NSW GOVERNMENT

NSW Resources Regulator

Quarterly safety report

JANUARY TO MARCH 2020

ABOUT THIS REPORT

This quarterly health and safety performance report has been prepared by the NSW Resources Regulator for mining operators in NSW. It contains industry and sector specific information, in addition to information regarding hazards. Wherever possible, trends and patterns have been identified.

The report references sector information about the number of 'active' mines. Active mines have the status: open, intermittent, mines under care and maintenance, open tourist mines, planned and small-scale titles that are current or pending.

The report also contains information on matters of concern to the NSW Resources Regulator including controls and actions that may be implemented to prevent or reduce the likelihood of future safety incidents.

Operators should use the sector specific information, emerging issues and good practice examples presented in this report to assist them in improving safety management systems and undertaking risk assessments at their sites.

This report refers to the date the incident was notified rather than the date the incident took place.

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NSW GOVERNMENT

Quarterly snapshot

The quarterly safety performance snapshots show key measures and assist industry in the development and promotion of safe work practices on mining operations.

7,714 Active mines at the end of the quarter

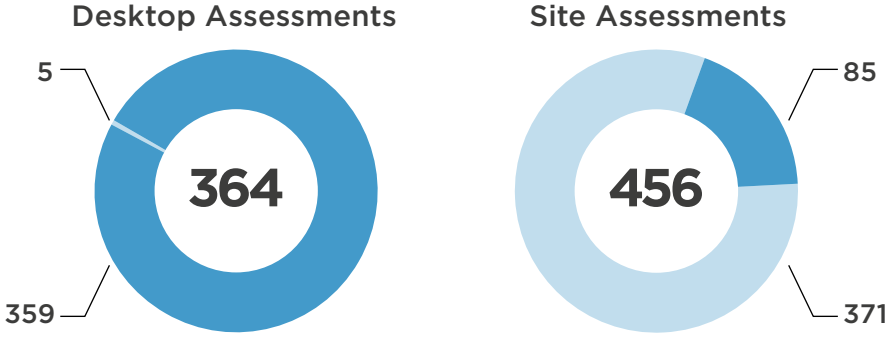
The NSW Resources Regulator regulates safety activities in the following industry sectors

- **127** COAL MINES
- **39** LARGE MINES — metalliferous and large quarries
- **2,683** SMALL MINES — metalliferous, small quarries and other gemstones
- **239** PETROLEUM & GEOTHERMAL — including exploration
- **3,880** OPAL MINES
- **746** EXPLORATION — excluding petroleum and geothermal

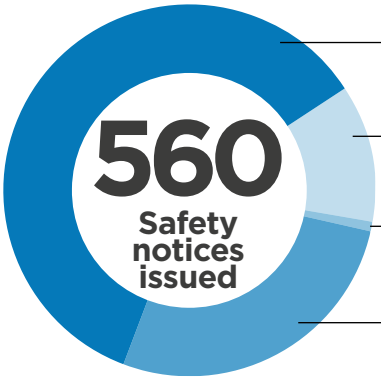
820 Safety Assessments commenced

Proactive

Reactive



COAL	LARGE MINES	SMALL MINES	PETROLEUM AND GEOTHERMAL	OPAL MINES	EXPLORATION SITES	NON-MINES
FROM 342 **281**	**131** FROM 128	**199** FROM 97	**24** FROM 13	**78** FROM 66	**3** NO CHANGE	**104** FROM 76



- **319** WHSA s191 improvement notices
- **58** WHSA s195 prohibition notices
- **1** WHSA s198 non-disturbance notices
- **182** WHS(MPS)A s23 notices of concerns

Quarterly snapshot

NSW Resources Regulator

110 Dangerous incident	Death 0
108 Potentially dangerous incident	Serious injury 17
155 Other high potential incident	Lost time/restricted duty >= 7 days 90
1 Explosives regulation	Medical treatment 45

526
Incident notifications received
based on requirement to report

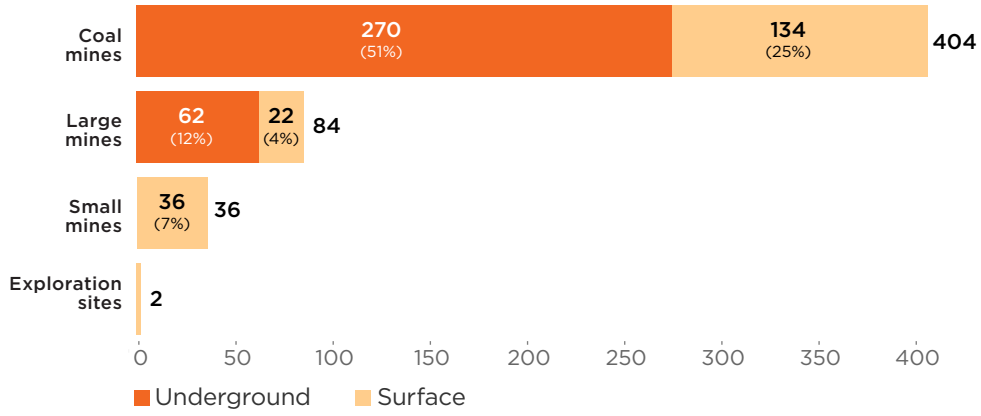
Incident notifications received by sector and operation type

FROM 420 **404** COAL

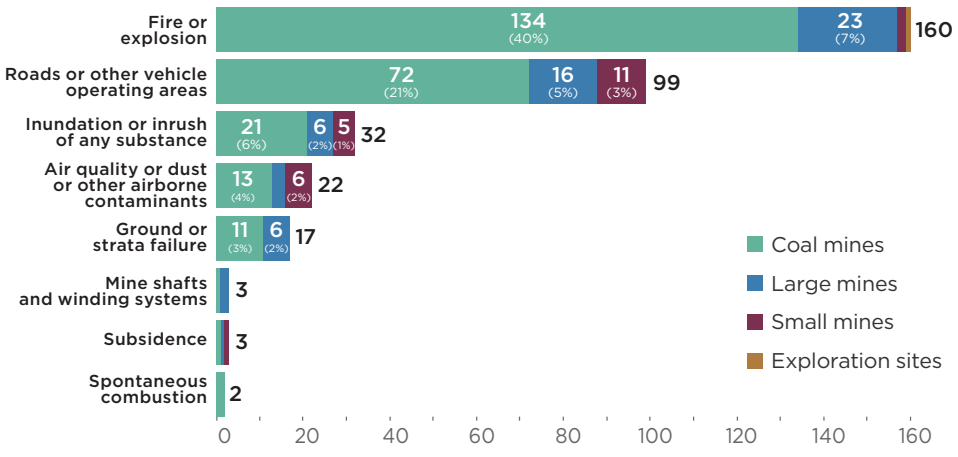
FROM 89 **84** LARGE MINES

FROM 43 **36** SMALL MINES

NO CHANGE **2** EXPLORATION SITES



Incident notifications received by principal hazard and sector



FIRE AND EXPLOSION — FROM 187 **160**

ROADS OR OTHER VEHICLE OPERATING AREAS — **99** FROM 75

INUNDATION OR INRUSH OF ANY SUBSTANCE — FROM 36 **32**

* represents 64.3% (338/526) of all incident notifications

For more information and performance metrics on the New South Wales mining industry visit our website resourcesregulator.nsw.gov.au

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Contents

Executive Summary

This report is prepared to assist mine and petroleum site operators meet their obligations under relevant work health and safety legislation, including the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*. It is also a way in which we monitor progress in implementing our risk-based compliance and enforcement strategy.

As a high-hazard regulator, we focus on compliance with legislative requirements associated with the principal hazards and other high-risk hazards including mechanical and electrical energy and explosives.

As well as providing an overview of incidents across the mining industry, this report looks at the safety performance and regulatory activities of six sectors: coal, large (non-coal) mines and quarries, small mines and quarries (including gemstones), opal mines, petroleum and geothermal sites, and exploration sites.

This report provides information on significant mining events in Australia and globally, summarises safety incident notifications, compliance activities and outcomes for the quarter of January to March 2020 (FY 2020 Q3). For selected measures, data is analysed over a 15-month period from January 2019 to March 2020.

There were no mining-related fatalities at mines in NSW during the quarter.

In the current quarter, we received 526 safety incident notifications. This represents a decrease of 5% compared to the previous quarter (FY 2020 Q2). However, all sector incident rates (notified incidents per active mine) have continued to remain stable during the past 15 months. Two-thirds of safety incident notifications received in the current quarter were notified as high potential incidents and a further 21% were notified as dangerous incidents. More than three-quarters of safety incident notifications received in the quarter (77%; 404 of 526) were from coal mines.

Approximately two-thirds of the safety incident notifications related to principal hazards, with the remainder related to other incidents including working at height and structures.

Classification of the 526 safety incidents notifications received in the current quarter (FY 2020 Q3) revealed that 28% were related to work environment, 21% were related to vehicle or plant incidents and 13% to implosion, explosion or fire.

We completed 820 safety assessments during the current quarter. Approximately, one-third of these (281 of 820) were undertaken in the coal sector. This quarter has also seen an increase in safety assessments within the small mines sector, with 24% (199 of 820) undertaken in this sector.

We conducted 376 proactive assessments (targeted assessments and planned inspections) this quarter, which represents approximately 46% of all assessments. During the same period, 56% (456 of 820) of total assessments commenced were site assessments.

National and international significant events

The NSW Resources Regulator is committed to sharing safety information about significant mining-related events and fatalities to increase industry awareness.

This inexhaustive list includes fatalities and significant events that occurred between **January to March 2020**.

Incidents have been selected based on their relevance to equipment and processes commonly used across the NSW mining industry.

Australia

Fatal injuries

NEW SOUTH WALES

While there were no fatalities reported in the mining sector this quarter, there was one workplace fatality that is relevant to the industry to consider the hazard.

- An 18-year-old apprentice auto electrician died in an incident at a workshop near Dubbo. The young worker was found trapped between the cab of the truck and its engine. While the incident did not take place at a mine site, it is relevant to the industry.

  For further details refer to the Incident Information Release.

OTHER STATES

Queensland

There was one fatality reported in this quarter.

- A 33-year-old contract tyre fitter was fatally injured while changing a large, wheel assembly (tyre and rim) on a rear axle expanding low loader at an open cut coal mine in Queensland's Bowen Basin. The tyre fitter was found trapped underneath a wheel assembly.

  For further details refer to the Resources Safety and Health Newsflash.

Western Australia

There were no fatal injuries reported in this quarter.

Dangerous incidents

NEW SOUTH WALES

Four dangerous incidents of note were published as safety bulletins or alerts by the Resources Regulator this quarter. A safety alert relating to COVID-19 was also published.

TABLE 1. NSW RESOURCES REGULATOR SAFETY ALERTS AND BULLETINS

DATE PUBLISHED	REFERENCE	TITLE
04 Feb 2020	SB20-01	Failure of highwalls
28 Feb 2020	SA20-01	Brake pad dislodges during winder test
28 Feb 2020	SA20-02	Roof fall buries continuous miner
05 Mar 2020	SA20-03	Tailgate hits worker's head
25 Mar 2020	SA20-04	COVID-19 related worker complaints

OTHER STATES

Queensland Department of Natural Resources, Minerals and Energy

There were three safety alerts, one bulletin and eight significant incidents published in Queensland this quarter.

- A coal mine worker was seriously injured when he was struck by an Eimco Load Haul Dump bucket. As the Eimco articulated it momentarily pinned him between the side of the bucket and the rib. This resulted in crush injuries due to the impact from the Eimco bucket. Refer to Mines safety alert No.370.
- Multiple incidents have occurred, where primers (detonators and boosters), have been impacted by the aggregate material during stemming processes, causing significant erosion to the explosive's composition.
- Incidents of this nature pose a serious risk to the safety of persons involved in explosives loading activities, through the potential for an unintended initiation, as cast boosters and detonators are susceptible to initiation through impact and friction. Refer to Explosives safety alert No.100.
- A serious incident, causing the death of a coal mine worker in 2019, has been investigated. The findings from the investigation and related incidents in Queensland and other states, suggest that significant similarities exist across the industry, requiring mine operators to audit their equipment and operating practices to ensure the lessons learnt are not forgotten. Refer to Mine safety bulletin No.185.

- A serious accident occurred while coal mine workers were undertaking track repairs on a Hitachi EX1900 excavator at a mine site. The workers were preparing to use a 360-tonne track press. Whilst aligning the track press in preparation to press out a track pin the pressurised cylinder head plate failed catastrophically.

  The failed component struck a worker causing serious arm injuries. He was airlifted to a Brisbane hospital and has required multiple operations and ongoing rehabilitation. The injured worker was working alongside two others at the time of the incident, neither of whom sustained injuries. Refer to Mines safety alert No.371.
- A worker was hit by an integrated tool carrier as he stopped to fasten down a jumbo drill steel that had come loose from the tray of the light vehicle he was driving. As the tool carrier was travelling up the decline, it collided with the tray of the light vehicle, pinning the worker, who received serious hip and abdominal injuries. Refer to Incident periodical - January 2020.
- A light vehicle travelling along a main haul road during the hours of darkness, contacted a centre bund, at an approach to an intersection. This resulted in a complete rollover, with the driver sustaining bruises to the forehead. Refer to Incident periodical - January 2020.
- While a manned rear dump truck was being jumpstarted, it rolled forward and contacted a light vehicle parked in front of it. The two maintenance workers that were in the immediate vicinity when this occurred, were able to avoid injury. Refer to Incident periodical - January 2020.
- A quarry worker climbed into a transfer chute through the discharge point to bar-down hung up material. While barring down the worker became uncomfortable and was exiting the chute when material fell and engulfed him, trapping him inside. The worker was hospitalised with serious injuries as a result of this event. Refer to Incident periodical - January 2020.
- A failure occurred with the slump of a drill bench. The advancing end wall slumped beneath a large blast hole drill, that was drilling the holes at the edge of the drill pattern. The drill moved with the slumped material, initially coming to rest at approximately 15 degrees from vertical, allowing the operator to evacuate.

  The material continued to move over time, causing the drill to slump further. Blasted material was pushed into position at the toe to buttress the face and support the drill.

  A recovery plan was initiated, and the drill was recovered to stable ground. Refer to Incident periodical - March 2020.
- A blasthole drill rig was conducting drilling operations during a nightshift. The drill operator halted operation to investigate a movement, caught in their peripheral vision. The operator found two lengths of steel handrail on the ground near the drill deck. Investigation determined the steel lengths had detached and fallen from the mast. Refer to Incident periodical - March 2020.

