NSW GOVERNMENT

NSW Resources Regulator

PLANNED INSPECTION PROGRAM
Roads or other vehicle operating areas - surface coal

CONSOLIDATED REPORT: MANAGING ROADS OR OTHER VEHICLE OPERATING AREAS IN THE SURFACE COAL SECTOR

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Contents

Executive summary

A crucial part of the NSW Resources Regulator's Incident Prevention Strategy involves targeted assessment and planned inspection programs for mines and petroleum sites. This is a focus on assessing an operation's control of critical risks through evaluating the effectiveness of control measures in the mine's safety management system.

This report summarises assessment findings from 59 mines in relation to the principal hazard of roads or other vehicle operating areas. Assessments were conducted for both open cut coal mines and coal preparation plants during the period from May to December 2019.

In this report, the critical controls assessed were:

- PC1.1 – Road standards
- PC2.1 – Traffic management
- PC2.3 – Competent vehicle operator.

Table 1. Threats and Critical Controls for the Material Unwanted Event (Surface vehicle interaction)

THREAT	CRITICAL CONTROL
■ **Substandard vehicle operator areas** ■ **Environmental conditions** ■ **Component failure**	PC1.1 – Road standards
■ **Vehicles operating in close proximity**	PC2.1 – Traffic management
■ **Substandard vehicle operator areas** ■ **Vehicles operating in close proximity** ■ **Environmental conditions** ■ **Component failure** ■ **Human and organisational factors**	PC2.3 – Competent vehicle operator

Legislative requirements and published guidance relating to the principal hazard of roads or other vehicle operating areas are listed in Appendix A. Figures 2, 3 and 4 present safety compliance findings for each de-identified mine and critical control. Explanatory notes on the assessment system are also listed in Appendix B.

Recommendations

To address the continued occurrence of incidents involving vehicle interactions and rollovers, mine operators should:

- ensure that effective verification processes are in place to measure and monitor compliance with site procedures for road design and construction
- ensure that supervision arrangements are adequate so that work area inspections are detailed thoroughly and identify all reasonably foreseeable hazards
- implement vehicle speed monitoring systems, particularly for ramp and crest speeds for heavy equipment
- review safe parking standards to ensure that the requirements are clearly stated such as mandatory construction and use of designated parking areas
- eliminate unnecessary vehicle interactions onsite through segregation of traffic or permit restrictions, where reasonably practicable
- reaffirm expectations with supervisors around visible leadership practices and the requirement to conduct meaningful interactions with workers.

It is recommended that mine operators review their site's respective risk assessment, principal hazard management plan, and associated documents to manage the risks pertinent to roads or other vehicle operating areas. During the review process, mine operators are encouraged to consider the above recommendations, as well as the guidance published within Appendix A.

Introduction

The NSW Resources Regulator's planned assessment programs provide a planned, risk-based and proactive approach to assessing how effective an operation is when it comes to controlling critical risk. These programs apply principles that:

- focus on managing prescribed 'principal hazards' from the Work Health and Safety (Mines & Petroleum Sites) Regulation 2014
- evaluate the effectiveness of control measures implemented through an organisation's safety management system
- consider the operation's risk profile.

The objective of risk profiling is to identify the inherent hazards and the hazard burden that exist at individual operations in each mining sector in NSW. The information is then used to develop the operational assessment and inspection plans that inform the program.

Scope

Planned inspection programs include two assessment types:

- **Targeted assessments**, incorporating:
  - desktop assessment of:
    - compliance against legislation with respect to the management of health and safety risks associated with roads or other vehicle operating areas – see Appendix A for details
    - the definition of the controls the mine utilises to prevent and mitigate the risks to health and safety associated with roads or other vehicle operating areas
  - a workplace assessment of the implementation of those controls through the inspection of plant and worker interviews.
- **Planned inspections**, which involve a workplace assessment of the implementation of controls through the inspection of plant and worker interviews.

