

## **Consolidated report**

# Outburst, coal burst and rock burst

## Underground coal mines

July 2023 to November 2023



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## Executive summary

A crucial part of the NSW Resources Regulator’s Incident prevention strategy for mines and petroleum sites involves:

- targeted assessments and planned inspection programs - focusing on assessing an operation’s control of critical risks through evaluating the effectiveness of control measures in the mine’s safety management system
- compliance priority programs - proactively assessing a topic that is an emerging risk across the industry, which is driven primarily from incident data as well as evolving industry trends. Although these topics may also be contained within the Regulator’s planned inspection programs, the aim of compliance priority programs is to gather further information and knowledge about how the industry is managing and controlling a specific issue.

The Regulator has developed a bowtie hazard management framework and standardised assessment template for each program plan. Under each program plan, the effectiveness of the safety management system at each mine site is assessed against a standard set of control supports and critical controls.

Exposure to an uncontrolled release of energy generated by outbursts, coal bursts and rock bursts can be a significant risk in some underground coal mines. This type of event occurring in an underground coal mine environments has the potential to cause serious and/or fatal injuries to workers if not controlled effectively.

This report will provide analysis and recommendations for underground coal mine assessments of critical controls due to threat and consequence by outburst, coal burst and rock burst.

An inspection assessment program was developed to assess how an underground coal mine is prepared to manage that risk.

In total there were 5 underground coal mine assessed.

In summary, there were 150 individual assessment findings and of those, 3 assessment findings required enforcement action to be taken.

The assessment program was conducted between July 2023 and November 2023.

In summary, there were 8 compliance notices issued in total comprising of:

- 6 x WHS(MPS)A s23 notices of concern
- 2 x WHSA s191 improvement notices

Explanatory notes on the assessment system are also listed in Appendix A.

## Assessment criteria for all assessments

Critical controls were identified by the Regulator and assessment criteria were assigned to each potential threat.

A tabulation of the threat or consequence and the control supports for the assessment program outburst, coal burst and rock burst at underground coal mines is provided in Table 1.

Table 1. Threats and critical controls assessed for the planned inspection program outburst, coal burst, rock burst – underground coal mines

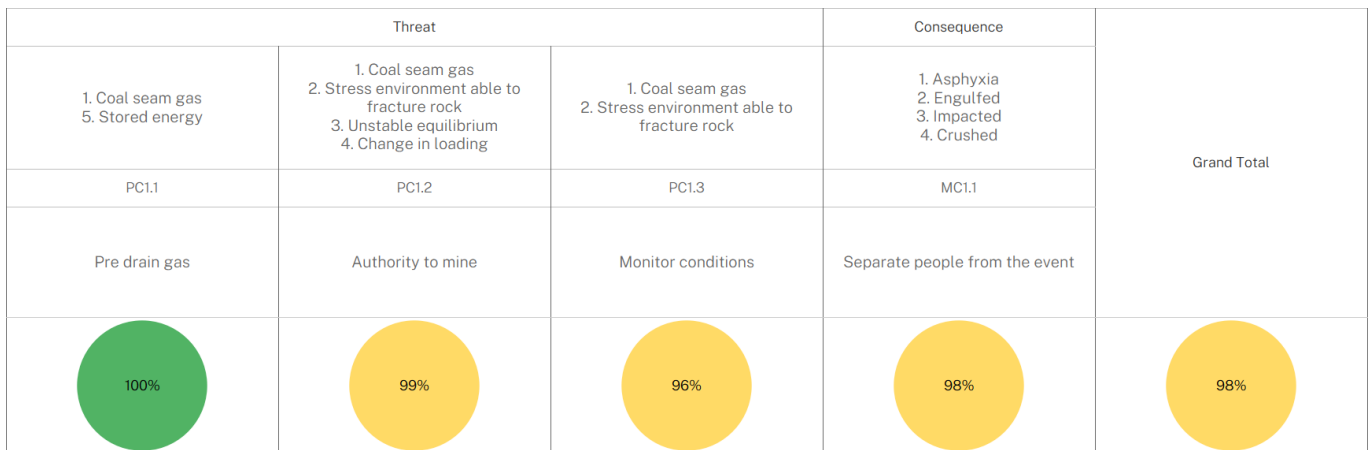
| Threat or consequence                       |                                             | Critical control | Control support                |
|---------------------------------------------|---------------------------------------------|------------------|--------------------------------|
| Threat                                      | 1. Coal seam gas                            | PC1.1            | Pre drain gas                  |
|                                             | 5. Stored energy                            |                  |                                |
|                                             | 1. Coal seam gas                            | PC1.2            | Authority to mine              |
| 2. Stress environment able to fracture rock |                                             |                  |                                |
| 3. Unstable equilibrium                     |                                             |                  |                                |
| 4. Change in loading                        |                                             |                  |                                |
|                                             | 1. Coal seam gas                            | PC1.3            | Monitor conditions             |
|                                             | 2. Stress environment able to fracture rock |                  |                                |
| Consequence                                 | 1. Asphyxia                                 | MC1.1            | Separate people from the event |
|                                             | 2. Engulfed                                 |                  |                                |
|                                             | 3. Impacted                                 |                  |                                |
|                                             | 4. Crushed                                  |                  |                                |