- An unplanned movement occurred when repairs to an electric rope shovel were undertaken in parallel. As the tracks were broken to provide access for maintainers to replace parts, the dipper was raised and swung 90 degrees. When the dipper was lifted off the ground, the shovel rolled forward and came off the tracks. Refer to Incident periodical - March 2020.
- As an excavator operator placed a bucket load of rock in a truck tray and slewed for the next pass, rock bounced off the side of the rear dump tray and came through the front windscreen. The rock struck the cabin roof and exited via the rear windscreen. The operator suffered superficial physical injuries from the broken glass. See Incident periodical - March 2020.

Western Australian Department of Minerals and Resources (DMIRS)

There were five safety bulletins and two significant incidents published in Western Australia during the quarter.

- A bulldozer operator sustained serious injuries to their leg, after being crushed between a hydraulic access staircase and a handrail, which were attached to the bulldozer. Refer to Significant Incident Report no.280.
- Two workers at an underground mine were approaching a paste retaining wall during paste filling, when the wall catastrophically failed. An inrush of fluidised paste entered the drive inundating the workers, who escaped by climbing up the wall mesh. Refer to Significant Incident Report no.279.

TABLE 2. WA DEPARTMENT OF MINERALS AND RESOURCES - MINES SAFETY BULLETINS

REFERENCE	TITLE
MSB No.169	Managing noise-induced hearing loss (NIHL) in the Western Australian mining industry - Mines Safety Bulletin No. 169
MSB No.170	Braking Performance of Relocation Systems for Heavy Mining Equipment - Mines Safety Bulletins No. 170
MSB No.171	Pit wall failure management - Mines Safety Bulletin No. 171
MSB No.172	High pressure compressor systems on drill rigs - fire and explosion hazard - Mines Safety Bulletin No. 172
MSB No.173	Inspection and maintenance of handrails - Mines Safety Bulletin No. 173

New Zealand

Dangerous incidents

In New Zealand, four dangerous incidents were published during the quarter:

- A driver was able to exit to safety as his truck rolled over a tip edge. The subcontractor driver delivered a truck and trailer load of rock to a site. He tipped the load successfully, then manoeuvred the trailer to tip the truck at the edge of a drop-off. The driver then engaged the PTO to lift the truck hoist, while also engaging the clutch. As he released the clutch, the truck jerked and jumped backwards, resulting in him losing control and traction. The driver removed his seatbelt and jumped clear as the truck rolled backwards over the face. Refer to Safety Alert.
- A worker suffered serious injuries to his feet welding a heavy machinery component in a workshop. The welder was working on a grader blade turn circle, that was not chocked securely. The chocked stand failed, and the turn circle rotated downwards onto the concrete, contacting the workers feet that were positioned underneath, causing him severe crush injuries. Refer to Safety Alert.
- An operator at a quarry was injured when his excavator rolled onto its side. While sorting material on a pad approximately one metre high, the left track moved and caused the excavator to unbalance and roll over. Refer to Safety Alert.
- Unplanned movement as a result of unstable parking practices is a common risk associated with vehicles at mines and quarries. A service truck driver had a near miss when a water cart rolled and collided with the vehicle he was standing beside. After breaking down on a ramp and being repaired (in pit), a water cart began roll forward, approximately seven metres and collided with the rear of the vehicle servicing it. Refer to Safety Alert.

United States of America

Fatal injuries

The United States of America's Mine Safety and Health Administration (MSHA) published the following five fatal injuries and one safety alert during the quarter:

- A 30-year-old mine worker at a surface limestone facility fell into a portable load out bin and died at the scene. He had less than a years' experience at the mine and only two weeks experience at this task. Refer to Fatality Alert.
- A 45-year-old mine examiner, with over 11 years' experience, was traveling down the drift in a personnel carrier on his way into an underground coal mine. Evidence indicates that the personnel carrier struck the left rib near

the bottom of the slope. The mine worker was found unresponsive beside his vehicle. Refer to Fatality Alert.

- A contractor mechanic with over 20 years' experience, was fatally injured on the surface of an underground coal mine. While attempting to help a truck driver position a trailer, the truck moved forward and the trailer wheels rolled over the worker. The contractor was transported to the hospital, where he later died. Refer to Fatality Alert.
- A 29-year-old equipment operator, with just over a year's experience, was fatally injured at a construction sand and gravel pit. The worker was struck by a 20' x 8' x 1-inch metal plate that was being installed on a feeder hopper. Refer to Fatality Alert.
- A 28-year-old foreman with several years' experience, was carrying out repair work on a dredge at a sand mining operation, when he was involved in a fatal incident. The worker was priming the main suction pump when a two-inch line ruptured and the resulting forces knocked the victim into the water. Refer to Fatality Alert.
- Damaged or defective welds on aerial lifts, have caused several fatalities in the mining industry. These include, a weld splice failure, (on a recently repaired lift arm) that fractured and struck a mechanical worker on the head, causing a fatal injury. Refer Safety Alert.

Compliance and enforcement

The NSW Resources Regulator uses a range of tools to promote and secure compliance in mines and petroleum sites in relation to work health and safety legislation. These include desktop assessments, site inspections, investigations and enforcement actions, such as issuing notices and commencing prosecutions.

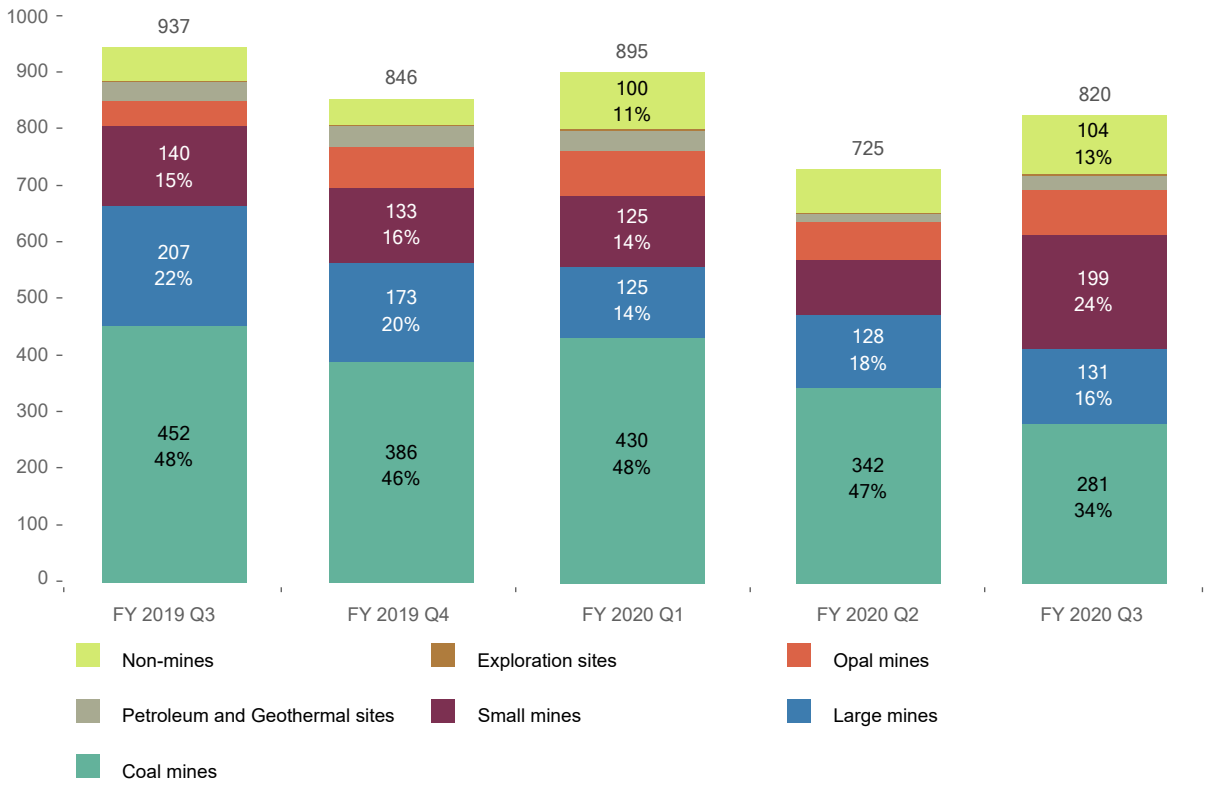
Detailed information regarding compliance activities, priorities, outcomes and reports are published on our website and in our monthly business activity reports.

Safety assessments by sector

The total number of safety assessments commenced during the past 15 months is shown below, by mining sector.

The graph below shows that the coal sector continues to be a priority for our safety assessment programs, accounting, on average, for 45% of safety assessments, during the previous five quarters. The last quarter also shows a rise in safety assessments commenced at small mines.

FIGURE 1. SAFETY ASSESSMENTS COMMENCED BY SECTOR JANUARY 2019 TO MARCH 2020



Safety assessments by category and nature

The focus of our onsite compliance activity is on preventing incidents through planned, risk-based interventions (proactive).

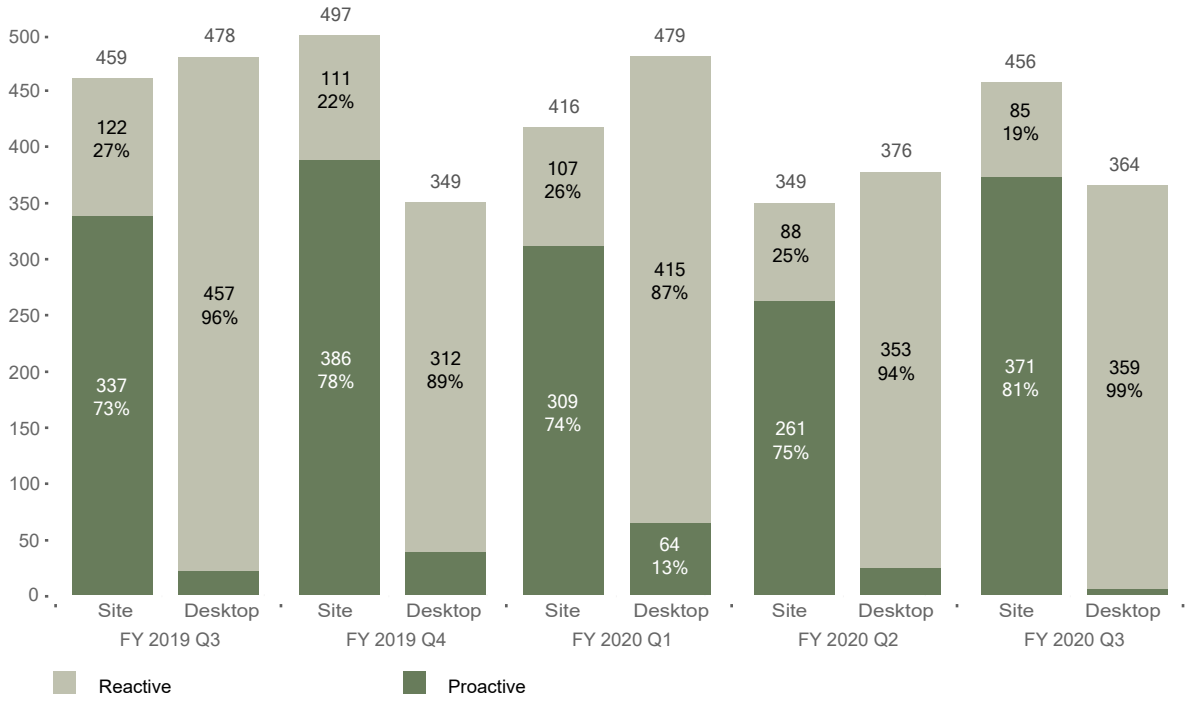
Site-based (visiting mine sites) and desktop activities are both important regulatory tools.

Desktop assessment activities include reviews of control measures following an incident, review of standing dust committee reports, assessment of high-risk activity notifications, applications for exemptions from work health and safety laws, subsidence management plans and preparation for site work.

Proactive onsite assessments focus on establishing whether critical controls have been effectively implemented.

The graph below shows the proportion of site-based and desktop activities commenced for proactive and reactive safety assessments, for each quarter since January 2019. In the past 15 months, on average, just over 76% of our site-based activities were proactively focused on incident prevention.

FIGURE 2. SAFETY ASSESSMENTS COMMENCED BY CATEGORY AND NATURE JANUARY 2019 TO MARCH 2020

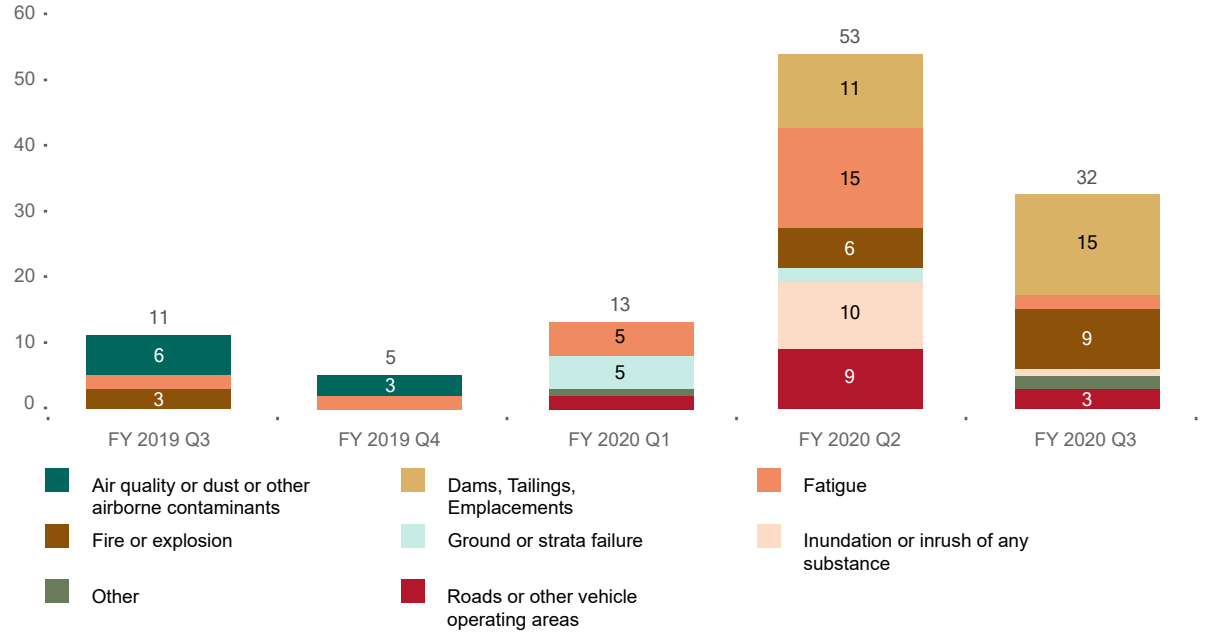


Targeted assessment program

Our targeted assessment program (TAPs) establishes a risk-based and proactive approach for assessing the extent to which critical controls for managing principal mining hazards have been implemented. Each TAP is performed by a team of inspectors from various disciplines. The team works with the mining operation's management team to ensure a thorough assessment is conducted.