The process

The process for undertaking an assessment under a planned inspection program generally involves the following stages:

- Preliminary team meetings, preparation and review of documents.
- Execution of an on-site assessment involving:
  - a site desktop assessment of relevant plans and processes measuring legislative compliance of the relevant plans (targeted assessments only)

- the inspection of relevant site operations (both targeted assessment and planned inspections)

- Discussion and feedback to the mine management team on the findings and actions that need to be taken by the mine operators in response.

Assessment findings

Summary findings

Compliance action was taken at multiple sites due to various contraventions of the relevant regulations and acts. Fortunately, no sites required immediate intervention, however numerous notices were issued under section 191 of the *Work Health and Safety Act 2011* and section 23 of the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*.

Several sites were found to have documentation relating to roads or other vehicle operating areas which was either not current or did not address all existing hazards. This included instances where site risk assessments were considered inadequate since they did not cite specific hazards and actual controls. In these cases, it was commonly found there was a lack of consultation with workers and review processes were typically done by senior management. Communication of revised documents was also found to be deficient on certain occasions and this was evidenced by workers who had a poor awareness and understanding of the nominated controls on site.

The key issue which was identified for roads or other vehicle operating areas was pertaining to intersection design and construction. In many instances, sites were found to be non-compliant with their own management plans and had inconsistent standards throughout the operation. This highlighted an underlying issue whereby workers and supervisors had failed to detect these problems, even though such areas were routinely accessed and inspected. In some cases, workers were noticeably unfamiliar with the fundamental level of controls required. It should be noted that some sites had implemented mature verification systems to ensure that newly constructed intersections, as well as historical intersections, were formally checked for compliance on a regular basis.

One of the most effective controls in preventing vehicle collisions is through the elimination of vehicle interactions. There were some good examples of sites taking opportunities to segregate heavy and light vehicle roadways, which also reduced congestion at major roadways and intersections. Although this is not mandated, it was strongly recommended to mine operators who had not implemented such measures, that they look to adopt similar principles where reasonably practicable. In addition, strict permitting systems were established at several operations and further reduced the likelihood of vehicle interaction within active work areas.

Another major concern identified from the assessments undertaken was relating to non-compliances with vehicle separation standards and positive communications, particularly in high interaction areas. There were numerous occasions where inspectors observed workers to be in breach of their own site procedures when approaching production work areas such as dig floors and dumps. Such tasks are repeatedly conducted within a single shift and workers appeared to be complacent with the risks presented at the time. An effective and robust management system will identify such non-compliances as they arise, and some operations could provide evidence that corrective actions had taken place in relation to prior breaches. Supervisors play a key part in upholding and maintaining the site standards for issues such as this and a large portion of mine's displayed a poor standard of

compliance verification. As a result, contraventions were noted for supervision failing in their legislated duty to protect persons from vehicle interaction risks and maintaining a safe system of work.

Controls assessed

Threats

- Substandard vehicle operator areas
- Environmental conditions
- Component failure

Critical control: PC1.1 Road standards

There are numerous mechanisms which can contribute to the quality of road standards and if not managed appropriately can potentially result in serious or fatal injuries to workers who operate equipment within those areas. For this reason, it is critical that mines ensure such areas are suitable for use and are regularly maintained and monitored. In relation to road standards, the criteria below were assessed for each site:

- A risk assessment identified risks associated with roads or other vehicle operating areas.
- Procedures described the controls relating to road standards.
- Suitable roads were available for vehicles.
- Roads were inspected and maintained.
- Road standards information, training and instruction material was produced and delivered.

With regard to this specific critical control, the following issues were identified throughout the planned inspection program:

- Demarcation, signage and windrows were not to site standards or requirements.
- No requirement for dedicated light vehicle parking zones at loading and dumping areas.
- Windrows restricting visibility for light vehicle operators at intersections.
- Pedestrians, light vehicles and heavy vehicles not adequately segregated.
- Compliance verification process for new intersections not implemented.
- Shift inspections of work areas were inadequate.

