbury, a 57 year old electrician, was fatally injured at Carborough Downs coal mine when coal fell from a longwall face.

On 12 January 2020, Mr Donald Rabbitt, a 33 year old tyre fitter, was fatally injured at Curragh coal mine when an earthmoving tyre fell on him during the process of removing the tyre.

[6] https://www.parliament.qld.gov.au/documents/tableOffice/TabledPapers/2020/5620T197.pdf

Over the past 12 months, the Queensland Mines Inspectorate has supported a range of initiatives which have been aimed at arresting the rise in the number and frequency of serious accidents across coal mines and mineral mines and quarries and improving the underlying safety culture.

The Minister's industry-wide *Safety Reset* program brought a direct focus on ensuring that every person working at a mine or quarry, regardless of their role or position in the hierarchy, understands their safety and health obligations and the importance of a positive safety culture. The Safety Reset program was an important starting point for the industry in realigning its approach to safety and health and was widely regarded as a successful initiative.

The inspectorate has continued to refine its compliance and enforcement program to intentionally focus on the most serious harms. It has either met or exceeded its targets for inspections and audits across coal mines and mineral mines and quarries, while the number of in-depth investigations it has conducted continues to rise. This increase has occurred in spite of the disruptions caused by COVID–19.

Combined industry and regulator initiatives have had a positive impact on safety and health outcomes in the industry with the serious accident frequency rate falling for the first time since 2014–15. Positively, this has been accompanied by a rise in the high potential incident rate, indicating efforts to improve the reporting culture of the industry have had an effect.

These improvements are encouraging, but unless industry stakeholders embed the recognised cultural changes, I am concerned they will lose momentum and return to a fatality cycle which has been evident over the past 20 years.

An example of how cultural change can positively impact safety and health outcomes has been the government, union and employer response to mine dust lung diseases. The inspectorate and industry have successfully implemented strategies and programs to change the culture and attitude towards dust and to minimise the exposure of mine workers to hazardous levels of mine dust. Average exposure levels for both coal dust and respirable crystalline silica have continued to remain well below the workplace exposure limit and exceedances have also remained low. In 2019–20, the focus of these initiatives has been expanded to take a broader view of airborne hazards, providing better protection for workers.

In addition, the programs which have been implemented to detect signs of mine dust lung disease in coal mine workers have been expanded and made available to current and former mineral mine and quarry workers, ensuring that all mine and quarry workers in Queensland have access to world-class health surveillance programs that can detect signs of mine dust lung disease early and improve outcomes for those workers who are affected.

The introduction in March 2020 of the Mine Dust Health Support Service, a collaboration between the Department of Natural Resources, Mines and Energy, the Office of Industrial Relations and WorkCover Queensland, to provide access to counselling services and guidance regarding health screening, community support and compensation entitlements is a welcome addition to supporting former and current workers and their families.

In the same way the 2017 Coal Workers' Pneumoconiosis Select Committee report marked a new era for the industry and the regulator when it came to recognising the health hazard posed by mine dust, I believe the Brady report signals a new era for the industry regarding safety culture.

One of the significant challenges for the regulator and the industry in 2020–21 and beyond will be taking the key recommendations of the Brady report and embedding them into everyday practice. The move towards high reliability organisation theory will require all stakeholders to think differently and challenge existing practices and ideas that have become entrenched.

I believe the industry already has the necessary skills, experience and commitment to make this transition. Much of the industry is already on a journey towards adopting high reliability organisation characteristics.

It is important to ensure that the industry and regulator stay committed and develop the necessary culture to make the journey together to ensure mine workers return home safe and healthy.

Dr Brady's review tells the story of the industry's recent history. It is sometimes confronting because it shines a light on the failures. However, I see it as a bright point because it serves as a catalyst for change. Its true value is that it has generated the necessary conversations about how the government, unions and employers can work together to write the story about what the mining industry can be in the future.

Kate du Preez
Commissioner for Resources Safety and Health

> *"A senseless tragedy remains forever tragic, but it is up to us whether it remains forever senseless."*
>
> *— Robert Breault*

About the Commissioner

Kate du Preez is the Queensland Commissioner for Mine Safety and Health. The role of Commissioner is a public service officer appointed by the Governor in Council and employed under the *Public Service Act 2008*. She is the first independent Commissioner and the first woman to be appointed to the role.

Mrs du Preez has more than 20 years of experience in the mining industry across Africa and Australia, including working in underground coal mines and in management positions. She holds a Bachelor of Science in Mining Engineering and was the first woman in South Africa to hold a mine manager's certificate of competency in coal mining. As a miner herself, Mrs du Preez is passionate about the mining industry and is a strong advocate for mining safety and health issues.

INDUSTRY OVERVIEW

All mines and quarries in Queensland are required to implement a safety and health management system[7] that accounts for the risks involved in the operation of that mine or quarry. The system must also include strategies that mitigate those risks to a level that is both within acceptable limits and as low as reasonably achievable.

In most cases, these systems and processes are effective and protect the majority of workers. However, there are still too many incidents where identified hazards with known controls are the cause of injury or fatality.

In 2019–20, the Queensland coal mining industry experienced three fatalities. There were no fatalities at mineral mines or quarries. The industry saw an overall fall in the serious accident frequency rate from 1.0 serious accidents per million hours worked in 2018–19 to 0.7 in 2019–20. While it is encouraging to see a reduction in the frequency of serious accidents, the improvements must be sustained over the long term.

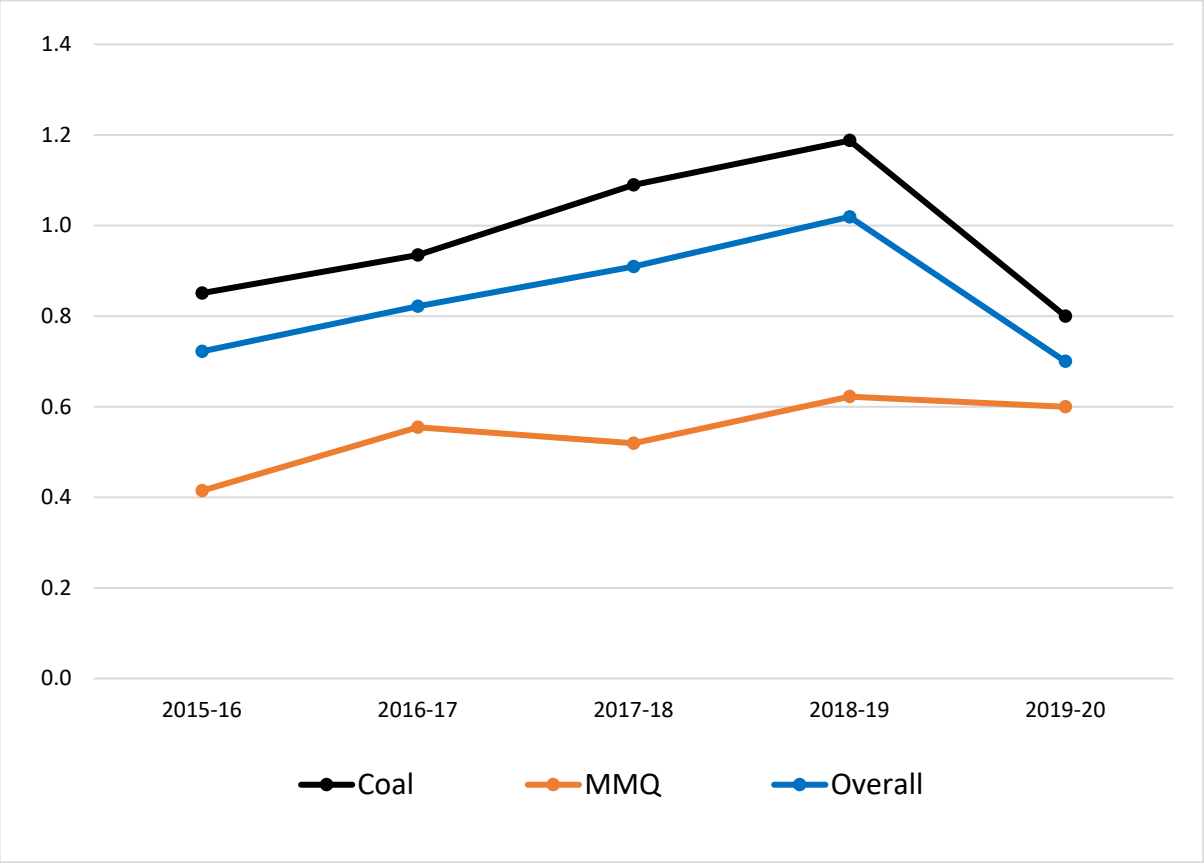

Figure 1: Serious accident frequency rate (serious accidents per million hours worked) 2015–16 to 2019–20

[7] Subsection (1)(c) to (f) and (h)(i) does not apply to a site senior executive of a mine that is an opal or gem mine, if no more than 4 workers are employed at the mine

Under Queensland's mining safety and health legislation, a serious accident is defined as an accident at a mine or quarry that causes the death of a person or for a person to be admitted to a hospital as an in-patient for treatment for the injury. The serious accident frequency rate is one of a number of measures used to determine safety performance in the industry. However, due to the specific definition of serious accident, it can be seen as an accurate measure of safety performance in the industry.