In the current quarter, 32 targeted assessments were commenced, across six different hazards.

FIGURE 3. TARGETED ASSESSMENT SITE ASSESSMENTS COMMENCED BY HAZARD JANUARY 2019 TO MARCH 2020

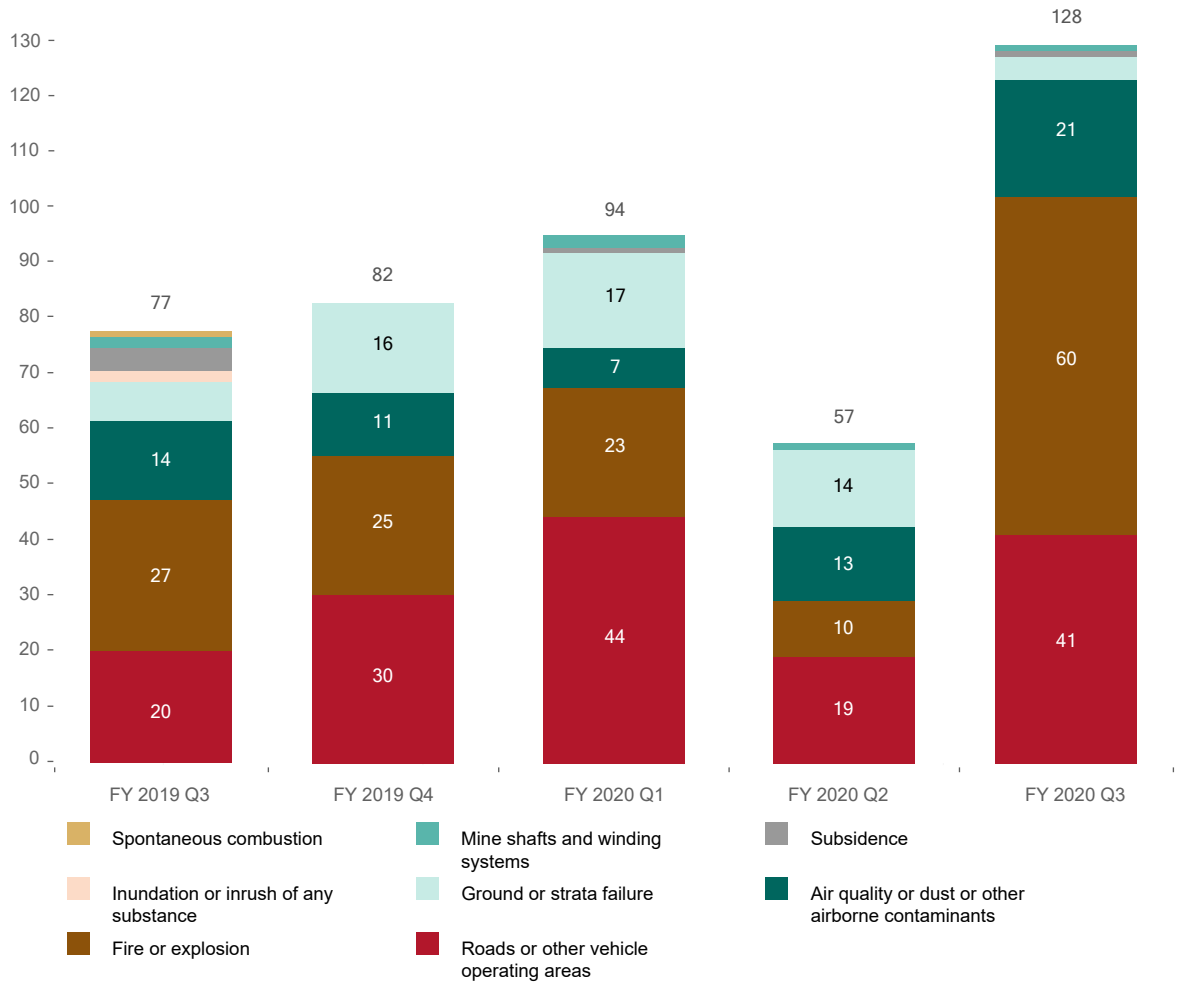


Planned inspections

Planned inspections assist in identifying compliance weaknesses which could lead to an incident or injury. These inspections follow a pre-prepared plan focusing on a specific hazard or principal control plan.

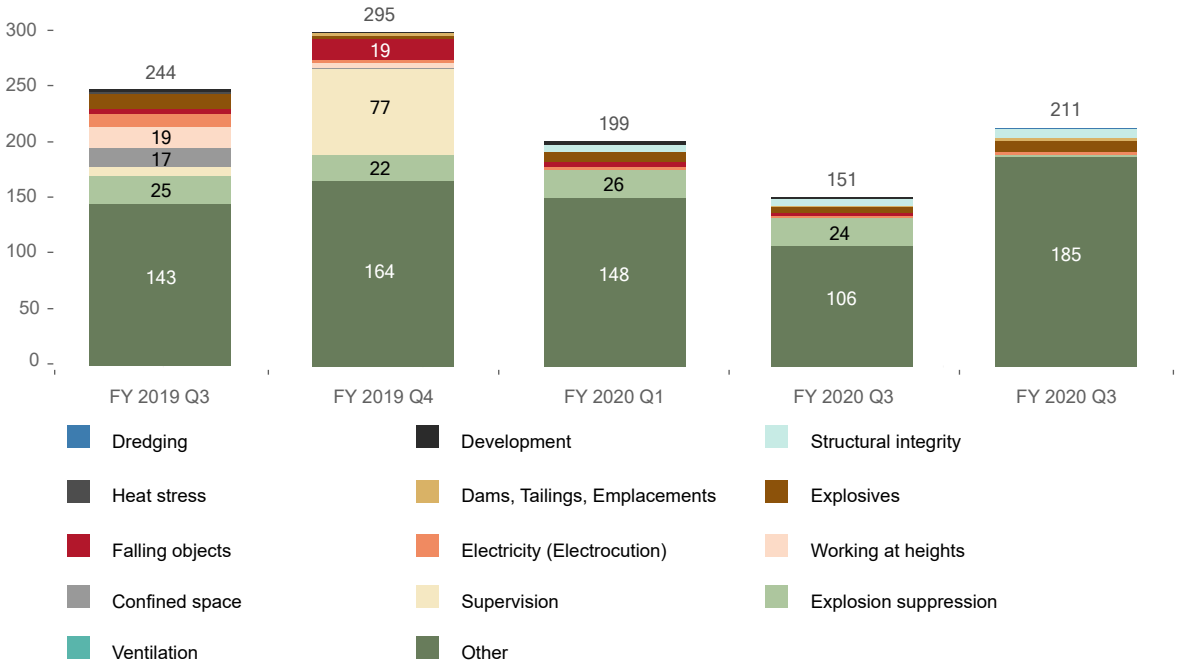
In the current quarter, planned inspections were conducted on the principal hazards shown in the graph below.

FIGURE 4. PLANNED INSPECTION SITE ASSESSMENTS COMMENCED BY PRINCIPAL HAZARD JANUARY 2019 TO MARCH 2020



The graph below shows planned inspection site assessments, commenced on other hazards.

FIGURE 5. PLANNED INSPECTIONS SITE ASSESSMENTS COMMENCED BY OTHER HAZARD JANUARY 2019 TO MARCH 2020



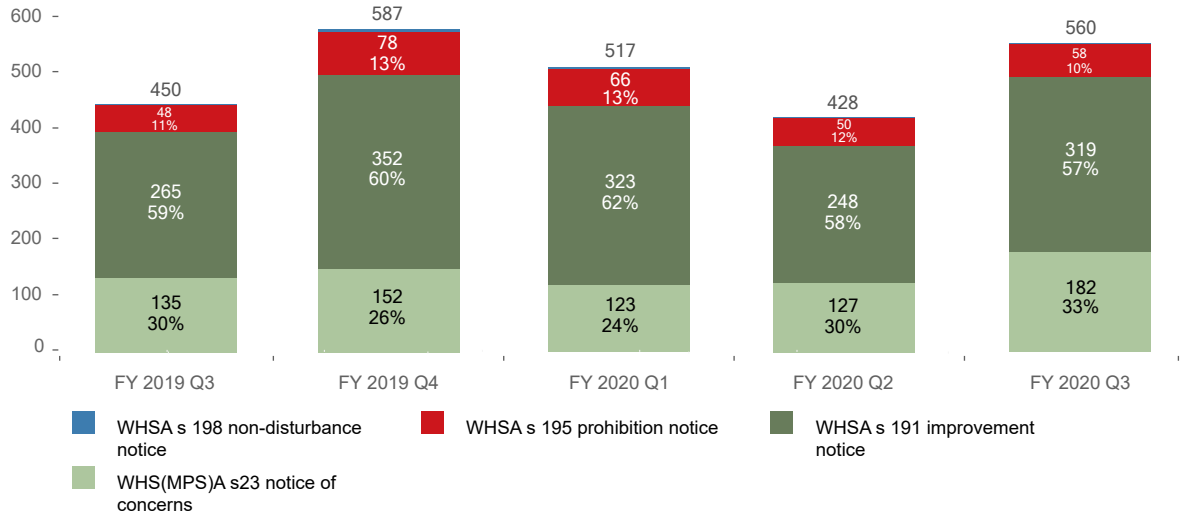
Safety notices issued

Safety notices issued include prohibition and improvement notices, notices of concern (written notice of matters) and non-disturbance notices.

The graph below shows the number and types of safety notices issued in the five quarters since January 2019. The number of notices issued during the five quarters does vary with the peak showing in FY2019 Q4, a reflection of the state-wide high visibility operation conducted in June 2019.

In the current January - March 2020 quarter (FY 2020 Q3), our inspectors issued 560 safety notices. This represents a 31% increase (132) over the 428 safety notices issued in the previous quarter. More than half (57%) of safety notices in the current quarter were improvement notices, 33% were written notice of concerns and 10% (58 of 560) were prohibition notices.

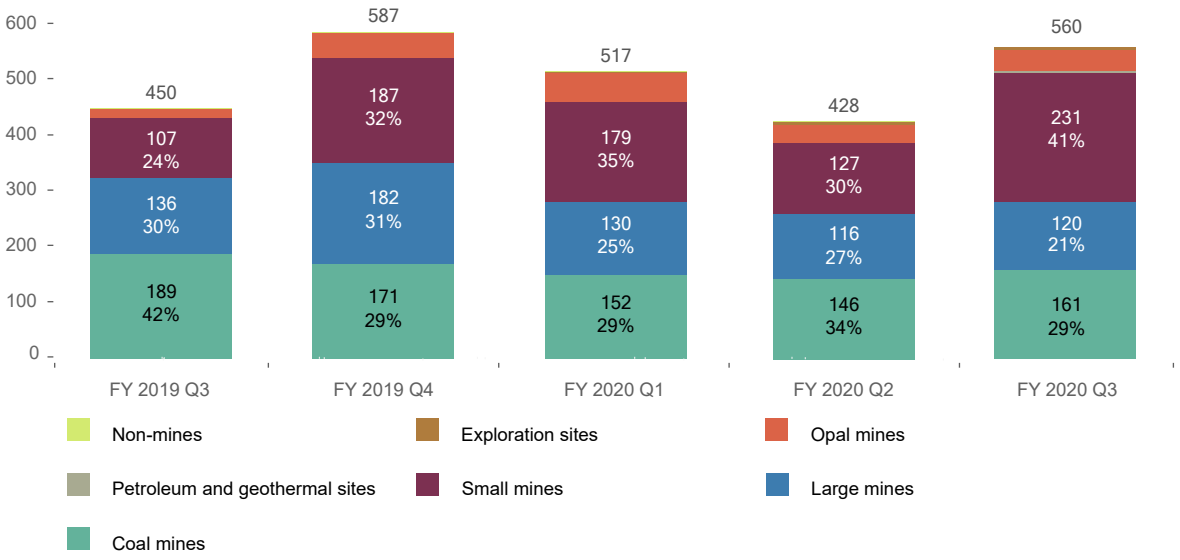
FIGURE 6. SAFETY NOTICES ISSUED BY NOTICE TYPE JANUARY 2019 TO MARCH 2020



For the January – March 2020 quarter, approximately 41% (231 of 560) of safety notices were issued to small mines, making it the largest contributing sector to the number of notices this quarter. This represents an increase in just over 80% compared to the previous quarter.

During the quater 29% (161 of 560) of notices were issued to the coal sector, while another one in five (21%) of safety notices, were issued to large mines.

FIGURE 7. SAFETY NOTICES ISSUED BY SECTOR JANUARY 2019 TO MARCH 2020



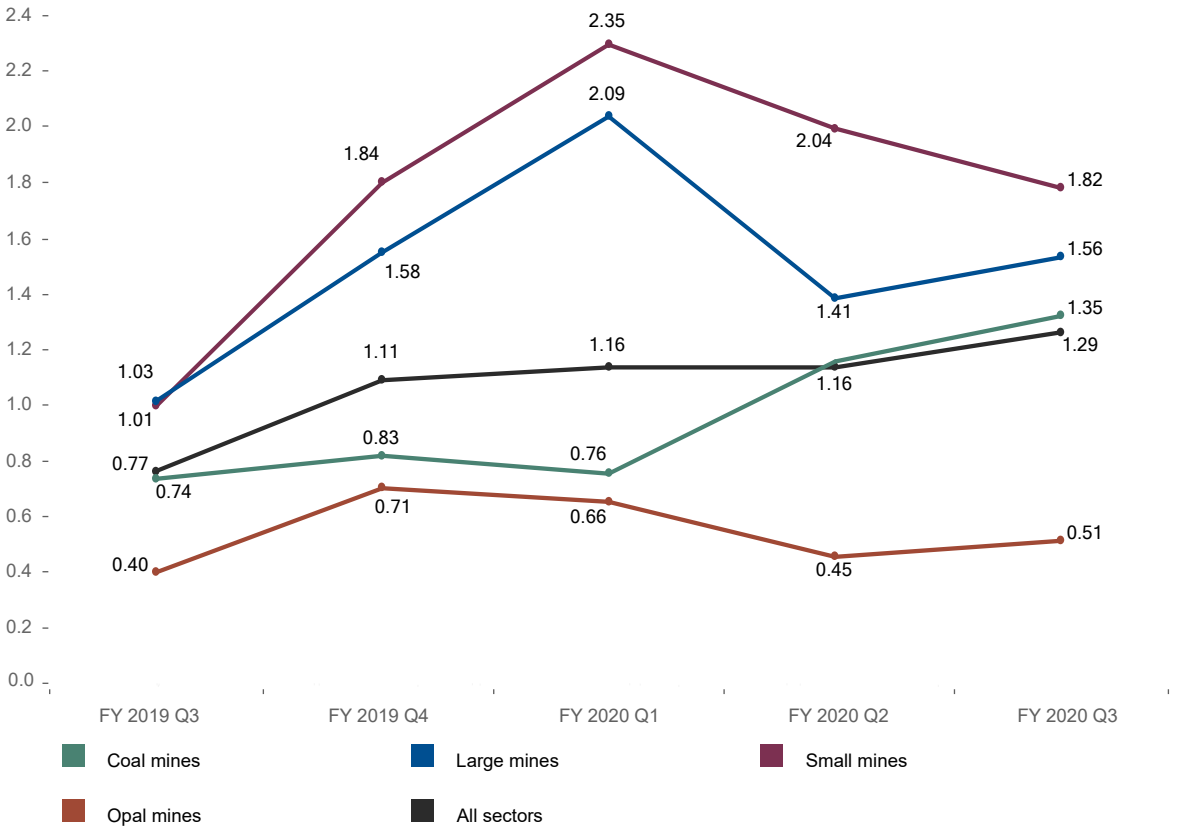
Safety notice issue rate for program plans

Across all mining sectors the safety notice issue rate was 1.29 per programmed assessment for the January – March 2020 quarter. Compared to the previous quarter this represents an increase of around 10%. The rate of notices issued per programmed assessment has increased across all sectors, except in the small mines sector. Since FY 2019 Q3 there has been a steady upward trend in the overall notice issue rate per assessment.