Threat

- Vehicles operating in close proximity

Critical control: PC2.1 Traffic management

Traffic management is a critical control which is intended to prevent the opportunity for vehicles or mobile plant to interact with infrastructure, pedestrians, or other vehicles and mobile plant. It is expected that mines have implemented effective traffic management controls to ensure that such interactions are eliminated or in any case minimised so far as is reasonably practicable. This inspection program assessed each site's traffic management controls with regards to the following criteria:

- A risk assessment identified the risk of vehicles operating in close proximity to pedestrians, other vehicles and infrastructure.
- Procedures described the identified traffic management controls.
- Trigger Response Action Plans (TARPs) guided the execution of the traffic management controls.
- Documents, tools and equipment required to manage traffic were made available.
- Traffic management information, training and instruction material was produced and delivered.
- Workers were compliant with traffic management requirements.
- Vehicle interaction near misses and events were reported, investigated and actioned in a timely manner.

With regard to this specific critical control, the following issues were identified throughout the planned inspection program:

- Supervision failed to enforce vehicle separation and positive communications standards.
- Absence of controls for dumping in proximity to open roadways/work areas below.
- Compliance monitoring for ramp and crest speeds for heavy equipment was not implemented.
- In vehicle monitoring system data was not being analysed and non-compliances were not actioned accordingly.
- Lack of restrictions or permit systems for workers to limit the volume of mine traffic and congestion.

Threats

- Substandard vehicle operator areas
- Vehicles operating in close proximity
- Environmental conditions
- Component failure
- Human and organisational factors

Critical Control: PC2.3 Competent vehicle operator

In addition to implementing effective road standards and traffic management controls, it is imperative that vehicles are safely operated by workers who have the necessary knowledge and skills to carry out the task. Mines should have comprehensive and robust systems in place to ensure workers are not only trained and competent, but also authorised to operate vehicles within various areas of the operation. Sites were assessed on the following criteria:

- A risk assessment identified the risk of vehicles operating in close proximity to pedestrians, other vehicles and infrastructure.
- Procedures described the identified competent vehicle operator controls.
- A system for managing competency of vehicle operators was established.
- Vehicle operating procedures were available.
- Vehicle operators were assessed as competent and supporting documents were available.
- Vehicles were safely operated.
- Hazards were identified and controlled.
- Information, training and instruction were delivered to vehicle operators.

With regard to this specific critical control, the following issues were identified throughout the planned inspection program:

- Mobile plant parked inappropriately due to misunderstanding of the site standards.
- No formalised requirement for non-routine workers (such as non-production workers) to contact the area supervisor or be familiarised with the current hazards and controls in the mining area.
- Supervision and training requirements were not in place for solo trainee operators.
- Training and assessment programs did not address all the necessary task specific competencies or address specific risks associated with roads or other vehicle operating areas.

Assessment findings by mine

This table presents aggregate assessment findings by critical control providing a summary view of the status of each mine's hazard management processes. Importantly, the system recognises the value of fully implemented and documented controls by awarding an additional point if both elements were assessed as present. More details explaining the assessment system are found in Appendix B.

Figure 1. Assessment findings for the planned inspection program for roads or other vehicle operating areas – surface coal (overall results < 90%)

	0101 Surface vehicle interaction		
	1. Substandard vehicle operating areas 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity	1. Substandard vehicle operating areas 2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure 5. Human and organistional factors
	PC1.1	PC2.1	PC2.3
Mine location	Road standards	Traffic management	Competent vehicle operator
Mine A	Red	Red	Orange
Mine B	Red	Orange	Yellow
Mine C	Red	Orange	Yellow
Mine D	Orange	Yellow	Orange
Mine E	Red	Yellow	Green
Mine F	Yellow	Orange	Orange
Mine G	Yellow	Orange	Yellow
Mine H	Yellow	Yellow	Orange
Mine I	Yellow	Yellow	Orange
Mine J	Red	Yellow	Green
Mine K	Yellow	Yellow	Yellow
Mine L	Yellow	Green	Yellow
Mine M	Yellow	Yellow	Green
Mine N	Yellow	Orange	Yellow
Mine O	Yellow	Yellow	
Mine P	Green	Orange	Yellow
Mine Q	Yellow	Yellow	Green
Mine R	Yellow	Yellow	Yellow
Mine S	Orange	Yellow	Green