Another key measure for the mining industry is high potential incidents. Under Queensland legislation, a high potential incident 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. High potential incidents are often a lead indicator and, in 2019–20, 96 per cent of high potential incidents did not involve an injury to any worker.

In his recent review of fatalities and serious accidents in the Queensland mining and quarrying industry, Dr Sean Brady advised that the regulator should not use high potential incidents as a measure of safety performance, rather they should be used as a measure of the health of the safety and reporting culture of the industry:

> *High potential incident reporting should be encouraged in order to better ensure early warning signals of impending incidents and fatalities are captured and disseminated to the wider industry. This provides the best opportunity to identify hazards before they cause harm and ensure they are effectively controlled.*

Dr Brady advised that the honest and accurate reporting of high potential incidents by the wider industry, and the encouragement to do so, should be of paramount importance.

The high potential incident frequency rate for 2019–20 rose slightly to 20.3 incidents per million hours worked, up from 19.6 incidents per million hours worked in 2018–19. This increase could be attributed to the improvements in safety culture brought about by the strong industry response to the Minister's Safety Reset program. These Safety Reset sessions were attended by workers, operators, regulators and union officials and were an opportunity for all stakeholders to openly discuss safety issues and concerns and to recommit to a positive safety culture. The Safety Reset program was a crucial first step in refocusing the industry's attention to what should be everyone's number one priority; the safety and health of workers.

Industry performance at a glance

Table 1: Industry key performance measures 2019–20

All mine types		
	2019–20	**2018–19**
Fatalities	3	5
Serious accidents	84	110
Serious accident frequency rate (per million hours worked)	0.7	1.0
Number of high potential incidents	2288	2117
High potential incident frequency rate (per million hours worked)	20.3	19.6

Coal mines			Mineral mines and quarries		
	2019–20	**2018–19**		**2019–20**	**2018–19**
Fatalities	3	3	Fatalities	0	2
Serious accidents	64	90	Serious accidents	20	20
Serious accident frequency rate (per million hours worked)	0.8	1.2	Serious accident frequency rate (per million hours worked)	0.6	0.6
Number of high potential incidents	1877	1726	Number of high potential incidents	411	391
High potential incident frequency rate	23.2	22.8	High potential incident frequency rate	13.0	12.2

Number of workers

As at 30 June 2020, there were a total of 52,769 people employed in the coal mining and mineral mining and quarrying industries:[8]

- 38,655 in coal mines
- 12,496 in minerals mines
- 1618 in quarries.

These workers were distributed across:

- 52 surface coal mines
- 12 underground coal mines
- 163 surface mineral mines
- 22 underground mineral mines
- 212 quarries.

Types of workers

Typically, mine and quarry workers have been split into two major categories—employees and contractors. However, the definition of *contractor* has become quite complex in recent years and includes a range of workers who are employed under very different circumstances.

The term contractor includes:

- specialist contractors—those who perform specific or specialised tasks
- labour hire workers—workers employed by a labour hire company to perform mining operations
- contractors operating mines—when an entire mine is operated by a contracting company on behalf of the mine owner.

It is important that each industry group is recognised as distinct to ensure a more thorough analysis of safety and health data and to understand whether some groups are at higher risk.

Safety reset

In the wake of multiple mining and quarrying fatalities and in recognition of the need to refocus industry's attention on improving safety culture, the Minister called for a Safety Reset program to be held in July and August 2019 across the entire coal mining and mineral mining and quarrying industries.

The objective of the Safety Reset was to facilitate safety discussions between management, operational staff and union representatives to help to improve safety outcomes.

In total, more than 52,000 mine and quarry workers participated in 1197 Safety Reset sessions (more than 95 per cent of the total workforce). Participants included mine and quarry workers, senior mine and quarry management, union representatives and mines inspectors.

The Department of Natural Resources, Mines and Energy conducted an online survey and targeted telephone interviews with industry stakeholders and Safety Reset attendees to assess the Safety Reset initiative and to inform further actions.

Respondents raised four main themes in relation to the Safety Reset initiative:

- the importance of leadership in addressing safety issues and the impact this had on safety culture
- the impact of workforce casualisation and the importance of an experienced, well-trained and permanent workforce in improving safety culture
- the need for improved quality of training and more frequent training
- the need for more clearly defined, standardised and simplified processes, policies and procedures.

[8] https://www.business.qld.gov.au/industries/mining-energy-water/resources/safety-health/mining/accidents-incidents-reports/safety-performance

Other notable themes included:

- concerns that safety issues could not be raised without fear of reprisal
- a focus on production over safety
- a desire for greater enforcement of existing laws and regulations including more unannounced site inspections and more independent monitoring of mine operations
- environmental hazards that impact workers' health.

Stakeholder feedback reflected general satisfaction with the Safety Reset program. Many attendees reported that the initiative had an ongoing positive impact on the safety culture at their workplace and that practical changes had been implemented as a result of the sessions.

Figure 2: Images from Safety Reset sessions

PERFORMANCE OF THE QUEENSLAND MINES INSPECTORATE

The Queensland Mines Inspectorate is part of the Resources Safety and Health division in the Department of Natural Resources, Mines and Energy.

Mines inspectors are statutory officers appointed under the *Coal Mining Safety and Health Act 1999* and the *Mining and Quarrying Safety and Health Act 1999*. Inspectors are responsible for:

- monitoring safety and health performance at mines
- taking action if unsafe practices or conditions are detected
- investigating incidents and complaints
- providing advice to the chief inspectors regarding mine safety and health
- making recommendations to the Commissioner about prosecutions.

Inspectors have specific powers under the respective Acts to:

- enter workplaces and other places
- apply for, and execute, warrants
- seize or restrict access to evidence
- stop and secure plant and equipment
- obtain information.

The inspectorate employs two chief inspectors—Chief Inspector, Coal and Chief Inspector, Mineral Mines and Quarries—who have additional powers to give directives and to review and confirm, vary, or set aside directives given by inspectors, inspection officers or industry safety and health representatives. The chief inspectors may delegate their powers to issue directives to an inspector who is appropriately qualified and experienced.

Compliance and enforcement

The inspectorate undertakes a variety of compliance activities, including inspections and investigations of complaints and incidents.

The inspectorate monitors industry to ensure sites meet their legislated obligations, ensuring that the risk of injury or illness resulting from operations is at an acceptable level. Inspectorate activities include inspections and audits, as well as engagement via industry forums, site senior executive meetings and other activities which provide obligation holders with the support, guidance and information necessary to discharge their safety and health obligations.

In instances of non-compliance, the inspectorate has a range of compliance tools that may be used:

- A substandard conditions or practices notice can be issued requesting that particular actions be taken within a specified timeframe to address an issue of non-compliance at a mine.
- A directive may be issued, which is a statutory, enforceable requirement to a mine to take particular action within a specified timeframe. Directives remain in force at the operation they were issued to unless withdrawn in writing.
- The suspension or cancellation of certificates of competency.
- Prosecution can be used if the public interest requires a punitive response to non-compliance.

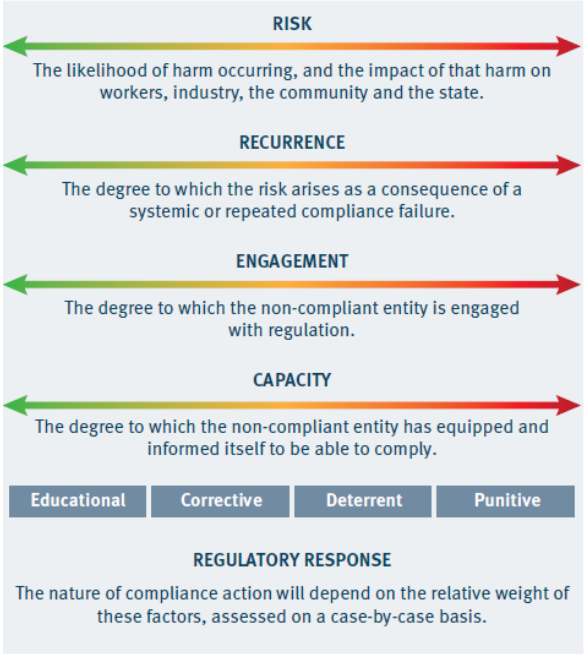

Figure 3: Factors considered when making a decision regarding regulatory action[9]

The inspectorate determines the most appropriate course of action on a case-by-case basis.

In making decisions, the inspectorate considers a number of factors as outlined in Figure 3.