While notices may be issued in relation to incident notifications and various tasks including High Risk Activities, only those that have been issued under a program plan assessment have been reported here. In the current quarter approximately 88% of notices issued related to program plans and almost half of all assessments were conducted under a program plan (Targeted Assessment, Planned Inspection, Targeted Intervention and Technical Services).

Of note, petroleum and geothermal sites, exploration sites and non-mines, have been included in the all sectors category.

FIGURE 8. SAFETY NOTICE ISSUE RATE PER PROGRAMMED ASSESSMENT BY SECTOR JANUARY 2019 TO MARCH 2020



Hazards

The Work Health and Safety (Mine and Petroleum Sites) Regulation 2014 (the regulation) identifies principal hazards for special consideration because they have a reasonable potential to result in multiple deaths in a single incident or a series of recurring incidents.

There are nine principal mining hazards specified in the regulation. A principal hazard can also be identified by the mine operator through risk assessment.

Principal mining hazards

GROUND OR STRATA FAILURE

FIRE OR EXPLOSION

INUNDATION OR INRUSH OF ANY SUBSTANCE

GAS OUTBURSTS

MINE SHAFTS AND WINDING SYSTEMS

SPONTANEOUS COMBUSTION

ROADS OR OTHER VEHICLE OPERATING AREAS

SUBSIDENCE

AIRBORNE DUST AND OTHER AIRBORNE CONTAMINANTS

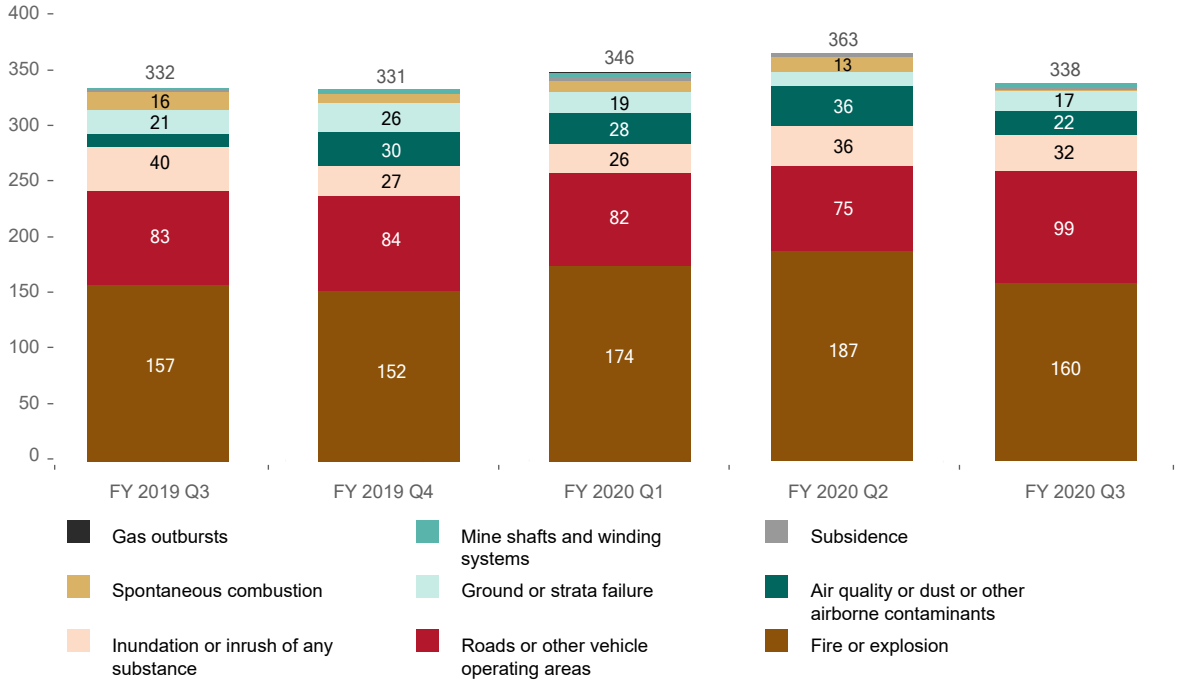
(HAZARDS IDENTIFIED BY THE MINE OPERATOR) PROHIBITED ITEMS OR SUBSTANCES

The figure below shows the number of incident notifications received for the current quarter (FY 2020 Q3) where the incident relates to a principal hazard.

Overall there were 526 incident notifications received in the current quarter. Of these, approximately two-thirds related to principal hazards and the remainder related to other incidents including working at height and structures.

The chart below presents a further breakdown of numbers of incidents notifications received by quarter related to principal hazards and principal control plans as defined in clause 5 of the regulation.

FIGURE 9. INCIDENT NOTIFICATIONS RECEIVED BY PRINCIPAL HAZARD JANUARY 2019 TO MARCH 2020



The table below shows all the notifications by principal hazard for the past five quarters.

TABLE 3. INCIDENT NOTIFICATIONS RECEIVED BY PRINCIPAL HAZARD JANUARY 2019 TO MARCH 2020

PRINCIPAL HAZARD	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	TOTAL
Gas outbursts	-	-	1	-	-	1
Mine shafts and winding systems	1	3	3	1	3	11
Subsidence	2	1	4	3	3	13
Spontaneous combustion	16	8	9	13	2	48
Ground or strata failure	21	26	19	12	17	95
Air quality or dust or other airborne contaminants	12	30	28	36	22	128
Inundation or inrush of any substance	40	27	26	36	32	161
Roads or other vehicle operating areas	83	84	82	75	99	423
Fire or explosion	157	152	174	187	160	830
Total - Principal Hazard	**332**	**331**	**346**	**363**	**338**	**1,710**
Total - Other	**181**	**164**	**215**	**191**	**188**	**939**
Total Incidents	**513**	**495**	**561**	**554**	**526**	**2,649**

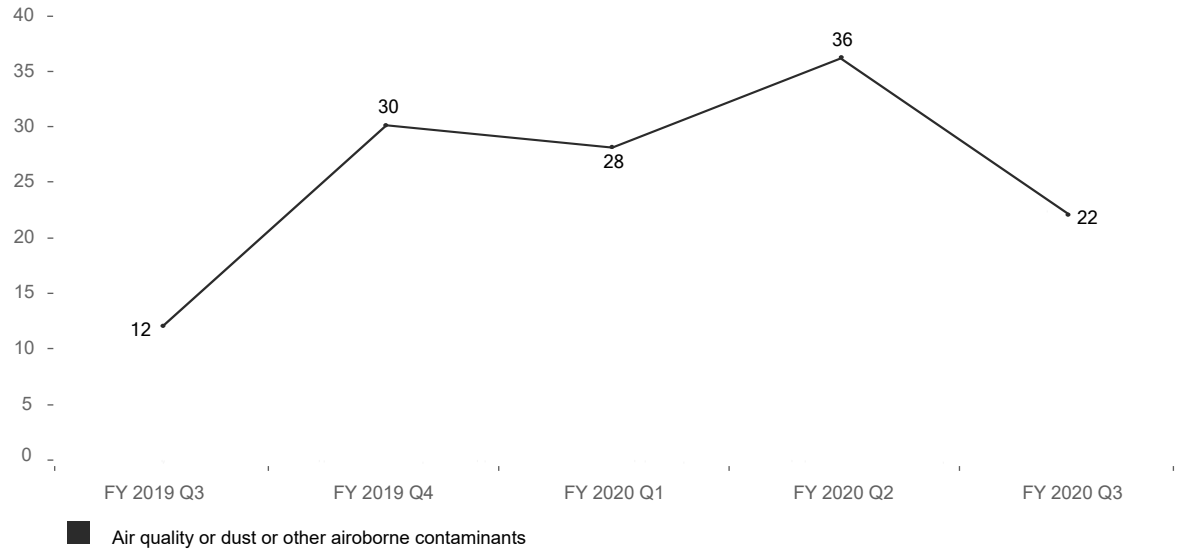
FROM 36
22

Air quality, dust or other airborne contaminants

Airborne contaminants comprise a large and varied range of substances and forms. Coal and silica particles, along with methane and carbon monoxide, are regularly present in mining as dusts, fumes and vapours. These contaminants have exposure standards and can affect workers rapidly (CO or CO2) or over several years (coal or silica).

The figure below shows that incident notifications related to airborne contaminants decreased 39% from the last quarter.

FIGURE 10. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD AIR QUALITY, DUST OR OTHER AIRBORNE CONTAMINANTS JANUARY 2019 TO MARCH 2020



REVISION TO SILICA EXPOSURE STANDARD

The new respirable crystalline silica workplace exposure standard of 0.05mg/m3 will take effect in NSW from 1 July 2020. The new exposure standard is prescribed following a revision of the Workplace Exposure Standards for Airborne Contaminants (WESFAC).

Mines and petroleum sites will need to report exceedances of the new exposure standard to the NSW Resources Regulator from 1 July 2020.

We recognise that the ability to meet the new standard, in a relatively short time frame, will be a challenge to some mine operators. However, in consideration of the insidious nature of silicosis and other respirable dust diseases, it is our position that a reduction in the exposure standard is appropriate and compliance is achievable through the application of the hierarchy of controls.

The position paper details our regulatory approach during the period of July - December 2020 to assist the NSW mining industry in managing the transition to compliance with the new exposure standard.

SERIOUS INJURY - WORKER INJURED AFTER INGESTING CORROSIVE, AIRBORNE SUBSTANCE

A senior plant attendant was seriously injured after ingesting hydrated lime. The worker was cleaning and inspecting an area within a lime hydration plant, at the time of the incident.

The mine's early investigation found that the worker caused hydrated lime to become airborne and he inhaled the substance. The worker was taken to hospital, where it was confirmed he had suffered a corrosive throat injury.

Recommendations:

- Mine operators are reminded that they must provide and maintain safe systems of work.
- Workers are reminded that correct personal protection equipment (PPE) must be worn in areas designated by the mine operator.
- Respiratory protective equipment is the last line of defence in the control of airborne dust inhalation.

WORKER CONTRACTS MIXED DUST PNEUMOCONIOSIS

A worker employed at various underground coal mines in the southern coalfields of NSW contracted mixed dust pneumoconiosis, secondary to exposure of coal dust and silica. He also worked as a motor mechanic for 11 years and was in the civil construction and tunnelling industry for about 18 months.

In consideration of the specific nature of the medical diagnosis and the worker's employment history, it is reasonable to conclude that the worker's condition is related to his work as an underground coal miner, however it cannot reasonably be determined, based on a review of the evidence obtained, whether the worker contracted the disease as a consequence of exposure while working at any particular mine.

Refer to the incident investigation release IIR20-01.

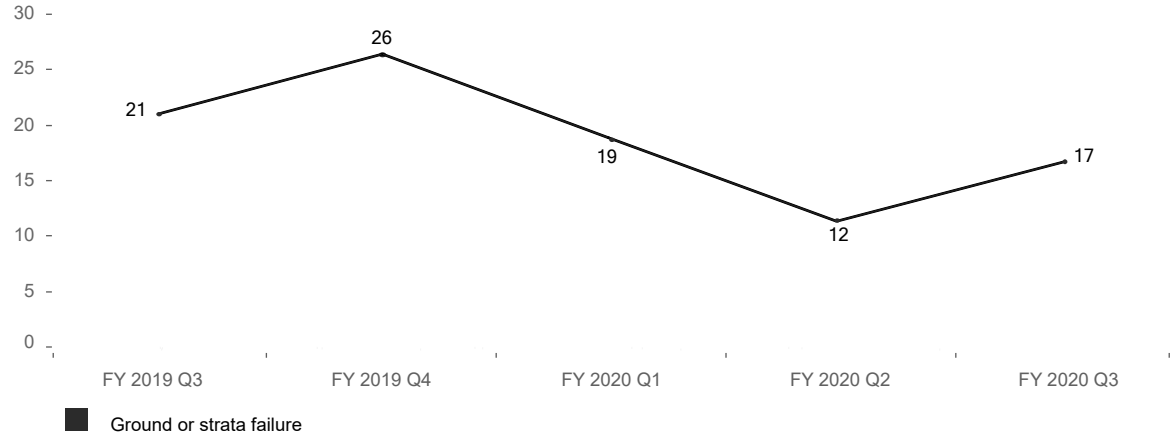
Ground or strata failure

17
FROM 12

Ground or strata failure is an ever-present hazard in both surface and underground mining, with a significant risk posed to workers from unplanned movement of ground.

The figure below shows that incident notifications related to ground or strata failure have risen slightly, following a decrease for the three quarters prior.

FIGURE 11. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD GROUND OR STRATA FAILURE JANUARY 2019 TO MARCH 2020



DANGEROUS INCIDENT - STRESS-INDUCED COAL BURST EVENT

An underground coal mine experienced a stress-induced coal burst caused by localised conditions (longwall approaching a stub, goaf hanging/cantilevering.) No workers were in the immediate vicinity when the burst occurred.

Recommendations:

- Predicting coal bursts is not precise, so mine operators should consider that when an increased coal burst potential has been identified because of the presence of geological structure or changes in stress regimes, control measures should be implemented to reduce the likelihood of a coal burst occurring, and worker exposure should one occur.