## Assessment findings for underground coal mines

Overall, the assessment findings for underground coal mines were:

- 5 underground coal mines assessments comprised of:
  - 150 individual findings for the assessed criteria
  - 3 findings with enforcement action recorded

The summary of assessment findings overall results by critical control is provided in Figure 1. Summary assessment findings overall results by critical control



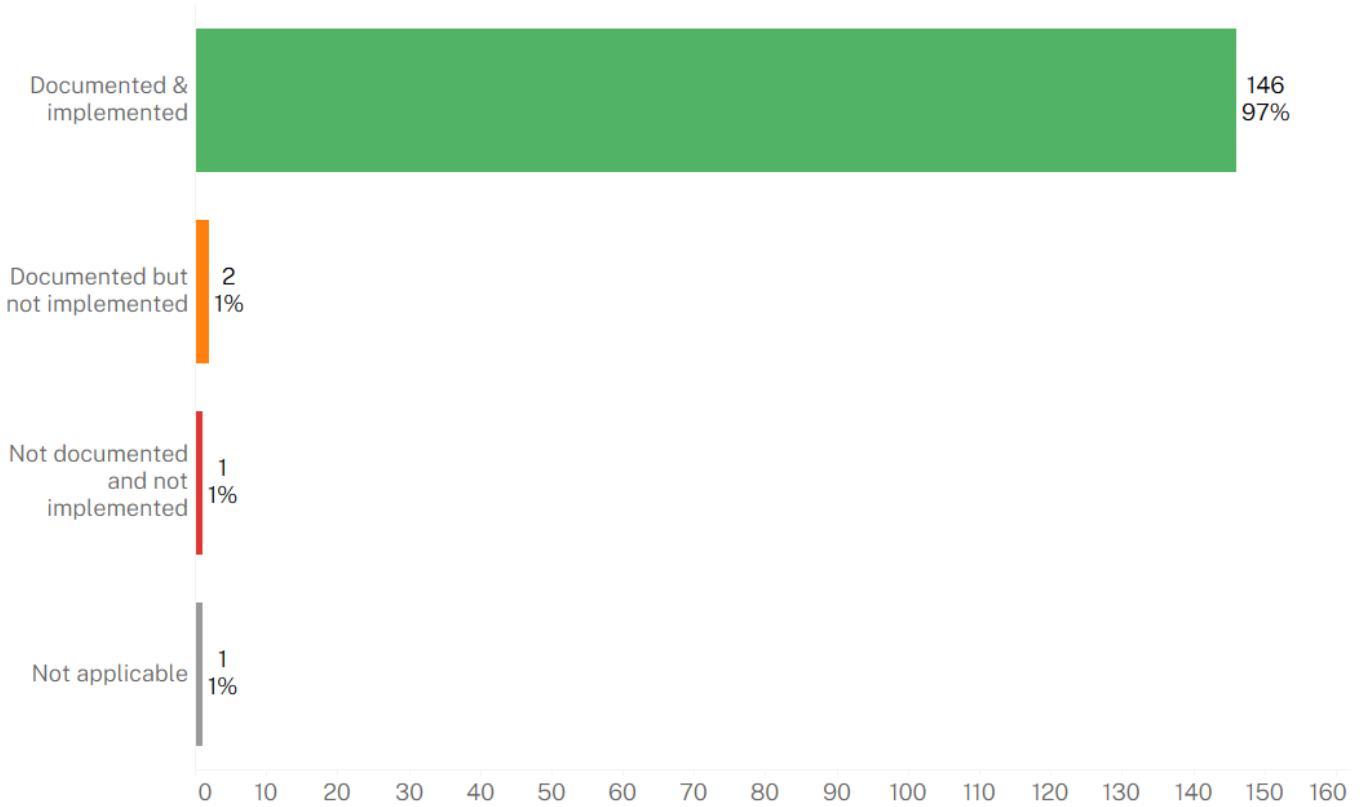
■ Green (=100%)  
■ Yellow (>= 80% and <100%)  
■ Orange (>= 65% and <80%)  
■ Red (<65%)

In summary the total of all underground coal mines assessment findings was 98%.