In all cases of compliance, the inspector will make an entry on the mine record of the issue and action to be taken by the mine.

About inspections, audits and investigations

Inspections are typically undertaken by a single inspector and are focused on a particular hazard, activity, topic or work area. An inspection is usually completed in a single day but requires planning and follow-up action.

All inspections are planned, but may be either announced or unannounced, depending on the inspection's focus. The inspectorate aims for 10–20 per cent of inspections to be unannounced, based on good regulatory practice. The actual number of unannounced inspections is driven by an assessment of current activities and risks in the sector.

Audits are in-depth reviews of safety and health management systems, risk management plans and procedures, and their implementation. They can involve reviewing large volumes of information and discussions with site personnel over a number of days.

The proportion of inspections and audits varies from sector to sector. For example, in the mineral mines and quarries sector, where the inspectorate regulates thousands of smaller operations like quarries and small-scale mines, inspections take up the larger part of the compliance program. For larger coal mining operations involving complex safety systems, both inspections and audits are used.

Complaint investigations are undertaken when the inspectorate receives information about an alleged breach of the law or potential danger to workers. Complaints should generally be raised first at site with supervisors or site safety and health representatives. If not properly addressed in the workplace, an inspector will log the complaint and conduct an investigation, which could involve a site inspection. The complaint process is confidential and the results are provided to the complainant once completed.

[9] Department of Natural Resources, Mines and Energy Resources Safety and Health Compliance Policy, September 2018

Compliance program in 2019–20

The inspectorate's inspection and audit program is risk-based and is focussed on matters of highest safety and health impact—including principal hazards. Inspectors consider the site's ability to manage risk, industry trends and performance, confidential complaints and prior regulatory action taken. As a result, the inspectorate's compliance program varies over time depending on the prevalent industry or site conditions.

Inspections and audits are fundamental to the inspectorate's compliance program and help drive the Queensland resources sector towards the vision of *Zero Serious Harm*. The effectiveness of the program is a result of in-depth examination of the plans, systems and procedures in place to manage hazards. During inspections and audits, if inspectors find risk is not being effectively managed, they can issue notices and directives requiring sites to improve or even stop work until it can be resumed safely. The program provides important safety and health information which is shared with industry stakeholders and used to continuously improve regulatory work.

The inspectorate investigates all fatalities and certain serious accidents, complaints and high potential incidents. As part of the investigation process, the inspectorate completes a nature and cause investigation to allow industry and the regulator to learn from incidents by considering the underlying factors that may have contributed to the incident.

In 2019–20, the inspectorate conducted 1419 mine inspections, 103 audits and 122 investigations, and received 188 complaints. The inspectorate also issued 997 substandard conditions or practice notices, 368 directives, 11 safety alerts and 3 safety bulletins, and held 3 compliance meetings (Table 2–Table 9).

In 2019–20, the inspectorate exceeded its planned number of inspections and audits across coal mines and mineral mines and quarries. It is important to note that while the regulator sets annual targets for proactive activities such as inspections and audits, and makes assumptions about the number of complaints and incidents to be investigated, it must remain flexible to changes in industry performance which may necessitate a change in the mix of regulatory activity. An example of this is the requirement to prioritise the investigation of fatalities and serious accidents over routine inspections and other activities.

In addition, the number of in-depth investigations conducted by the inspectorate increased by 64 per cent over the past three years and, prompted by the improved safety and reporting culture generated by the Safety Reset program, the number of complaints received increased by 70 per cent.

Mine inspections

Table 2: Mine inspections conducted in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	445	365	390
Mineral mines and quarries	974	962	986
Total	1419	1327	1376

Mine audits

Table 3: Mine audits conducted in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	96	60	42
Mineral mines and quarries	7	7	23
Total	103	67	65

Investigations

Table 4: Investigations conducted in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	67	74	45
Mineral mines and quarries	65	49	41
Total	122	123	86

Complaints received

Table 5: Complaints received in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	95	52	54
Mineral mines and quarries	84	50	49
Other—no mine involved	9	2	4
Total	188	104	107

Substandard conditions or practices notices

Table 6: Substandard conditions or practices notices issued in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	337	303	241
Mineral mines and quarries	660	836	623
Total	997	1139	864

Directives

Table 7: Directives issued in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	140	144	147
Mineral mines and quarries	228	291	303
Total	368	435	450

Compliance action

Table 8: Compliance action in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	0	3	26
Mineral mines and quarries	3	6	3
Total	3	9	29

Suspended operations[10]

Table 9: Number of operations, or part of, suspended in 2019–20 (compared to 2018–19 and 2017–18)

	2019–20	2018–19	2017–18
Coal mines	34	13	25
Mineral mines and quarries	65	72	67
Total	99	85	92

[10] If an inspector, inspection officer or industry safety and health representative believes risk from mining operations is not at an acceptable level, they may give a directive to any person to suspend operations in all or part of the mine.

Safety alerts

In 2019–20, the inspectorate issued 11 safety alerts on a range of issues. This is compared to 10 in 2018–19 and 10 in 2017–18.

Safety alerts are short reports that provide an examination of safety and health incidents at mines in relation to specific incidents. They are issued to all mines and are published on the department's website. Alerts provide recommendations for mines to help reduce recurrence of incidents.

Safety alert newsflashes

In 2019–20, the inspectorate issued eight safety alert newsflashes on a range of issues.

Newsflashes were introduced as a means of quickly drawing attention to the occurrence of a serious incident in the mining industry. They are issued to all mines and are published on the department's website. Newsflashes are timely notifications to industry of a fatality or serious accident with initial matters that operators should consider in their operations.

Safety bulletins

In 2019–20, the inspectorate issued three safety bulletins on a range of issues. This is compared to 10 in 2018–19 and 9 in 2017–18.

Safety bulletins are short reports that provide general advice on safety and health best practice at mines in relation to specific topics. They are issued to all mines and published on the department's website.

Incident periodicals

In 2019–20, the inspectorate commenced publishing a combined coal and mineral mine and quarry safety periodical, highlighting incidents that have occurred in Queensland mines and quarries.

The periodical aimed to enhance awareness of potential hazards and assist operators to implement proactive controls.

In June 2020, based on positive industry feedback, the inspectorate started publishing monthly sector-specific periodicals.

Announced and unannounced inspections

In considering the level of announced versus unannounced inspections, it is valuable to consider the purpose and effectiveness of both types of inspections. Announced inspections are a necessary practice for a regulator to ensure the effectiveness and efficiency of the risk is managed considering direct observation, variety of evidence and discussions. However, unannounced inspections are an essential aspect of a regulator's approach and a reasonable proportion of inspections should be carried out unannounced, including visits at weekends and out of normal working hours.

In the case of major hazards, announced inspections are more effective than unannounced inspections as many risk controls cannot be directly observed by inspectors without prior arrangement. Typically, their efficacy must be inferred through the examination of mine plans and the systems and procedures put in place to manage these hazards, and from discussions with those who developed and are responsible for implementing the plans in practice. Even when a mine site is advised in advance of a visit, there are only a limited range of matters of importance which can be changed in the relatively short time between announcing an inspection and carrying it out.

An independent review of the inspectorate's compliance program found that, while there is no definitive method of determining the appropriate level of unannounced inspections,

evidence from the regulation of other high hazard industries suggests a level of approximately 10–20 per cent.

Further, increasing unannounced inspections risks:

- diminishing the inspection process to a random and superficial spot check
- coaching industry away from the risk-based, systems-based model at the heart of the legislative framework
- reducing the efficiency of inspections due to the absence of key mine personnel from site (e.g. electrical engineering manager) or delays in gathering the documents required for review and discussion by the inspector.

In 2019–20, the inspectorate conducted 17 per cent of its inspections unannounced—13 per cent of coal mine inspections and 18 per cent of mineral mine and quarry inspections.

It is important to note that just because an inspection has been announced, the inspector is not confined to the areas of the mine they have indicated they will focus on. Inspectors routinely go to other parts of a mine site and speak confidentially with mine workers based on a range of factors.

Incident reports

The inspectorate recognises the importance of sharing information with industry, workers and the public regarding investigations into mining safety and health incidents. Reports about investigations into safety and health incidents in Queensland's coal mines and mineral mines and quarries are published where it is in the public interest to do so.

Publishing incident reports can help raise awareness about risks that may affect the safety and health of workers, promote good safety and health practices, and deter practices and behaviours that endanger the safety and health of workers.

The inspectorate published two incident reports in 2019–20.

Preliminary observations: North Goonyella high potential incident

On 1 September 2018, Peabody Energy made the decision to withdraw workers from the underground workings of the North Goonyella coal mine after detecting methane at or above the trigger action response plan. This is in line with the legal obligations for mine operators to avoid or remove unacceptable risk to workers. This incident was a high potential incident and was reported to the inspectorate.