Related alerts and bulletins:

- IIR16-05 Austar coal burst
- Report into double fatality at Austar coal mine on 15th April 2014

DANGEROUS INCIDENT - QUICK THINKING PROTECTS WORKERS

A slip in a 60 metre highwall resulted in about 2500 cubic metres of material falling. The dimensions were about 45 metres high with the maximum extent from the highwall toe of 10 to 15 metres. A catch windrow was in place under the highwall about 10 metres from the highwall toe. The slip was noticed early enough to remove all workers from the area before the material fell to the ground.

Recommendations

- Mine operators must have safe systems of work in place to inspect highwalls. These inspections must consider weathering effects, ground water and conditions that affect the high wall stability.

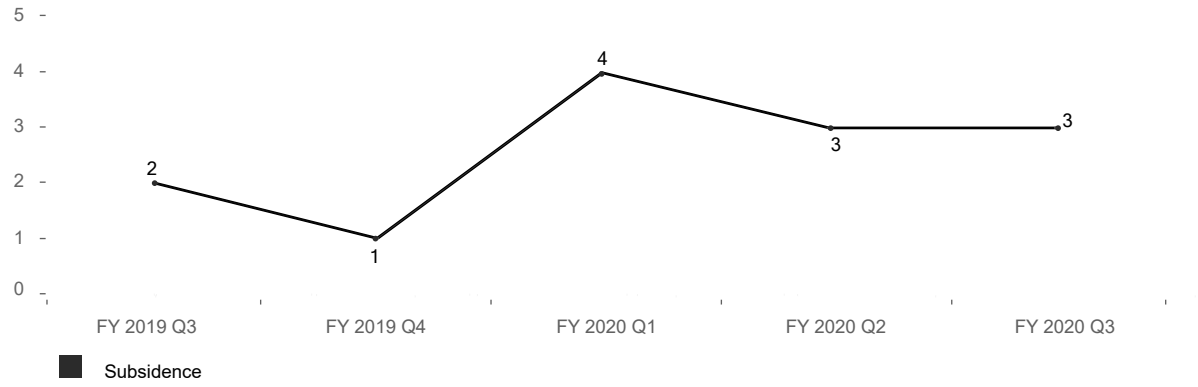
Following several incidents where people and equipment have been exposed to significant health and safety risks as a result of highwalls, low walls and dumps failing, the NSW Resources Regulator has published SB20-01 Failure of highwalls.

Subsidence

Subsidence hazards are a potential in any land, below which, there has been underground mining. The potential to cause significant damage (from deformation or sinkholes) to infrastructure (roads, dwellings etc.) and injure persons nearby, makes this a principal hazard in NSW.

The figure below shows incident notifications for subsidence is consistent with the quarter prior.

FIGURE 12. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD SUBSIDENCE JANUARY 2019 TO MARCH 2020



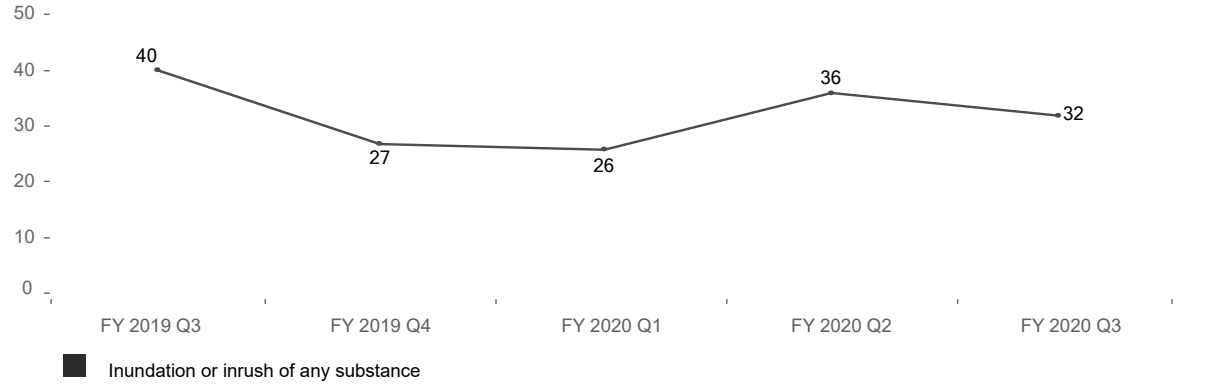
FROM 36
32

Inundation or inrush of any substance

Inundation and inrush is a low frequency, high consequence hazard, particularly in underground mining. Incidents often involve inrushes of water or inundation by denser materials (sand or rock). The potential to cause multiple fatalities in a single event like at Gretley Colliery in 1996, make this a principal hazard in NSW.

The figure below shows that incident notifications related to inundation or inrush decreased slightly from last quarter.

FIGURE 13. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD INUNDATION OR INRUSH JANUARY 2019 TO MARCH 2020



DANGEROUS INCIDENT - WORKER INJURED FROM BLOCKAGE

An operator at a surface coal mine was responding to a blockage in a feeder under a coal loading bin. The operator cleared the blockage and normal feed resumed. Shortly after, wet material flowed out of the feeder chute and hit the operator in the chest, knocking him off his feet. The operator suffered bruising.

The plant was processing difficult material that needed the addition of water to keep it moving through the plant. This event was preceded by an upstream blockage in a sizer that was hosed out.

Recommendations

When developing the control measures to manage the risks of inundation or inrush of any substance, mines must consider:

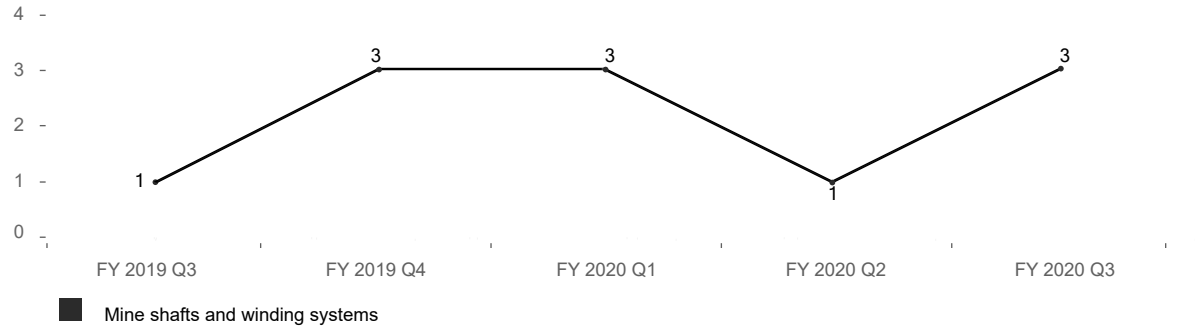
- failure or blockages of flow channels
- the potential for the accumulation of water, gas or other substances, or materials that could liquefy or flow into other workings or locations.
- In addition, mine operators should have a written procedure for the task of clearing a blocked chute and they should ensure workers adhere to the procedure.

Mine shafts and winding systems

Mine shaft integrity and the operation of winding systems require specific focus. The safe movement of material and workers up/down mine shafts is hazardous and has the potential to impact on the safety of multiple workers at a mine.

The figure below shows incident notifications related to mine shafts and winding systems increased from last quarter but is consistent with the two quarters prior.

FIGURE 14. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD MINE SHAFTS AND WINDING SYSTEMS JANUARY 2019 TO MARCH 2020



Gas outbursts

Gas outbursts are not a high frequency hazard event but their often sudden and violent nature, has the potential to cause fatalities to workers nearby. This hazard also includes the liberation of gases that can asphyxiate, explode or cause a fire. These circumstances make this a principal hazard in NSW.

There were no incident notifications for gas outbursts this quarter.

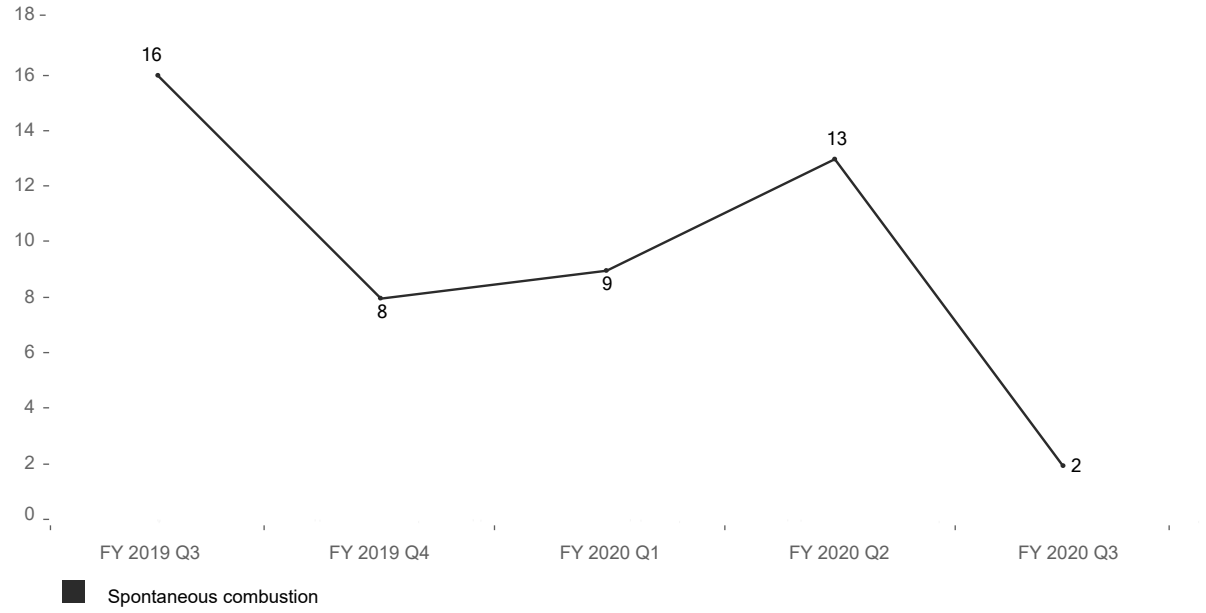
FROM 13
2

Spontaneous combustion

While spontaneous combustion (of coal) is a hazard exclusive to the coal sector, the consequences have the potential to cause multiple fatalities and devastate entire communities.

The figure below shows an 85% decrease in incident notifications related to spontaneous combustion compared to last quarter.

FIGURE 15. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD SPONTANEOUS COMBUSTION JANUARY 2019 TO MARCH 2020

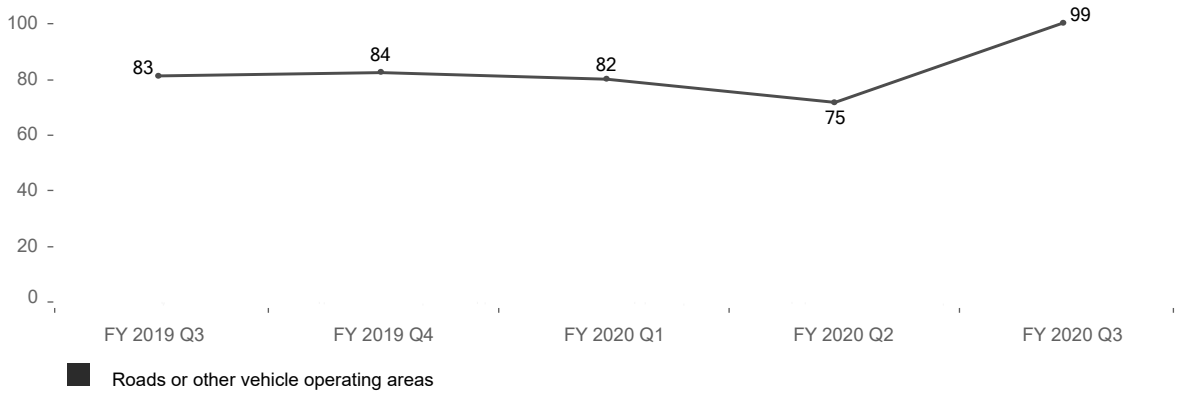


99
FROM 75

Roads or other vehicle operating areas

Vehicle movements in and around mine sites, require specific design considerations and controls, to ensure that collisions and other vehicular accidents do not occur, and place workers lives at risk. The high volume of vehicular interactions on mine sites and the size of the mobile plant utilised classifies this as a principal hazard in NSW.

FIGURE 16. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD ROADS OR OTHER VEHICLE OPERATING AREAS JANUARY 2019 TO MARCH 2020



INVESTIGATION INFORMATION RELEASE - OPEN EDGE LEFT UNPROTECTED

A worker in a light vehicle, drove off an open edge (inactive shovel face) and fell about 14 metres. The driver had been conducting blast sentry clearance in the area. The driver was unaware that a section of the bund across the road leading to the inactive face had been opened to allow two drill rigs to tram from the blast area. The bund was not replaced, and no other barricade or signage was put in place to prevent vehicle access to the area. The area had previously been a roadway before being excavated.

The vehicle landed nose first before coming to rest on its roof. The driver exited the vehicle and called the emergency response crew, who stabilised the driver until the ambulance arrived. The driver was taken to hospital and cleared of any injuries.

Refer to the incident investigation release IIR20-03.

INVESTIGATION INFORMATION RELEASE - COLLISION BETWEEN DOZER AND LIGHT VEHICLE

A worker parked a light vehicle on a bench in a working area of the mine and left it unattended to begin operating an excavator. A dozer already operating in the area reversed some 80 metres before hitting the light vehicle, resulting in extensive damage.

Mobile plant interactions in mines, particularly between light vehicles and heavy mobile plant such as dozers, are a well-known risk. Mine operators must identify, implement and maintain appropriate no-go zones and separation areas between light vehicles and heavy mobile plant.

Refer to the incident investigation release IIR20-02.

Spotlight on good practice
Anti-tip system helps reduce rollovers

Vehicle incidents feature prominently among the more serious and dangerous incidents in mining. While mechanical failures and maintenance issues are significant contributors, many of these incidents also have a human factor component. Errors in judgement, poor communication practices, failures to drive to the conditions and inattention, are only some of the key human factors that contribute, or directly cause these vehicle incidents.

Hy-Tech's Tumbulgum quarry, a small north coast site, identified that the articulated dump truck (six-wheeled ADT) they were planning to use, to replace their old rigid 771 dump truck, might introduce some added human factor risks. They consulted, assessed the risks, researched the problem and came up with a clever and straightforward solution an anti-tip system.

The anti-tip system is being used on rigid haul trucks in the USA. After speaking with its developer, Quarry Manager Alan Seidenkamp was confident the system would work on the new ADT at the quarry. Following extensive onsite trials and training in its use, the system was adopted at the Tumbulgum site.

This system comprises:

- A sensor/monitoring device, that is factory set and is based on the acceptably safe, lean factor, as specified by the client. Underpinned by a risk assessment of the operating conditions, Alan and his team chose five degrees for their ADT.
- A disconnect switch attached to the body so that when it is not raised (for a tip), the connection between the sensor/monitoring box, disconnects and isolates the hydraulic lifting valves.