The lowest ranked assessment findings were related to monitoring conditions ranked at 96%.

The overall assessment findings ratings are provided in Figure 2.

Figure 2. Overall assessment findings ratings



In summary the overall assessment findings ratings for underground coal mines assessed were:

- 97% rating for documented and implemented finding,
- 1% rating for documented but not implemented finding,
- 1% rating for not documented and not implemented finding.

The overall assessment finding ratings by critical control are provided in figure 3.

Figure 3. Overall assessment findings ratings by critical control



In summary the overall findings ratings by the critical controls assessed were:

- Pre-drain gas - 35 documented and implemented findings.
- Authority to mine – 54 documented and implemented findings and 1 documented but not implemented finding. (55 findings in total)
- Monitor conditions – 23 documented and implemented findings, 1 not documented and not implemented finding and 1 not applicable finding. (25 findings in total)
- Separate people from the event - 34 documented and implemented findings and 1 documented but not implemented finding. (35 findings in total)

## Notices issued to assessed underground coal mines

There were **8** compliance notices in total issued to **4** of the **5** underground coal mines assessed during the program.

The compliance notices issued for underground coal mines assessed were reviewed and Table 2 lists the notices issued by type and number.

Table 2: Notices issued to underground coal mines

| NOTICE TYPE              | TOTAL ISSUED | NUMBER OF SITES |
|--------------------------|--------------|-----------------|
| s.23 notice of concerns  | 6            | 4               |
| s.191 improvement notice | 2            | 2               |

| NOTICE TYPE | TOTAL ISSUED | NUMBER OF SITES                                    |
|-------------|--------------|----------------------------------------------------|
| Total       | 8            | 4                                                  |
|             |              | Note: some mine sites were issued multiple notices |

## Recommendations for underground coal mines

Based on the findings outlined in this report and with respect to the numbers and types of compliance notices issued during the underground coal mine assessment program. The following recommendations should be reviewed by mine operators of underground coal mines:

- Review outburst, coal burst and rock burst management plans for current industry information, recent technological developments and improved risk management controls.
- Review gas drainage management plan training and worker compliance with the No-Go zones around gas drainage equipment and gas pipe line installations.
- Review gas drainage management plan site design and signage for safe shunting of mobile equipment and collision avoidance around gas drainage equipment and gas pipe line installations.
- Review workforce and management training in the implementation of outburst, coal burst and rock burst management plans.

## Further information

For more information on safety assessment programs, the findings outlined in this report, or other mine safety information, please contact the NSW Resources Regulator:

| CONTACT TYPE       | CONTACT DETAILS                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------|
| Email              | <a href="mailto:cau@regional.nsw.gov.au">cau@regional.nsw.gov.au</a>                                |
| Incident reporting | To report an incident or injury call 1300 814 609 or log in to the <a href="#">Regulator Portal</a> |
| Website            | <a href="http://www.resourcesregulator.nsw.gov.au">www.resourcesregulator.nsw.gov.au</a>            |
| Address            | NSW Resources Regulator<br>516 High Street<br>Maitland NSW 2320                                     |



# Appendix A – Assessment criteria rating

Each assessed criteria is rated from 1 through 4 based on evidence supporting the expected control supports identified at the mine site:

Evidence supporting expected control supports

| Expected control supports | Rating                                                                                        | Evidence supporting rating / comments |   |   |   |  |
|---------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------|---|---|---|--|
|                           | <table border="1"> <tr> <td>4</td> <td>3</td> </tr> <tr> <td>2</td> <td>1</td> </tr> </table> | 4                                     | 3 | 2 | 1 |  |
| 4                         | 3                                                                                             |                                       |   |   |   |  |
| 2                         | 1                                                                                             |                                       |   |   |   |  |

Assessment findings results are calculated based on the total points allocated to the assessed ratings as a percentage of the maximum possible points for each criteria group, and any findings rated as ‘Not applicable’ were excluded from the calculation.

Criteria assessed ratings and points

| Assessed as                                                             | Rating | Points |
|-------------------------------------------------------------------------|--------|--------|
| Documented & implemented<br><b>Compliant</b>                            | 4      | 4      |
| Implemented but not documented<br><b>Improvement needed</b>             | 3      | 2      |
| Documented but not implemented<br><b>Significant improvement needed</b> | 2      | 1      |
| Not documented and not implemented<br><b>Non compliant</b>              | 1      | 0      |
| Not applicable (N/A)                                                    |        |        |

Findings results (points) with colours assigned as follows:

- Green (=100%)
- Yellow (>= 80% and <100%)
- Orange (>= 65% and <80%)
- Red (<65%)
- Not applicable