The inspectorate committed substantial resources to the incident response, operational activities which followed, and the inspectorate's investigation—nine inspectors worked for a total of 453 full-time equivalent days.

The inspectorate formally commenced an investigation in January 2019, although information gathering started in November 2018. An assessment of the regulatory decisions taken from 1 September 2018 shows they were in accordance with the coal mining safety and health regulatory framework and the policies and procedures of the inspectorate.

In August 2019, the inspectorate published a report which outlined its five preliminary observations which may be relevant to the nature and cause of the incident.

Irrespirable atmosphere in a mine or quarry—Incident learnings and recommendations

Over the past two decades, there have been a number of incidents in the Queensland mining and quarrying industry related to irrespirable atmosphere, including one fatality.

In August 2019, the inspectorate published a report which summarised several of the incidents and made six recommendations to industry to raise awareness and highlight risk controls which must be implemented and verified to prevent future incidents occurring.

Prosecutions

Prosecutions may be undertaken in response to instances of non-compliance where it is in the public interest to prosecute and there is sufficient evidence as to be capable of securing a conviction. For example, prosecution may be considered appropriate where the alleged offender shows significant resistance to, or disengagement with, its safety and health obligations.

In 2019–20, there were 11 prosecutions (or appeals resulting from prosecutions) before the courts, involving 27 defendants. Six prosecutions against 14 defendants were commenced and remained on-going during this period. Two prosecutions against three defendants that commenced in 2018–19 remained on-going during this period.

Several appeals were finalised in 2019–20, including:

- appeals that had been commenced in 2018–19 were finalised with convictions upheld against two defendants
- appeals that had been commenced in 2018–19 were upheld with four defendants acquitted
- prosecutions against four defendants were struck out following appeals that had been commenced 2019–20.

At the end of 2019–20, appeals relating to the acquittal of four defendants remain on-going and seven prosecutions against 17 defendants remain on-going.

Of the on-going prosecutions five of the prosecutions involving 15 defendants relate to fatalities in coal mines and quarries and two prosecutions involving two defendants relate to serious injuries in coal mines.

Review of all fatal accidents in Queensland mines and quarries from 2000 to 2019

In 2019–20, a key focus of the inspectorate's work was to complete an expert review to identify changes needed to improve safety and health in Queensland's mines and quarries. On 8 July 2019, the Honourable Dr Anthony Lynham, Minister for Natural Resources, Mines and Energy announced that a review of all coal mining fatalities from 2000–2018 by Dr Sean Brady would be expanded to include all fatalities up to July 2019 and would be extended to mineral mines and quarries.

The purpose of the review was to investigate:

- why mine and quarry workers have died over the past 20 years
- how industry can improve safety and health
- how the mines inspectorate can work better.

The review adopted a multi-pronged approach to investigate the underlying causes of fatalities, considering:

- the causes of each individual fatality
- collected incident data—details from 40,000 incidents were available for review
- the number of hours worked
- discussion with a wide variety of stakeholders from industry and the regulator
- review of submissions
- analysis of findings from individual fatalities and incidents.

As part of the investigation of fatalities, the nature and cause investigations completed by the inspectorate were used to produce 47 fatality causal diagrams. These causal diagrams detailed the various contributing factors of each fatality and categorised the key factors for each fatality into physical, individual, supervision and organisational factors.

Some of the key findings from the review of fatal incidents included:

- 26 of the 47 fatalities involved a lack of task specific/inadequate training or lack of competence for the task
- 32 of the fatalities required supervision for the task involved, with 25 found to involve inadequate or absent supervision
- 10 fatalities involving known faults, where individuals were aware of them, but no action was taken
- 9 fatalities had known near misses occur prior to the fatality
- the majority of the 47 fatalities involved at least one failed or absent control that could have prevented the fatality.

An analysis of serious accidents found:

- 45 per cent of serious accidents involved ineffective controls where a hazard was identified, controls were implemented, but they were ineffective and a serious accident occurred
- 36 per cent involved an unidentified hazard
- less than 30 per cent of the control applied after a serious accident were hard controls with 62 per cent of controls administrative in nature.

The following recommendations were made for industry:

1. The industry should recognise that it has a fatality cycle. Unless it makes significant changes to how it operates, the rate of fatalities is likely to continue at current levels.
2. The industry should recognise that the cause of fatalities are typically a combination of banal, every day, straightforward factors, such as a failure of controls, a lack of training and/or absent or inadequate supervision.
3. The industry needs to focus on ensuring workers are appropriately trained for the specific tasks they are undertaking.
4. The industry needs to focus on ensuring workers are appropriately supervised for the tasks they are undertaking.
5. The industry needs to focus on ensuring the effectiveness and enforcement of controls to manage hazards.

6. The industry should adopt the principles of High Reliability Organisational theory in order to reduce the rate of serious accidents and fatalities.
7. The industry should shift its focus from lost time injuries and the lost time injury frequency rate as a safety indicator

The following recommendations were made for the regulator:

1. The regulator needs to play a key role in collating, analysing, identifying and proactively disseminating the lessons learned from the incident and fatality data it collects from the industry.
2. The regulator should develop a new and greatly simplified incident reporting system that is easy to use by those in the field.
3. The regulator should adopt the serious accident frequency rate as a measure of safety in the industry.
4. The regulator should adopt the high potential incident frequency rate as a measure of reporting culture in the industry.

The review was tabled in the Queensland Parliament by the Minister for Natural Resources, Mines and Energy on 6 February 2020. The regulator has accepted all recommendations.

Reviews of the inspectorate's regulatory framework, compliance and enforcement function

Over the last few years, multiple independent reviews and audits have provided recommendations to address issues and enable improvements in the Queensland mine safety and health regulatory framework.

Several opportunities for enhancements of the regulatory strategy were identified and the inspectorate has worked to implement programs of work in 2019–20 to realise the desired improvements.

Following on from the publishing of an updated compliance policy in November 2017, the process for compliance assessment has also been reviewed and revised and will be documented as part of an overall document quality system. The document quality system will be incorporated into a planned new reporting and assessment system which is being undertaken as part of a strategic review of information technology systems and processes. Further enhancements to the information technology systems in the inspectorate are planned to be completed in 2021–22.

In addition to risk-based planning as part of the new information technology platform, the inspectorate has responded to recommendations to adjust the balance of its compliance activities to reflect its view of risk in the industry. Over the past three years, the number of hazard-specific audits has been increased in proportion to inspections. This change was due to the fact that major hazards in the sector are most effectively managed by assessing, in much greater detail, the systems and processes in place to manage those hazards. As a result, longer and more intensive audits are seen as a valuable use of time on these hazards compared to shorter and less involved inspections. It should be noted that despite this rebalancing between inspections and audits, the overall time inspectors have spent on site has increased. The inspectorate has also worked to review its mine record entry procedure to focus more on critical risk controls and has delivered enhanced training to mines inspectors to further this effort.

Further to recommendations made in previous reviews, the data collected and analysed by

the inspectorate has increased significantly, particularly regarding the reporting of dust monitoring results. This increased focus on data collection and analysis is also a cornerstone of Dr Sean Brady's recommendations in his *Review of all fatal accidents in Queensland mines and quarries from 2000 to* 2019. The inspectorate is currently in the process of replacing its data collection and analysis system to improve its usability and to enable a more comprehensive interrogation of data and the identification of trends from serious accidents and high potential incidents.

Responding to the recommendations from multiple reviews and audits has required significant attention from inspectors and senior leaders, and this has occurred while the inspectorate has continued to carry out its legislated regulatory responsibilities. The implementation of these improvements must also be reviewed and refined to ensure that they have been effective and have resulted in real improvements to safety and health.

Coal mines

Table 10: Queensland Mines Inspectorate key performance targets for coal mines 2019–20

Target	Achieved/not achieved	Notes
Undertake **396** coal mines inspections	Achieved	The inspectorate undertook **445** coal mine inspections
Conduct between **10–20%** of coal mine inspections unannounced	Achieved	The inspectorate conducted **13%** of coal mine inspections unannounced
Undertake **60** coal mine safety and health management system audits	Achieved	The inspectorate undertook **96** coal mine safety and health management system audits

During 2019–20, the inspectorate's primary focus in relation to coal mines was on mine ventilation, the management of methane gas in underground mines, the effectiveness of supervision, the effectiveness of risk assessment, vehicle interaction and critical risk management.

In 2019–20, the inspectorate conducted 445 inspections of coal mines, which exceeded its target of 396. This is a substantial increase compared to the number of inspections conducted in 2018–19 (365) and in 2017–18 (390).

Of the inspections conducted, 13 per cent were unannounced, as compared with 19 per cent in 2018–19, which falls within the range of what is generally considered good regulatory practice.

The inspectorate also conducted 96 audits of safety and health management systems, risk management plans and procedures, and their implementation at coal mines, which significantly exceeded its target (60) and the number of audits conducted in 2018–19 (60) and in 2017–18 (42).