If the sensor detects that it is outside of its pre-determined limits, it will not allow the body to raise and alternatively, if the sensor limit is breached while raising the body, it will stop raising and immediately start lowering.

- A sensor box connected directly to a warning light that is placed either on the front of the body so the driver can see it in the rear-view mirror while reversing or mounted in the cabin.

With the control box mounted to the body and not the axle, there is a greater ability to detect instability, earlier. This is because the axle will 'lean' only after the body has begun to. Sometimes this delay in reaction (by the operator), is too late to be able to take effective countermeasures and prevent a rollover.

The system has several benefits to help reduce human factor risks. It can assist the operator to accurately assess the stability of ground around where they tip. It helps prevent the tipping operation in an unstable situation. It can also indicate instability while the vehicle is moving. This is particularly useful to raise driver awareness of the safe operating speed for the conditions.

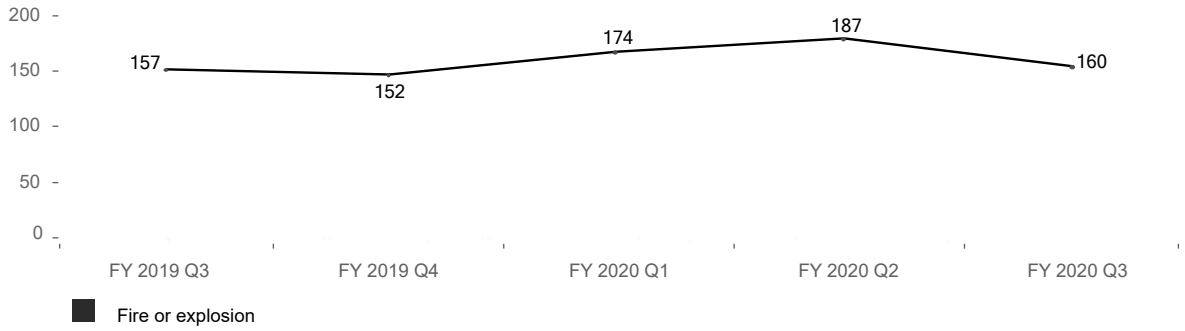
The approach uses higher order engineering controls, such as isolation features.

Fire or explosion

This principal hazard includes risk associated with all sources of flammable, combustible and explosive substances and materials in the working environment. A common source of these incidents are fires on mobile plant (at both underground and surface operations).

The figure below shows a small decrease of incident notifications for fire or explosion compared to the previous quarter.

FIGURE 17. INCIDENT NOTIFICATIONS RELATED TO THE PRINCIPAL HAZARD FIRE OR EXPLOSION JANUARY 2019 TO MARCH 2020



DANGEROUS INCIDENT - CHANGE MANAGEMENT AND CONSULTATION FAILURES

An underground loader was in a draw point of an extraction drive. The operator saw some blue grey smoke coming from the engine area and shutdown the loader. He inspected the engine bay and saw flames coming from the belly plate area. He activated the fire suppression system, which extinguished the fire.

A mine investigation identified that the mine had made a modification to all its loaders to facilitate engine oil sampling. The failed hose had been clamped in place and was not part of any scheduled service inspection. The OEM did not approve any modification.

Recommendations

- When modifications take place, mine operators should challenge if the modifications are the best option. Consultation with the OEM is suggested when the modification is identified as a life of asset modification.
- Operators must confirm that adequate change management processes are followed to ensure any new risks are identified and additional controls are implemented.
- Any modifications to plant must be added to service schedules so that they are maintained throughout the life of the asset.

Principal control plans

This section covers incidents that are of high potential, frequently occurring or of importance and complexity, that they are covered under their own control plans. There is an 'overlap' of incidents covered in these plans and those covered by certain principal hazards.

Health control plan – incidents

The health control plan covers health hazards that workers may be exposed to. These include (but are not limited to); fatigue, dust, noise, vibration, hazardous substances, radiation.

HEAT AND AIR POLLUTION FROM BUSHFIRES CAN BE HAZARDOUS AND CAN CAUSE HARM TO PEOPLE WORKING IN BOTH INDOOR AND OUTDOOR WORK ENVIRONMENTS.

Employers have duties under work health and safety laws to manage these risks and protect worker health and safety.

Resources and guidelines about the potential hazards and risks associated with working in heat and air pollution are available from the Safe Work Australia website.

Workers who are exposed to heat are at risk of developing heat stress, which can lead to more life-threatening conditions. For additional information specific to heat stress and other health and safety issues associated with hot working conditions, visit the NSW Resources Regulator website.

Mechanical engineering control plan – incidents

The mechanical engineering control plan covers 'lifecycle' risks associated with mechanical hazards (vehicles, plant and mechanical systems and structures), that workers may be exposed to. This includes risks associated with pressurised fluids.

Related alerts and bulletins;

- SB13-01 Fluid injections result in surgery
- SB12-03 Fluid power isolation failures
- SA06-16 Fatal High Pressure Hydraulic Injection
- SA09-04 Hydraulic injection near miss

DANGEROUS INCIDENT - FITTER INJURED BY HIGH-PRESSURE RELEASE OF FLUID

A fitter was attending to a breakdown at an underground plate feeder. He was using a battery powered grease gun to purge grease lines. When he disconnected the grease gun, the grease nipple failed and there was a high-pressure fluid release, that hit him on his forearm. He felt pain at the point of contact and his shoulder and chest were sprayed with grease. The fitter was taken to hospital where it was confirmed that he had suffered a fluid injection injury. The fitter underwent surgery to remove the grease.

The mine removed all battery powered grease guns from service, until it completed an investigation into the incident.

Recommendations:

- Ensure all employees working with or around equipment with high-pressure hydraulic systems are fully aware of the dangers of fluid injections entering the body and the damage they can cause.
- Mine operators should develop emergency response procedures for dealing with high-pressure fluid injection. Pressurised fluid injuries are a failure of a risk control to a major hazard.
- When equipment is tested or repaired, no standing zones must be implemented to remove workers from the line of fire if a failure occurs.

SERIOUS INJURY - PROTECTION FAILURE LEADS TO FALL AND BREAK

An operator was accessing a haul truck via the stairs when the handrail gave way and the operator fell sideways to the ground, about one to one-and-a-half metres. The operator suffered a broken wrist and broken leg.

The Regulator has commenced an investigation into this incident. Refer to IIR20-05 Mine Worker seriously injured from fall.

Recommendations:

- Mines are reminded of the need to identify, assess, manage and rectify defects that affect the safety of plant or structures.

DANGEROUS INCIDENT - SOLUTION CREATES SERIOUS RISK

A limestone plant operator decided to use materials on hand to create a bollard barrier system to protect structures around the site from vehicle damage. However, by doing so they created added risk to their workers.

While a loader was feeding a hopper, it reversed and hit a red gas cylinder. The cylinder was buried upside down and was being used by the site as part of a bollard collision barrier. The cylinder which once contained CO2, was punctured and exploded. The pressure released from the damage, propelled the cylinder into the air where it hit buildings, before landing on the ground.

No one was injured.

Recommendations:

- In developing control measures to manage the risks of interaction between mobile plant and fixed structures, mines should ensure that the control itself does not introduce a new level of risk.
- **Under no circumstances** should gas cylinders be used for anything other than their intended use.

ENFORCEABLE UNDERTAKING LEADS TO EDUCATIONAL VIDEO AIMED AT RAISING AWARENESS

Sibelco Australia has developed an educational video as part of an enforceable undertaking. The video raises awareness and assists workers, contractors and mine operators in the broader industry with identifying some of the requirements for fall prevention on mobile plant

Click here to watch video.

Electrical engineering control plan - incidents

The electrical engineering control plan covers 'lifecycle' risks, associated with electrical hazards (supply, vehicles, plant or infrastructure), that workers may be exposed to.

DANGEROUS INCIDENT - ENERGISED BUT NOT ISOLATED

An electrician was in the process of replacing a faded out-of-service tag on a disconnected 415-volt lighting cable when he suffered an electric shock. The electrician was treated following the mine's site protocol.

The mine investigation identified that the circuit was still energised and had not been correctly isolated at the supply source.

Recommendations:

- Mine operators should review the adequacy and reliability of the risk controls that are implemented at their sites to prevent electric shocks.
- Electricians are reminded to prove that the circuit is dead before making any contact with it.

Explosives control plan - incidents

The explosives control plan covers risks associated with the use and management of explosives hazards, that workers may be exposed to. This includes incidents involving 'flyrock'.

DANGEROUS INCIDENT - IN THE ZONE DURING A SHOT FIRE

A shotfirer loaded a shot and notified it was ready to be fired. However, a truck, loader and their respective drivers, were still in the exclusion zone. When the shotfirer became aware that the truck had come out of the exclusion zone, he incorrectly thought that both vehicles and drivers had exited the exclusion zone together. He then proceeded to remove both of their tags and fire the shot while the loader operator was still in the exclusion zone. There were no injuries or damage.

It was identified that the mine was relying on the contractor's blasting procedures, however the contractor's procedures did not include the mine's specific details.

Recommendations:

- Mine operators must have clear and effective blasting procedures that are specific to individual mines.
- They should also remind workers that personal tags are only to be removed by the person they are issued to
- Positive communications to warn before firing

Spotlight on Emergency Management

The NSW Resources Regulator has been actively involved in promoting integrated emergency planning efforts between the mining industry and emergency services across the state for several years.

In February of 2020, we commenced a state-wide program of planned inspections. The scope of the program will be to inspect all self-escape and refuge systems in all underground mines, throughout 2020. The impacts on regulatory inspections of the COVID-19 virus, has temporarily interrupted the program, but early results are of concern to the Regulator.

After inspections at fives mines, compliance to clause 100 of the regulation is poor. Specifically, inspectors observed:

- three sites had either failed train workers in use of self-rescuers / refuge systems,
- two sites had only partially trained workers in their use, believing them to be experienced workers and so, trained,
- one site had incorrectly endorsed training records relating to training conducted.

As a result of the non-compliances identified, several enforcement notices were issued to these mines.

Background

With the introduction of the current regulation, underground metal mines have been required to maintain more specific training requirements regarding self-rescuers. The transitional arrangements for these new requirements ended in February 2017. Since this time, all underground mines (other than opal mines) must comply with the requirements of clause 100 of the regulation.

All underground mines should review the training of workers in the use of self-rescuers and associated escape and refuge systems. We will be continuing to monitor compliance and issue enforcement notices to mines that fail to meet their obligations to keep their workers safe.

In the spotlight
COVID-19

The NSW Resources Regulator continues to closely monitor the implementation of controls to manage COVID-19 risk at mine sites.

We have continued to receive complaints and enquiries from workers, and we remind operators that they must have measures in place to eliminate or manage the risks arising from COVID-19. While you will not be able to eliminate the risk of workers contracting COVID-19 while carrying out work, you must do all that is **reasonably practicable** to minimise that risk.

Several organisations have developed additional resources to assist the industry and identify key controls that are reasonably practicable for operators to implement. Where operators have not adopted these controls, we expect to see evidence of risk assessments being carried out and suitable alternative controls adopted.

Resources Regulator inspections

We have conducted a risk assessment and implemented procedures to minimise the risk of our inspectors contracting or transmitting the virus while performing their duties. Our highest priority is the health of our staff and workers at mine sites.

The extent of our proactive assessment activities is subject to constant review. We have reduced our programs, and will make further changes as required, subject to the spread of the virus; the changing risk profile of the mining industry; government directions, and stakeholder feedback. Our response to serious and critical incidents will remain unchanged, however, this will be conditioned by a risk assessment undertaken on a case by case basis.

Further information regarding our response plan is published on our website.

Sector profiles

NSW Resources Regulator

SECTOR REPORTING

Coal mines

Opencut, underground and coal preparation plants

Large mines

METALLIFEROUS AND QUARRIES

Quarries that produce >900,000 tonnes pa and large opencut or underground metalliferous mines

Small mines

METALLIFEROUS, QUARRIES AND OTHER GEMSTONES

Quarries and other mine types (e.g. sand, clay, lime) that produce <900,000 tonnes pa, opencut or underground metalliferous mines and gemstone mines

Petroleum and Geothermal

Onshore petroleum and geothermal productions and exploration sites

Opal Mines

Opal mines at Lightning Ridge and White Cliffs

Exploration

Exploration sites (excluding petroleum)

Non-mine

Includes many manufacturers (including OEMs), suppliers, designers, importers, licence holders and registration holders

Coal sector

Safety incident notifications

Mine operators must notify the regulator about the occurrence of certain types of safety incidents.

As presented in the table below, incident rates (numbers of incidents reported per active mine) have remained stable during the past 15 months. On average 57 coal mines (46%) notified an incident during this period.

TABLE 4. COAL SECTOR INCIDENT NOTIFICATION RECEIVED RATES JANUARY 2019 TO MARCH 2020

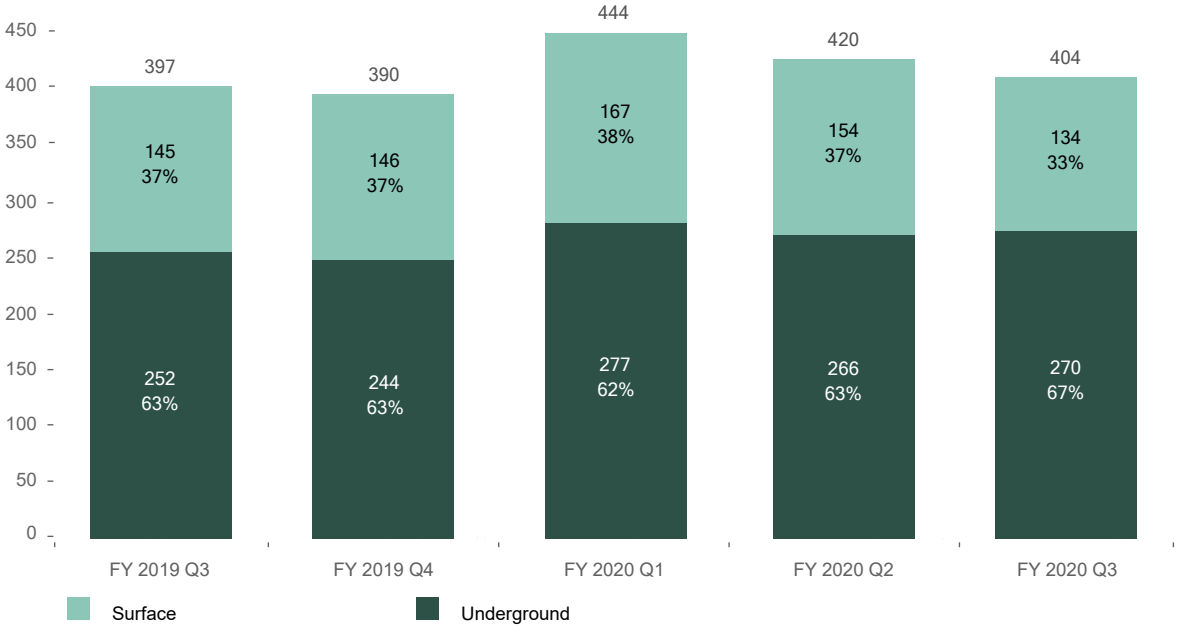
MEASURE	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Incidents	397	390	444	420	404	411
Active mines	121	123	122	128	127	124
Incident rate per active mine	3.281	3.171	3.639	3.281	3.181	3.311
Mines that notified incidents	53	54	60	55	61	57
% of mines notifying an incident	44%	44%	49%	43%	48%	46%
Incident rate per notifying mine	7.491	7.222	7.400	7.636	6.623	7.274

The graph below shows the proportion of safety incident notifications received from surface and underground coal operations.