The inspectorate conducted 57 incident investigations (compared to 74 in 2018–19 and 45 in 2017–18) and considered 95 complaints (compared to 52 in 2018–19 and 54 in 2017–18).

Investigating incidents and complaints can take significant time and effort and can impact on the capacity of the inspectorate's regular compliance activity.

In 2019–20, a strong focus was placed on examining the effectiveness of supervision across the coal mining industry. The inspectorate conducted a specific audit project with a key focus on examining the time supervisors spent in-field supervising work.

Gas management at underground coal mines

In 2019–20, as part of its ongoing focus on gas management at underground coal mines, the inspectorate amended the Coal Mining Safety and Health Regulation 2017 to clarify and improve requirements for methane monitoring in underground coal mines.

The changes to the Regulation were required after an inspection and compliance audit process was conducted into methane gas management in 2017–18. The compliance audits involved requesting gas monitoring data from all longwall mines to conduct a detailed analysis of methane management in underground coal mines.

The audit resulted in the issuing of directives and substandard conditions or practices notices.

Following on from the audit, and based on the analysis of mine gas data and a review of gas management practices, in June 2019 the inspectorate published the *Methane management in underground coal mines best practice and recommendations* guide. The guide included the categories of engineering controls, trigger action response plans, gas monitoring systems, tube bundle detectors, real time and transportable detectors, and maintenance of detectors.

In February 2020, following on from the best practice guide, the Coal Mining Safety and Health (Methane Monitoring and Ventilation Systems) Amendment Regulation 2019 amended the Regulation relating to methane gas monitoring and ventilation. The amendments focussed on three areas—longwall mining, longwall development, and abandoned workings—to clarify and confirm minimum methane monitoring requirements at additional relevant locations in underground coal mines, and to require signposting of additional explosion risk zone boundaries. The amendments also included record keeping of methane monitoring and methane incidents, tripping of electrical supplies to machines, and consequential amendments about actions to be taken if a methane detector activates or is non-operational.

In the development of the amendments, the inspectorate consulted with industry and union stakeholders for more than two years on the findings from the methane management audits undertaken across the industry. Further consultation based on the best practice guide and the proposed amendments occurred in a number of forums, including with site senior executives, underground mine managers, ventilation officers and the Australian Mine Managers Association forums. In addition, the Queensland Resources Council and Construction Forestry Maritime Mining and Energy Union was consulted in separate forums and together with the Commissioner for Mine Safety and Health at several meetings of the Coal Mining Safety and Health Advisory Committee. These meetings raised some potential improvements to the amendments which were expected to be finalised in 2020–21. These changes impact monitoring in the lower-risk environments in the returns of the main headings where methane levels are substantially reduced by increased dilution from the overall mine ventilation network.

Effectiveness of supervision

The effectiveness of supervision has been identified as an issue in multiple serious accident investigations and across the coal industry more broadly in the Brady review.

In 2019–20, the inspectorate implemented a specific audit project aimed at collecting data on supervisor skills, experience and infield supervision, to facilitate data-driven, risk-based decisions on improving industry performance relating to supervision.

The inspectorate completed 213 supervisor audit assessments focussing on the key areas of:

- appointments, supervisor competency and experience
- in-field implementation of safety and health management system risk management procedures relating to supervision.

The preliminary assessment of data shows scope for improvement in the application of work planning, procedural documentation, worksite inspection, risk management and overall safety and health management system compliance.

Testing of polymeric chemical

In 2019–20, the regulator commenced a project to investigate occupational exposure to isocyanates during the pumping of polyurethane and urea silicate resins in underground coal mines.

The project involved working with major suppliers and applicators to better understand exposure risks associated with the use of these products and to assess the adequacy of current atmospheric and biological monitoring techniques.

The findings will be provided to the Coal Mining Safety and Health Advisory Committee's recognised standards sub-committee to inform a planned review of *Recognised Standard 16 Use and control of polymeric chemicals at underground coal mines*, particularly with reference to operational zones, health monitoring and chemical approval process.

Mineral mines and quarries

Table 11: Queensland Mines Inspectorate key performance targets for mineral mines and quarries 2019–20

Target	Achieved/not achieved	Notes
Undertake **970** mineral mine and quarry inspections	Achieved	The inspectorate undertook **974** mineral mine and quarry inspections
Conduct between **10–20%** of mineral mine and quarry inspections unannounced	Achieved	The inspectorate conducted **18%** of mineral mine and quarry inspections unannounced
Undertake **7** mineral mine and quarry safety and health management system audits	Achieved	The inspectorate undertook **7** mineral mine and quarry safety and health management system audits

During 2019–20, the inspectorate's primary focus in relation to mineral mines and quarries was on respirable dust and the prevention of incidents involving collisions, entanglement, falls.

In 2019–20, the inspectorate conducted 974 inspections of mineral mines and quarries, which slightly exceeded its target of 970. This falls in line with the number of inspections conducted in 2018–19 (962) and in 2017–18 (986) and shows consistency in the application of resources to inspections of mineral mines and quarries.

Of the inspections conducted, 18 per cent were unannounced, which falls within the upper range of what is generally considered good regulatory practice and is slightly higher than the percentage of unannounced inspections conducted in 2018–19 (17 per cent).

The inspectorate also conducted seven audits of safety and health management systems, risk management plans and procedures, and their implementation at mineral mines and quarries, which met its target (7) and was in line with the number of audits conducted in 2018–19 (7).

The inspectorate conducted 65 incident investigations (compared to 49 in 2018–19 and 41 in 2017–18) and considered 84 complaints (compared to 50 in 2018–19 and 49 in 2017–18). Investigating incidents and complaints can take significant time and effort and can impact on the capacity of the inspectorate's regular compliance activity.

In 2019–20, a strong focus was placed on examining the reporting culture of mineral mines and quarries to ensure that high potential incidents were being reported and thoroughly investigated.

Campaign for Change

In March 2019, the inspectorate implemented the *Campaign for Change*, a major inspection and education campaign which targeted three key areas for action in order to improve the controls which manage these identified risks.

In 2019–20, the inspectorate conducted a significant number of targeted Campaign for Change inspections, resulting in 31 directives being issued to suspend operations. As a result of the education and enforcement

initiatives associated with the campaign, incident frequency rates for those identified hazards have fallen significantly in 2019–20.

The Campaign for Change focussed on guarding, mobile equipment and isolation and aimed to ensure industry clearly understands that it is unacceptable to:

- operate plant without effective guarding in place
- use mobile equipment that is not maintained and inspected in accordance with original equipment manufacturer requirements
- allow workers to operate mobile equipment without being appropriately trained and competent
- conduct work on plant that is not correctly isolated and locked out.

The campaign message was communicated and reinforced at mining and quarrying industry conferences, seminars, and forums across the state and during regular inspections.

Management of respirable crystalline silica

The inspectorate continued to ensure the effective management of respirable crystalline silica in Queensland mineral mines and quarries by refining and updating the *Guideline for management of respirable crystalline silica in Queensland mineral mines and quarries*.

A new version of the guideline was published in April 2020 as the *Guideline for management of respirable dust in Queensland mineral mines and quarries* and includes monitoring requirements for respirable dust and enhancements to health surveillance standards to align with the Coal Mine Workers' Health Scheme.

Further enhancements included:

- an added emphasis on establishing effective and reliable respirable dust control measures
- clarification of the requirements of qualitative and quantitative risk assessment of workers' exposure
- amendment of references to occupational exposure limits in preparation for regulatory changes to the respirable crystalline silica limit from September 2020
- the exclusion of small scale and tourist mines from the requirements of the guideline unless they are directed by an inspector to comply.

It is expected that these changes to the guideline will assist industry to reduce workers' exposure to respirable dust and to assist in managing the lower exposure limit for respirable crystalline silica in effect from 1 September 2020.

Since the implementation of the guideline in August 2017, the percentage of workers at mineral mines and quarries that are covered by risk analysis and personal dust sampling programs has risen to 95 per cent of workers.

The results of personal sampling data shows the efforts of industry to improve the effectiveness of controls in dust management in line with the guideline have had an overall positive effect with significant improvements in the exceedance rate for respirable crystalline silica and respirable dust.

Monitoring respirable crystalline silica in small mineral mines and quarries

The inspectorate has continued its program of conducting respirable crystalline silica sampling in small and medium mineral mines and quarries to assess compliance against the

Guideline for management of respirable dust in Queensland mineral mines and quarries.

The program continued to include sampling in operations such as hard-rock quarries, sand mines, gemfield/alluvial gold mines and operations producing sandstone, silica sand, decorative stone, peat, bentonite, diatomaceous earth and lime. It included the collection of samples by a mines inspector and a structured inspection program to evaluate compliance with the guideline.

Sample results have continued to reflect those of larger mineral mining and quarrying operations and indicate that, while many workers in smaller operations are not routinely exposed to dangerous levels of respirable crystalline silica, a small percentage of workers are at risk of unacceptable exposure.

In 2018–19 and 2019–20, more than 300 personal dust samples and 29 static-position samples were collected from 79 sites and the results from this monitoring helped to clarify the exposure risk level across small to medium mineral mines and quarries.

Over the past two years, the inspection program resulted in the issuing of 185 compliance actions with the majority requiring sites to evaluate and control their respirable crystalline silica risk and engage with an occupational hygienist to develop and undertake an exposure monitoring program.

The inspection program also identified significant gaps in the level of understanding and awareness among small to medium mineral mine and quarry workers about the risks from exposure to respirable crystalline silica. As a result, the inspectorate developed an online training package providing information to workers on:

- the adverse health impacts of dust and respirable crystalline silica exposure
- the identification and control of emission sources
- personal exposure monitoring
- obligations of site senior executives, operators and workers
- documentation and recordkeeping requirements.

Mine emergency exercise

All Queensland underground coal mines must run annual simulations to test their readiness for emergencies. In addition to their own exercises, each year one mine hosts a level 1 emergency exercise. These exercises have been held annually since 1998 and are monitored by assessors from the Queensland, New South Wales and international coal mining communities.

It is the responsibility of the Chief Inspector, Coal to ensure that a State Emergency Exercise Executive Management Committee is convened each year to design, organise, implement and audit the exercise. The Chief Inspector, Coal determines who is to chair the committee. At a minimum, the committee must include:

- one representative of the inspectorate
- one representative from Simtars
- three representatives from mines including at least one mine manager
- one representative from the host mine
- one representative from the Queensland Mines Rescue Service
- one industry safety and health representative.

In 2019–20, the level 1 mine emergency exercise was held on 25 September 2019 at Cook Colliery in Central Queensland. Cook Colliery is an underground bord and pillar coal mine located approximately 29 kilometres south of Blackwater.

The scenario for the exercise was based on the consequences of a substantial earthquake—measuring 7.6 on the Richter scale—with disruption to the mine power and infrastructure, including a major fall in the drift, a substantial blockage of ventilation, and the loss of power to the mine site for 30 minutes.

The scenario addressed the following issues:

- the ability of coal mine workers to self-escape
- the mine site incident response
- the capacity for triage on a large number of coal mine workers
- donning self-contained self-rescuers
- the interaction with the industry safety and health representative, Queensland Mines Inspectorate and the Queensland Police Service
- the mobilisation of Queensland Mines Rescue Service and the establishment of a fresh air base
- social and mainstream media interaction.

Key industry recommendations included:

- Mines should identify the resources required for each operation to enable a quick response to the mutual assistance group.
- The industry standard should be to have two control room operators in the control room at all times to enable efficient communication and site monitoring.
- All mines should have an electronic database and information sharing system and this system should be used as part of the everyday mine communications and data transfer systems, not just for emergency response.
- Mines should have plans for dealing with social and mainstream media enquiries in the event of an emergency, in particular consideration should be given to the consequences of misinformation in emergency response situations and the need to ensure next of kin and the community have a reliable source of information.

In total, 22 assessors took part in the exercise, with representatives from industry (Kestrel, Oaky North, Moranbah North and Grosvenor coal mines), unions, government, Queensland and New South Wales mines rescue services, the University of Queensland Minerals Industry Safety and Health Centre.

Level 1 mine emergency exercise reports are published to allow all mine sites and other agencies to review the recommendations and use them to improve their emergency response systems.

A full report of the exercise can be found on the Business Queensland website at www.business.qld.gov.au.

Stakeholder engagement and education

The Queensland mine safety and health regulatory model gives equal voice to government, mine operators and mine workers. This tripartite relationship plays a vital role in creating an environment where issues can be raised and responded to, as they emerge, for the protection of worker safety and health.

The inspectorate engages with operators and workers via formal and informal means to ensure that all relevant stakeholders are able to provide feedback and have input into the regulatory and decision-making process. The inspectorate also proactively communicates with industry to inform and educate operators and workers about safety and health issues.

In 2019–20, face-to-face engagement opportunities have been restricted as a result of the COVID-19 pandemic. However, this has encouraged engagement to be conducted through other mediums such as video conferencing and online channels of communication.

The inspectorate engaged with operators and workers via a range of industry forums, meetings and workshops, including:

- representation on the Coal Mining Safety and Health Advisory Committee and the Mining Safety and Health Advisory Committee
- attendance at Safety Reset sessions across coal mines and mineral mines and quarries
- representation on the Cement Concrete and Aggregates Association occupational health and safety sub-committee
- engagement with the members of the Queensland Boulder Opal Association and Sapphire Miners Association on safety and health issues related to small-scale mining
- partnering with the Australian Institute of Occupational Hygienists for the Breathe Freely Australia program
- regular presentations to the advisory committees on dust and incident data.

In addition, the inspectorate cooperated with other regulators in Queensland, interstate and internationally on a number of investigations and projects, including Worksafe Northern Territory, Department Agriculture and Fisheries, Papua New Guinea government and Western Australia Department of Mines, Industry Regulation and Safety.

MINE DUST LUNG DISEASES

Mine dust lung diseases are caused by long-term exposure to high concentrations of respirable dust generated during mining and quarrying activities and include a range of occupational lung conditions. Coal workers' pneumoconiosis and silicosis are two of the more widely known mine dust lung diseases which can affect mine workers.

When the issue first re-emerged, it was coal workers' pneumoconiosis that was originally investigated. However, it was soon realised that the issue of mine dust lung diseases was far more complex and a broader response was required.

As at 30 June 2020, there have been 165 confirmed cases of mine dust lung disease in Queensland mine and quarry workers reported to the regulator since 1984, including, but not limited to, cases of pneumoconiosis (coal workers' pneumoconiosis, silicosis or mixed dust pneumoconiosis), asbestosis, and chronic obstructive pulmonary disease. The majority of cases of pneumoconiosis, where severity is known, are in the early stage of disease.

Of this total, there have been 118 reported cases among current and former Queensland coal mine workers whose experience was in coal mining only. This included 37 cases reported in 2019–20.

There have been 31 reported cases among workers with experience in both coal mines and mineral mines and/or quarries, of which 13 cases were reported in 2019–20.

There have been 16 reported cases among current and former Queensland mineral mine and quarry workers who have worked in mineral mining and/or quarrying only (two of these cases were for workers with experience in quarries only). This included six cases reported in 2019–20.

As a result of improvements made to the screening process and increased awareness of mine dust lung disease, it is reasonably expected that the number of reported disease cases will increase. Although it may seem counterintuitive, this trend is welcomed as it demonstrates that effective screening and accurate and early diagnosis of workers is taking place. It also enables action to be taken to remove workers with disease from further exposure or reduce that exposure to safe levels.

Other improvements include legislated requirements for mines to report known cases of prescribed diseases and the provision of data about accepted workers' compensation claims from the Office of Industrial Relations. Further improvements to the dataset are expected as a result of the Queensland Government's Notifiable Dust Lung Disease Register and associated reporting requirements, which commenced in 2019–20.

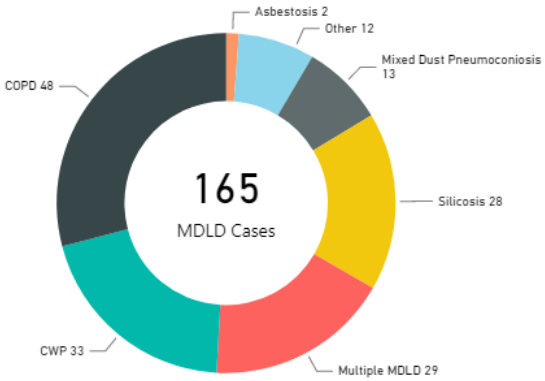

Figure 4: Reported cases of mine dust lung disease for all mining and quarrying, 1984—30 June 2020[11]

[11] Cases listed as multiple mine dust lung disease may include coal workers' pneumoconiosis, silicosis and mixed dust pneumoconiosis.

Chest X-ray dual reading program

All chest X-rays are now examined against the International Labour Organization's International Classification of Radiographs of Pneumoconioses (ILO Classification). The ILO Classification is the accepted international standard to describe and code potential abnormalities in chest X-rays that may indicate a mine dust lung disease. Through this screening process, the worker's X-ray is compared against a set of standard X-ray images. The concentration of small opacities in the affected zone of the lung is classified by increasing size on a 12-point scale which consists of four major categories (0, 1, 2 and 3) with three subcategories in each.

A classification of category 0 indicates a negative screening result. A result of 1 to 3 may indicate early stages of disease. Large abnormalities are classified as A, B or C and may indicate advanced stages of the disease, commonly referred to as progressive massive fibrosis. It is important to note that this is a screening process, and a positive screening result does not necessarily lead to a disease being diagnosed. Results must be further investigated using the clinical pathways guideline which provides the recommended process for follow-up investigation and referral to appropriate medical specialists and tests.