In the current quarter (FY 2020 Q3), we received 404 safety incident notifications from the coal mines sector. This is a slight increase (2%) when compared to the same period a year before (FY 2019 Q3).

In the current quarter just over two-thirds of safety incident notifications received from the coal sector (67%), were from underground coal mines. During the last five quarters, the proportion of safety incident notifications by underground coal mines has remained relatively consistent (64% of all notifications from the coal sector, on average).

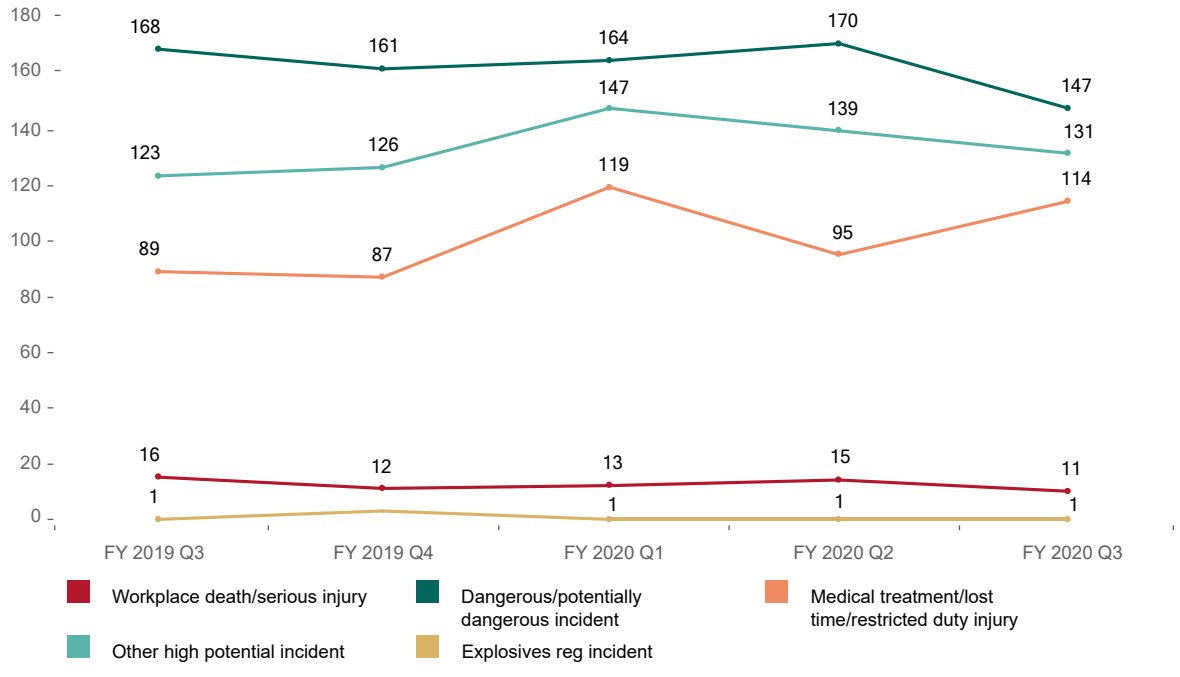
FIGURE 18. COAL SECTOR SAFETY INCIDENT NOTIFICATIONS BY OPERATION TYPE JANUARY 2019 TO MARCH 2020



Approximately 36% (147 of 404) of the notifications received in the current quarter (FY 2020 Q3) were for 'dangerous/potentially dangerous incidents. FY 2020 Q3, saw a slight 2% decrease in incidents received, when compared with the average of the previous four quarters.

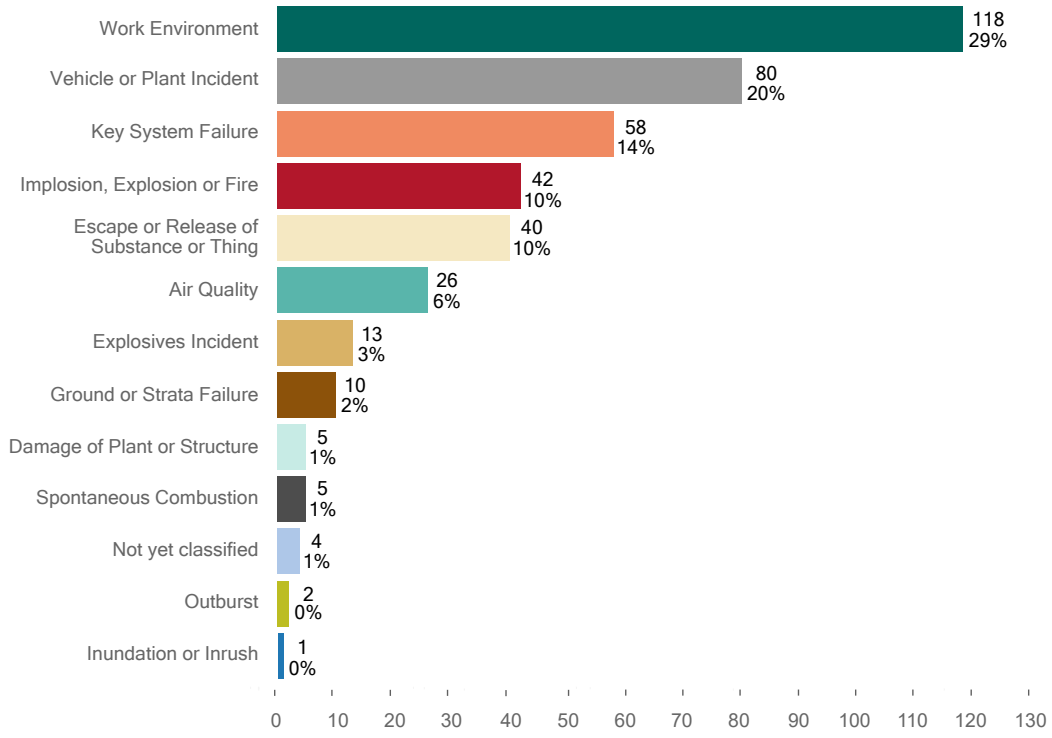
A decrease in the number of 'other high potential' and an increase in 'medical treatment, lost time and restricted duty injury incidents' received, was also observed this quarter compared to last quarter.

FIGURE 19. COAL SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED BY REQUIREMENT TO REPORT JANUARY 2019 TO MARCH 2020



Of the 404 safety incident notifications received in the current quarter (FY 2020 Q3), 29% were classified as work environment, 20% vehicle or plant and 14% key system failures. Work environment incidents include (but are not limited to) slips, trips and falls, falling flying objects, fall from heights, ventilation and noise. Key system failure incidents are those that include (but not limited to) explosion protection, ventilation winder, site power and other systems failure.

FIGURE 20. COAL SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED BY INCIDENT TYPE JANUARY 2020 TO MARCH 2020



Large mines sector

Safety incident notifications

As presented in the table below, incident rates (numbers of incidents reported per active mine) have remained relatively stable during the past 15 months. An average of 23 large mines and quarries (62%) notified an incident during this period.

TABLE 5. LARGE MINES AND QUARRIES SECTOR INCIDENT NOTIFICATIONS RECEIVED RATES JANUARY 2019 TO MARCH 2020

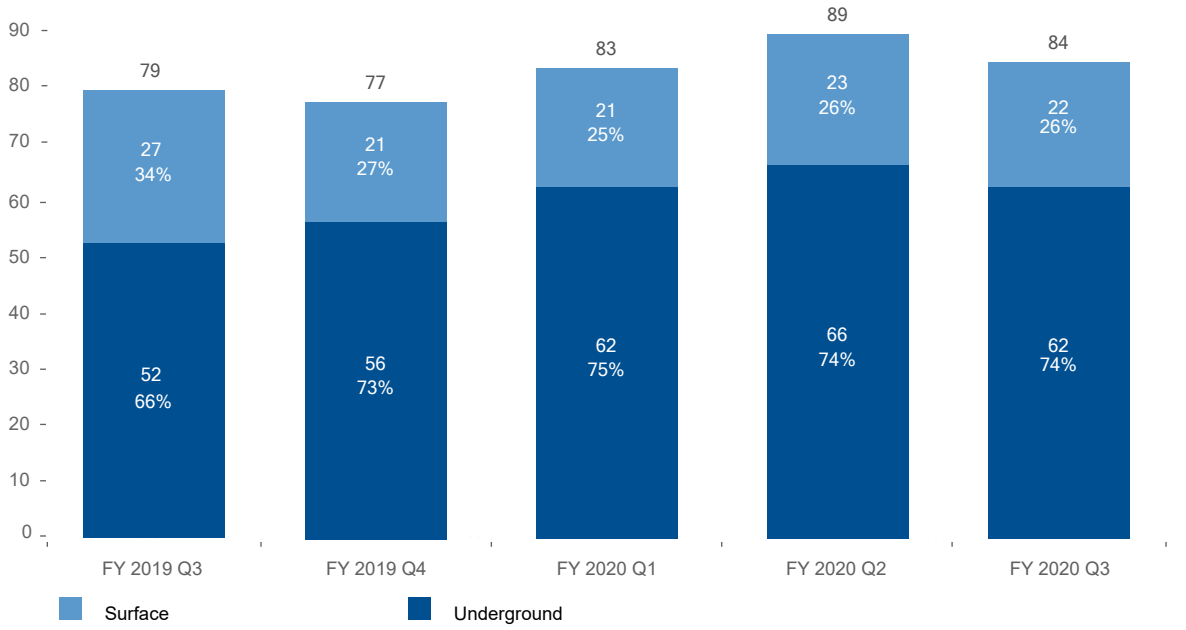
MEASURE	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Incidents	79	77	83	89	84	82
Active mines	36	38	37	38	39	38
Incident rate per active mine	2.194	2.026	2.243	2.342	2.154	2.192
Mines that notified incidents	21	26	22	24	24	23
% of mines notifying an incident	58%	68%	59%	63%	62%	62%
Incident rate per notifying mine	3.762	2.962	3.773	3.708	3.500	3.541

We received 84 safety incident notifications from the large mines and quarries sector for this quarter.

The graph below shows the proportion of safety incident notifications received from surface and underground large mines and quarries operations for the last five quarters.

In the current quarter, 74% of safety incident notifications from the large mines and quarries sector, were received from underground operations. During the last five quarters, most of the safety incident notifications were by underground operations (varying between 66% to 75% of notifications).

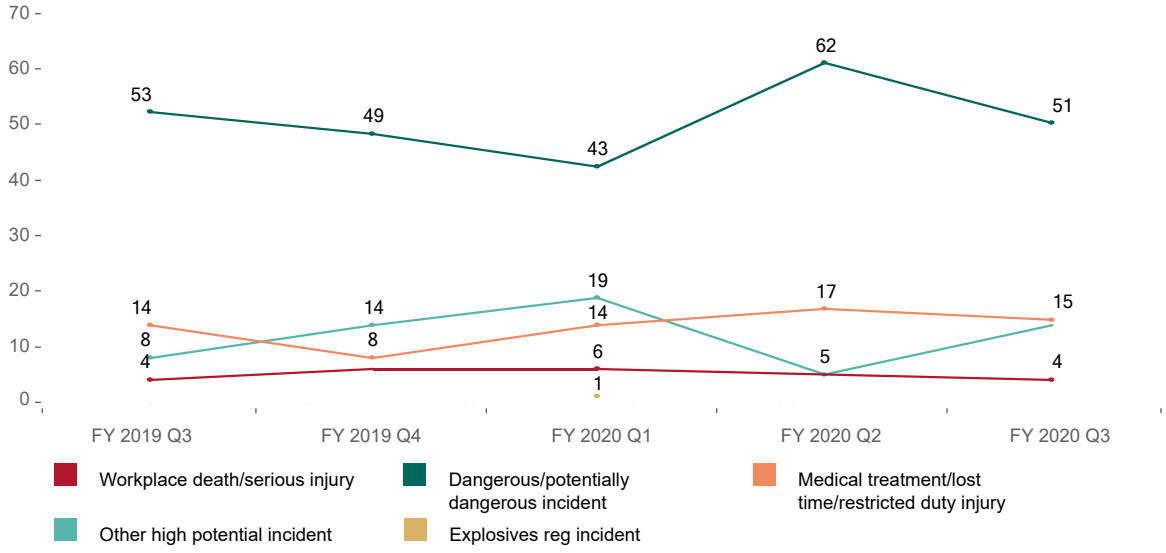
FIGURE 21. LARGE MINES AND QUARRIES SECTOR SAFETY INCIDENT NOTIFICATIONS BY OPERATION TYPE JANUARY 2019 TO MARCH 2020



The graph below shows the number of safety incident notifications by incident type received during the past five quarters from large mines and quarries sector.