From 1 July 2016 to 30 June 2020, more than 50,000 chest X-rays were sent to the United States for assessment by National Institute for Occupational Safety and Health approved B-readers. All these chest X-rays have been reported and returned. Since 1 March 2019, Lungscreen Australia's certified B-readers had also completed more than 29,000 chest X-ray reports.

Across both dual reading programs, totalling almost 80,000 chest X-rays, 99 per cent of X-rays have returned a negative ILO Classification result. One per cent returned a positive result and, of these, 31 resulted in a diagnosis of mine dust lung disease after investigation using the clinical pathways guideline.

The use of X-ray readers from the United States was an interim measure until Australian radiologists gained the internationally recognised B-reading qualification and sufficient experience in performing B-reads. With 36 qualified Australian B-readers now on the register of approved providers, the transition to an Australian X-ray reading service is complete.

Respiratory health screening for retired and former workers

Since 1 March 2019, the regulator has provided retired and former mine and quarry workers with access—on a voluntary basis—to free respiratory health assessments every five years, for life. These assessments support the ongoing health of retired and former workers through the diagnosis of occupational latent-onset respiratory disease. They also support the regulator's health surveillance objectives by providing worker health information that spans the period from commencement of employment into retirement.

Access to respiratory screening was already a right under the Coal Mining Safety and Health Regulation 2017 for retired and former coal mine workers. However, changes to the Mining and Quarrying Safety and Health Regulation 2017 progressed in 2019–20 extend this right to former mineral miners and quarry workers from 1 September 2020.

Other amendments included:

- requiring site senior executives to arrange respiratory health surveillance for mineral mine and quarry workers
- requiring respiratory health surveillance to be undertaken prior to commencing work in the industry and then at least once every five years while working
- stating the content of respiratory health surveillance such as a chest X-ray dual-read to the international standard, and a lung function test by spirometry
- enabling workers to request a respiratory health surveillance assessment on retirement from the industry.

As at 30 June 2020, the regulator had approved 155 retired and former worker assessments. Of the 98 completed, 13 cases of mine dust lung disease were diagnosed. This represents a higher rate of disease diagnosis compared to current workers, likely due to factors such as age, length of mining experience of retired and former workers, and the voluntary nature of the assessments, meaning those who are symptomatic are more likely to request assessment.

The Mine Dust Health Support Service

In a joint initiative with the Office of Industrial Relations and WorkCover Queensland, the Department of Natural Resources, Mines and Energy launched the *Mine Dust Health Support Service* on 2 March 2020.

The confidential helpline provides information on screening, compensation and support services for current and former mine and quarry workers (and their family members) who have been diagnosed with a dust lung disease from their employment.

As at 30 June 2020, the service had assisted 109 individuals to access the information and support they need.

Mobile health service for regional Queensland

In April 2020, the department partnered with Heart of Australia to provide a mobile health service for current and former mine and quarry workers to support the early detection and prevention of mine dust lung disease.

The service will have the capacity to conduct full health assessments, including chest X-ray screenings and spirometry, as well as follow-up investigations such as high-resolution computed tomography and complex lung function testing where required.

Construction is scheduled for completion in 2020-21 and the service will focus on regional and remote areas, where access to registered providers is limited, to improve health outcomes for these workers.

PEOPLE

The Queensland Mines Inspectorate is a multi-disciplinary cohort of regulatory professionals who are dedicated to the safety and health of mine workers and those affected by mining activities.

To be effective, the inspectorate needs individuals with the right technical expertise and industry experience which, in an industry such as mining, can mean a very competitive recruitment environment. It also needs individuals that have the capabilities of effective regulators (such as interpersonal and communication skills), as well as an understanding of the regulatory tools, techniques and tactics required to effectively enforce regulation.

As at 30 June 2020, the inspectorate employed 48 mines inspectors who were located in three regions. Inspectors work from six regional offices which are located close to the mining and quarrying operations which they regulate.

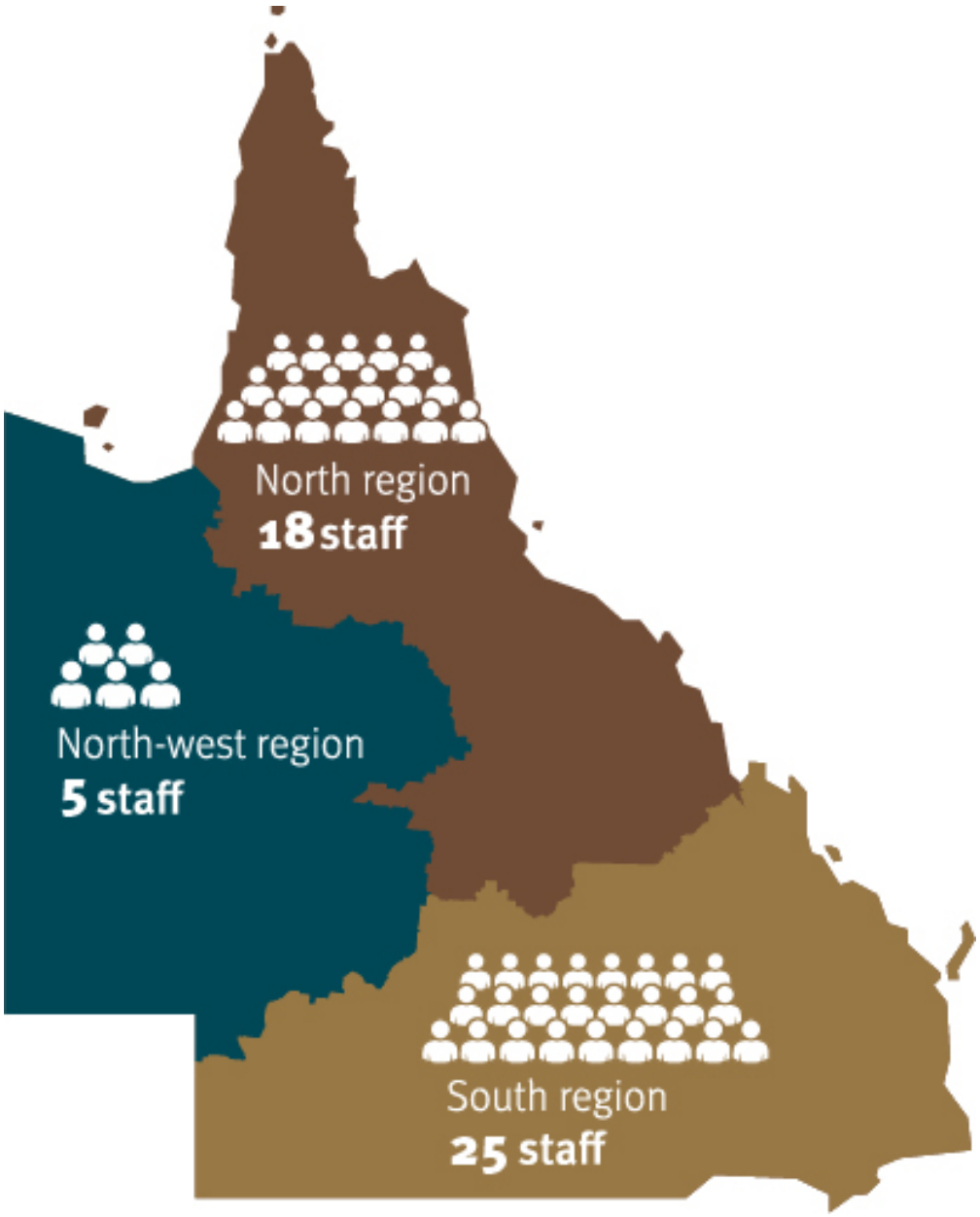

Figure 5: Location of mines inspectors in Queensland

In 2019–20, the inspectorate recruited nine inspectors and six inspectors ceased employment either through retirement or returning to employment in industry.

Resourcing requirements must be based on a regulatory strategy that identifies both the nature of the hazards prevalent in the mining industry and the kind of activity that is most effective in reducing risk from these hazards.

Mines inspectors have extensive experience in mining operations, and hold a range of skills, and trade, statutory and tertiary qualifications. This includes staff with:

- tertiary qualifications in science and mining, electrical and mechanical engineering
- first class, second class and deputy's certificates of competency
- certificates in open-cut examination and underground mine management
- postgraduate studies and undergraduate and professional certification in occupational hygiene and mine ventilation
- site senior executive notices
- trade qualifications
- diplomas in workplace inspection.

Resourcing challenges

One of the main resourcing issues for the inspectorate is that it draws its workforce from the same limited talent pool as industry—the inspectorate, in fact, competes for the same resources.

Attracting and retaining sufficiently skilled workers within the existing remuneration structure can be challenging for the inspectorate, particularly due to the industry's ability to offer significantly higher remuneration. In addition, the fly-in, fly-out nature of the industry and the need for inspectors to be located close to the mines they regulate means the inspectorate is sometimes unable to tap in to the talent pool that wishes to reside in major population centres, including interstate.