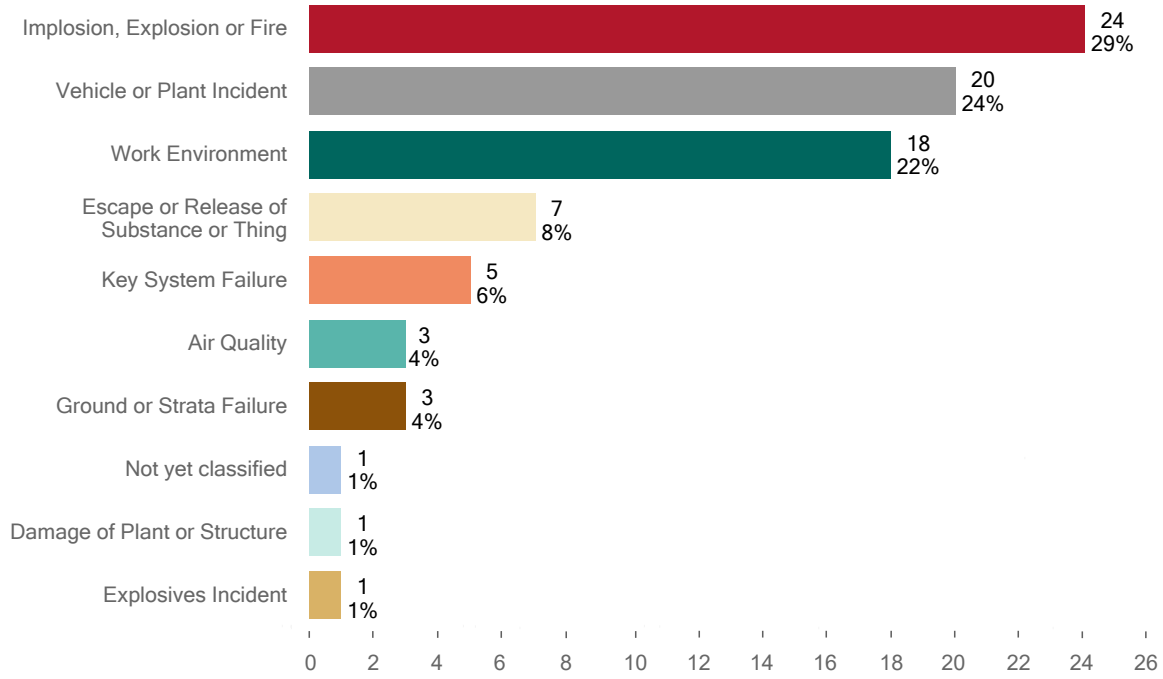
In this quarter, almost 61% of safety incident notifications received (51 of 84), relate to dangerous/potentially dangerous incidents. This is down from 70% (62 of 89) the previous quarter.

FIGURE 22. LARGE MINES AND QUARRIES SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED BY REQUIREMENT TO REPORT JANUARY 2019 TO MARCH 2020



Of the 84 safety incident notifications received in the current quarter (FY2020 Q3), 29% were implosion, 24% vehicle or plant and 22% work environment. Work environment incidents include (but are not limited to) slips, trips and falls, falling flying objects, fall from heights, ventilation and noise.

FIGURE 23. LARGE MINES AND QUARRIES SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED BY INCIDENT TYPE JANUARY 2020 TO MARCH 2020



Small mines sector

Safety incident notifications

As presented in the table below, incident rates (numbers of incidents reported per active mine) have remained relatively stable during the past 15 months. An average of 27.8 mines (1.04%) notified an incident during this period.

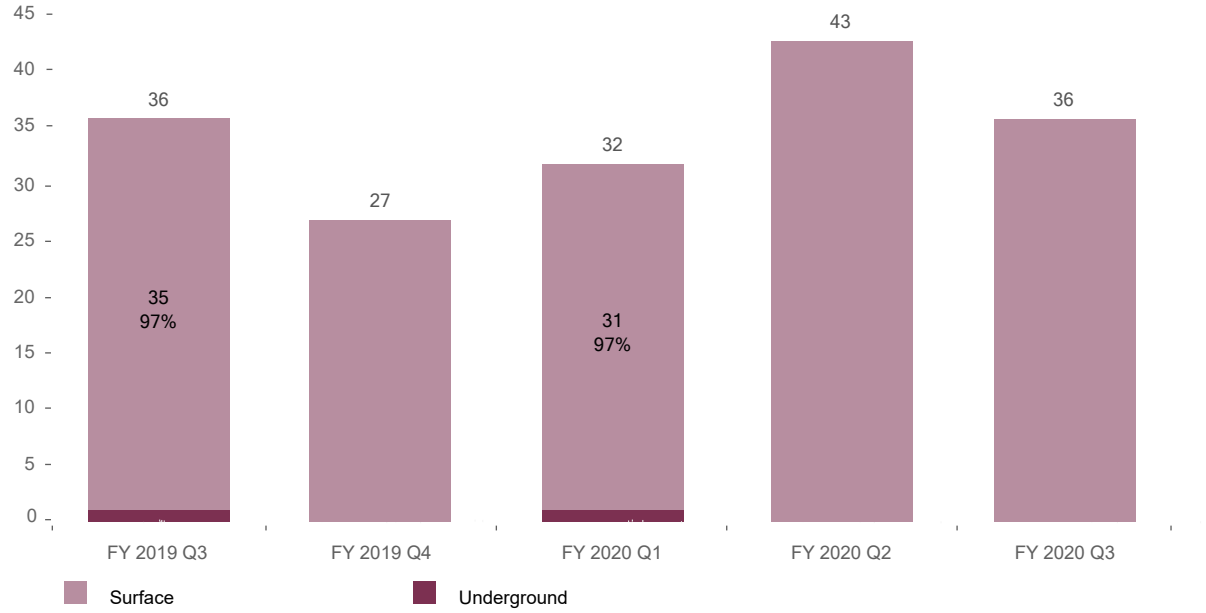
TABLE 6. SMALL MINES AND QUARRIES SAFETY INCIDENT NOTIFICATIONS RECEIVED RATES JANUARY 2019 TO MARCH 2020

MEASURE	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Incidents	36	27	32	43	36	35
Active mines	2653	2648	2661	2695	2683	2668
Incident rate per active mine	0.014	0.010	0.012	0.016	0.013	0.013
Mines that notified incidents	30	20	27	35	27	27.8
% of mines notifying an incident	1.13%	0.76%	1.01%	1.30%	1.01%	1.04%
Incident rate per notifying mine	1.200	1.350	1.185	1.229	1.333	1.259

The graph below shows the number of safety incident notifications received during the past five quarters from the small mines and quarries sector. The small number of notifications make it difficult to ascertain a trend.

In the current quarter (FY 2020 Q3), we received 36 safety incident notifications from the small mines and quarries sector, which is slightly higher than the average number (35) of incident notifications during the last five quarters.

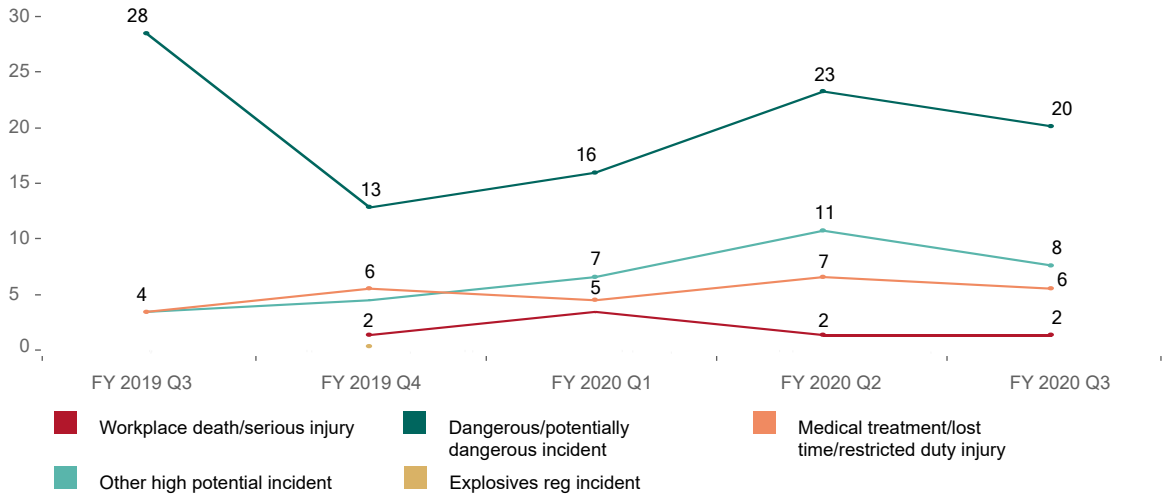
FIGURE 24. SMALL MINES AND QUARRIES SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED BY OPERATION TYPE JANUARY 2019 TO MARCH 2020



The graph below shows the number of safety incidents notifications received during the past five quarters from the small mines sector.

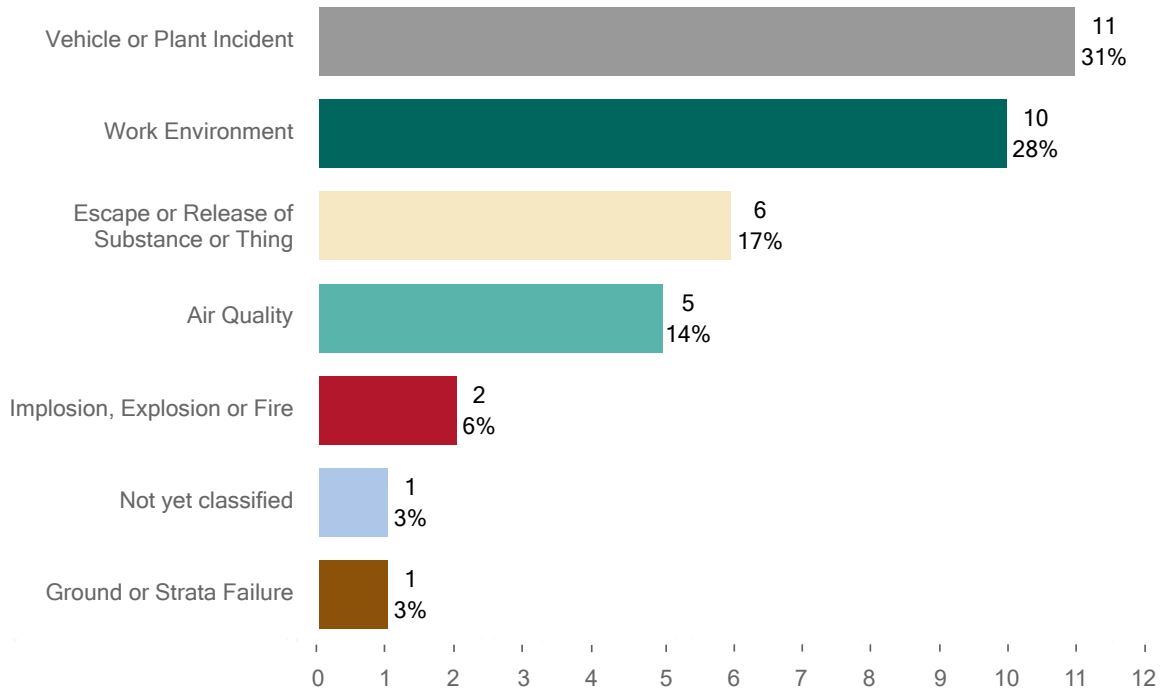
The majority (56%) of safety incidents for the small mines sector relate to dangerous/potentially dangerous incidents (20 of 36). A decrease was observed in notification of 'other high potential incidents'.

FIGURE 25. SMALL MINES AND QUARRIES SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED BY REQUIREMENT TO REPORT JANUARY 2019 TO MARCH 2020



Of the 36 safety incident notifications received in the current quarter (FY 2020 Q3), 31% were vehicle or plant incidents, 28% related to work environment and 17% related to escape or release of substance or thing. Work environment incidents include (but are not limited to) slips, trips and falls, falling flying objects, fall from heights, ventilation and noise.

FIGURE 26. SMALL MINES AND QUARRIES SECTOR SAFETY NOTIFICATIONS BY INCIDENT TYPE JANUARY 2020 TO MARCH 2020



Opal mines sector

Safety incident notifications

For the second consecutive quarter, no incidents were notified to us in the opal mine sector.

TABLE 7. OPAL MINES SECTOR SAFETY INCIDENT NOTIFICATION RATES JANUARY 2019 TO MARCH 2020

MEASURE	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Incidents	0	1	2	0	0	0.6
Active mines	3,522	3,564	3,733	3,811	3,880	3,702
Mines that notified incidents	0	1	2	0	0	0.6

Opal sector compliance activities

The table below shows the number of assessments conducted and notices issued by us for the opal mine sector during the last five quarters.

In this quarter, we issued 40 safety notices and conducted 78 safety assessments. This resulted in a notice issued rate of 0.51 per assessment for the quarter.

TABLE 8. OPAL SECTOR NOTICES ISSUED AND ASSESSMENTS COMMENCED JANUARY 2019 TO MARCH 2020

	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Safety notices issued (s23, s191, s195 and s198 notices issued)*	17	46	53	33	40	38
Safety assessments conducted	46	70	78	66	78	67.6
Notice issue rate per assessment	0.37	0.66	0.68	0.50	0.51	0.54

*Sections 191, 195 and 198 of the *Work Health and Safety Act 2011* and section 23 *Work Health and Safety (Mines and Petroleum Sites) Act 2013*

Petroleum and geothermal sector

Safety incident notifications

The petroleum and geothermal sector did not notify any safety incident notifications during the past five quarters.

TABLE 9. PETROLEUM AND GEOTHERMAL SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED JANUARY 2019 TO MARCH 2020

	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Number of incidents notified	0	0	0	0	0	0
Active mines	266	267	265	259	239	259

Petroleum and geothermal sector compliance activities

The table below shows the number of safety assessments conducted by us during the 15-month reporting period since January 2019, in the petroleum and geothermal mines sector. During the period, an average of 29 assessments were conducted each quarter.

In this quarter, we conducted 24 safety assessments, with four notices being issued.

TABLE 10. PETROLEUM AND GEOTHERMAL SECTOR NOTICES ISSUED AND ASSESSMENTS COMMENCED JANUARY 2019 TO MARCH 2020

	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Notices	0	0	0	0	4	0.8
Number of assessments	33	39	35	13	24	29
Notice issued rate per assessment	0.00	0.00	0.00	0.00	0.17	0.03

Exploration sector

Safety incident notifications

As presented in the table below, incident rates (numbers of incidents reported, per notifying mine) have remained relatively stable during the past 15 months. During the past five quarters there was, on average, one safety incident notification received in the sector.

TABLE 11. EXPLORATION SECTOR SAFETY INCIDENT NOTIFICATIONS RECEIVED JANUARY 2019 TO MARCH 2020

MEASURE	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	AVERAGE
Incidents	1	0	0	2	2	1
Active mines	744	753	791	780	746	763
Mines that notified incidents	1	0	0	2	2	1

Exploration sector compliance activities

The table below shows the number of safety assessments conducted by us in the exploration sector, during the 15-month reporting period since January 2019. During this period, an average of two assessments were conducted each quarter.

In this quarter, we conducted three safety assessments, with four notices being issued.

TABLE 12. EXPLORATION SECTOR SAFETY NOTICES ISSUED AND ASSESSMENTS JANUARY 2019 TO MARCH 2020

	FY 2019 Q3	FY 2019 Q4	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	TOTAL
Safety notices issued (s23, s191, s195 & s198 notices issued)*	0	0	2	5	4	2
Safety assessments conducted	1	1	2	3	3	2
Notice issued rate per assessment	0.00	0.00	1.00	1.67	1.33	0.80

* Sections 191, 195 and 198 of the *Work Health and Safety Act 2011* and section 23 *Work Health and Safety (Mines and Petroleum Sites) Act 2013 NSW*