There are currently five inspectors who hold a first class mine manager's certificate of competency; three in coal and two in mineral mines and quarries.

The inspectorate currently employs coal mine inspectors from a range of backgrounds including 11 inspectors that have held superintendent, mine manger or site senior executive roles and 11 that have mechanical and electrical engineering and occupational hygiene backgrounds.

The inspectorate continues to strive to recruit skilled and experienced mine workers as inspectors.

Workforce skills development

Inspectors are highly skilled professionals who undertake an ongoing program of continuous professional development to ensure they further develop and maintain their skills and understand the contemporary safety and health issues facing the industry.

Mines inspectors undertake lead auditor training based on the requirements of the Diploma of Quality Auditing and the training is delivered by a registered training organisation. This training provides inspectors with essential skills in initiating, leading, reporting and participating in a quality audit, including conducting pre-audit planning, document review, on-site audit activities, entry and exit interviews, and instruction in the legal liabilities of auditors. In total, 25 mines inspectors have completed the diploma.

During the year, two inspectors undertook the intensive *Managing regulation, enforcement and compliance* course with the Australia and New Zealand School of Government, taught by

Professor Malcolm Sparrow from Harvard University's John F Kennedy School of Government.

In 2019–20, the inspectorate has conducted training to improve how inspections are undertaken and recorded. However, one of the challenges has been in the development of the regulatory tools, techniques and tactics inspectors require to effectively enforce regulation. While the inspectorate has implemented quality assurance and peer review processes, much of the formal training available in the safety and health field is related to specific safety and health risks, such as falls from height—*what to regulate*—rather than training related to the regulatory skills, tools and techniques required by inspectors—*how to regulate*. The commercial training in regulatory skills that is available tends to be generic in nature and does not take into account the particular issues involved in regulating a high hazard industry such as mining. The ongoing development of inspectors' regulatory capabilities is a critical issue for the inspectorate.

The inspectorate is continuing to develop the skills of its inspectors and will seek suitable specialised regulatory training.

Appointment of chief inspectors

In 2019–20, the inspectorate appointed a new Chief Inspector, Coal and a new Chief Inspector, Mineral Mines and Quarries.

Chief Inspector, Coal

Peter Newman was appointed to the position of Chief Inspector, Coal in November 2019.

Peter has 45 years of practical experience in both coal and mineral mining, including as a practicing coal mine manager for 10 years. His qualifications include a *First Class Mine Managers Certificate (Queensland and NSW)* and an Honours Degree in Mining Engineering from Imperial College London. Peter is a member of the Australian Institute of Company Directors and a fellow of AusIMM (Australasian Institute of Mining and Metallurgy).

Peter was a member of the mines rescue team that responded to the Moura No. 4 mine explosion that killed 12 coal mine workers in 1986.

Chief Inspector, Mineral Mines and Quarries

Hermann Fasching was appointed to the position of Chief Inspector, Mineral Mines and Quarries in November 2019.

Hermann has more than 40 years of experience in the extractive mining industries and his qualifications include a Diploma of Engineering, Diploma of Government Workplace Inspection. Hermann is a Certified Practicing Quarry Manager and a fellow of the Institute of Quarrying Australia.

Regulatory independence

Independence is a fundamental requirement for any regulator and, to be seen as credible in its decision-making, the regulator must be a legally and functionally independent agency, making its own operational and enforcement decisions outside of political influence.

Therefore, the operational independence of the inspectorate is of paramount importance.

The inspectorate is continually seeking to ensure its independence in accordance with the principles of effective regulation. The inspectorate also works to minimise any

possibility, or even perception, of regulatory capture occurring.[12]

The inspectorate is highly aware of the risks of regulatory capture and mitigates the risk by ensuring inspectors complete a range of integrity and ethics training to raise their awareness of regulatory capture and how it occurs. This includes training in the Code of Conduct for the Queensland Public Service, complaints management, public sector ethics principles and ethical decision making. Training in this area is primarily conducted by the Office of the Queensland Ombudsman.

Strict internal policy provides an additional barrier. For example, for a period of at least six months from their appointment, a new inspector will not be assigned to inspect or audit the mine at which they previously worked. In addition, inspectors are not dedicated to specific mines or regions. They inspect and audit mines based on the compliance area of interest and skill set of the inspector.

[12] Regulatory capture is when a regulatory agency advances the interests of particular groups rather than acting in the public interest.

LOOKING AHEAD

After a quite turbulent period, 2020–21 is set to be something of a new chapter for the mining and quarrying industries. Beginning with the Safety Reset in July and August 2019 and continuing with the Brady review in February 2020, safety and health in the mining industry has been the subject of extensive internal and external examination. This has resulted in a number of significant recommendations for both the industry and for the regulator about their approach to safety and health and the underlying safety culture.

Dr Brady made a number of quite concerning findings about the industry including that it appeared to have accepted a *fatality cycle*, was becoming more reliant of administrative controls at the expense of other higher-order controls, was not providing appropriate training and supervision, and was overlooking the underlying causes of serious accidents.

Throughout the year, industry has been responding to the recommendations. However, this process is not something that can be realised in a short period of time. It will require an ongoing commitment over the long term to making fundamental changes to the way it approaches safety and health.

I would like to see this commitment continue, as I believe the industry has the necessary skills, experience and knowledge to implement the recommendations and continue to drive down the number of serious accidents which occur.

Dr Brady also found that the regulator needed to play a more active role in not only collecting data, but analysing, identifying and proactively disseminating information to the industry about incidents and the potential lessons learned.

The inspectorate's development and dissemination of incident periodicals for industry which regularly examine current safety and health incidents in detail has been a positive step in this direction.

In 2020–21, the regulator must address deficiencies in its reporting system and must commit to developing a greater capacity to collate, categorise, actively search and identify concerning trends in incident data and publish their analysis of this data.

The large amount of paperwork related to safety and health was seen by many stakeholders as a major challenge and something that was diverting time which could be better spent in the field talking to, and observing, workers. Dr Brady was unsure whether this large amount of paperwork was a result of industry having to comply with legislation or if it was driven by the mining companies themselves. To this end, the regulator must carefully consider the types of data it collects and what it does with that data once collected. More data does not necessarily equate to a safer industry. However, better data and more in-depth, qualified analysis that is distributed widely to industry will lead to improved safety outcomes.

From 1 July 2020, the regulator has moved from a part of the Department of Natural Resources, Mines and Energy into a fully independent statutory body—Resources Safety and Health Queensland. This is a significant change for the regulator and one of the key recommendations of the Coal Mine Workers' Pneumoconiosis Select Committee.

An opportunity for the regulator will be to use its independence to be more agile and adaptable to changing industry conditions and to be more flexible to respond to emerging issues. As an independent statutory body, transparency and accountability remain of paramount importance to ensure the expectations of the public are met when it comes to ensuring industry meets its

obligation to protect mine and quarry workers. I strongly encourage the regulator to consult with all tripartite stakeholders equally.

Finally, it is important to note the ongoing impact of COVID–19 on safety and health in the industry and for the regulator. Restrictions on travel and the movement of people makes things more difficult for an industry such as mining and quarrying, much of which is necessarily based in remote areas. It reduces access to skilled and experienced people and increases stress on those who are being relied upon in key roles.

So far the industry has adapted extremely well to the challenges and I expect that this will continue. However, with no end in sight for the pandemic, fatigue and mental health concerns must be acknowledged and addressed by the industry and the regulator and the ongoing effects of COVID–19 must be considered to ensure the mental health of all workers is as much of a priority as their physical health.

While this year has been full of change, and change can be difficult, doing nothing is not an option. In the words of Dr Brady:

> *If the industry continues to take a similar approach to safety, using the same philosophies and methodologies adopted over the past 19½ years, then similar safety outcomes are to be expected.*

Looking ahead, the industry and the regulator must embrace the changes wholeheartedly and break through the fatality cycle if the vision of *Zero Serious Harm* is to be achieved.

DEFINITIONS

Coal mine:	Mine subject to the *Coal Mining Safety and Health Act 1999* and associated Regulation
High potential incident:	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
Mineral mine:	Mine subject to the *Mining and Quarrying Safety and Health Act 1999* and associated Regulation
Lost time injury	An injury resulting in an injured person being unable to work the next day or a longer period, whether they are rostered to work or not
Quarry:	Excavation of hard rock for use in construction (operations covered by the *Mining and Quarrying Safety and Health Act 1999* and associated Regulation)
Queensland Mines Inspectorate:	Regulatory unit within Resources Safety and Health, Department of Natural Resources, Mines and Energy
Serious accident:	An accident at a mine that causes: a) the death of a person or b) a person to be admitted to a hospital as an inpatient for treatment of the injury

Commissioner for

Resources Safety & Health