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

Figure 2. Assessment findings for the planned inspection program for roads or other vehicle operating areas – surface coal (overall results > 90% and < 100%)

	0101 Surface vehicle interaction		
	1. Substandard vehicle operating areas 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity	1. Substandard vehicle operating areas 2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure 5. Human and organistional factors
	PC1.1	PC2.1	PC2.3
Mine location	Road standards	Traffic management	Competent vehicle operator
Mine AA	Yellow	Yellow	Yellow
Mine AB	Yellow	Green	Yellow
Mine AC	Yellow	Yellow	Not applicable
Mine AD	Yellow	Yellow	Green
Mine AE	Yellow	Yellow	Green
Mine AF	Yellow	Yellow	Green
Mine AG	Yellow	Green	Yellow
Mine AH	Yellow	Yellow	Green
Mine AI	Green	Yellow	Green
Mine AJ	Yellow	Green	Green
Mine AK	Yellow	Green	Green
Mine AL	Yellow	Green	Green
Mine AM	Yellow	Green	Green
Mine AN	Green	Yellow	Green
Mine AO	Yellow	Green	Green
Mine AP	Yellow	Green	Green
Mine T	Yellow	Yellow	Green
Mine U	Yellow	Yellow	Yellow
Mine V	Yellow	Yellow	Yellow
Mine W	Yellow	Yellow	Yellow
Mine X	Yellow	Yellow	Yellow
Mine Y	Yellow	Yellow	Green
Mine Z	Yellow	Green	Yellow

Green (=100%)
Yellow (>= 80% and <100%)
Not applicable

Figure 3. Assessment findings for the planned inspection program for roads or other vehicle operating areas – surface coal (overall results = 100%)

	0101 Surface vehicle interaction		
	1. Substandard vehicle operating areas 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity	1. Substandard vehicle operating areas 2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure 5. Human and organisational factors
	PC1.1	PC2.1	PC2.3
Mine location	Road standards	Traffic management	Competent vehicle operator
Mine AQ	●	●	●
Mine AR	●	●	●
Mine AS	●	●	●
Mine AT	●	●	●
Mine AU	●	●	●
Mine AV	●	●	●
Mine AW	●	●	●
Mine AX	●	●	●
Mine AY	●	●	●
Mine AZ	●	●	●
Mine BA	●	●	●
Mine BB	●	●	
Mine BC	●	●	●
Mine BD	●	●	●
Mine BE	●	●	●
Mine BF	●	●	●
Mine BG	●	●	●

● Green (=100%)
Not applicable

Notices issued

Of the 59 sites assessed under the inspection program, 37 mines received notices relating to the principal hazard of roads or other vehicle operating areas, while some mines received notices in relation to other matters. For the purposes of this report, contraventions related to other matters have been removed from the analysis. The notices issued for roads or other vehicle operating areas were examined in detail and Table 2 below lists the notices issued by type and details.

Table 2. Notices issued for the planned inspection program for roads or other vehicle operating areas

NOTICE TYPE	TOTAL ISSUED	NUMBER OF MINES
s.195 prohibition notice	0	0
s.191 improvement notice	37	20
s.23 notice of concerns	34	32
Total	**71**	**37**

Of the combined 71 notices issued, there were some common themes which were apparent throughout the program plan. Table 3 summarises the type of contraventions, and outlines the total occurrences encountered. These themes can be related back to the critical controls outlined earlier and identify some trends which are of concern.

Table 3. Notices issued - prevalence of categories of concern

IDENTIFIED CONCERN CATEGORY	TOTAL OCCURRENCES IN NOTICES
Active roads and intersections were not constructed to site standard or design guidelines	28
Documentation relating to controls for roads or other vehicle operating areas (Risk Assessment, PHMP, TARPs etc.) not relevant, current, or readily available	23
Poor standard of signage and delineation along active roads	21
Workers observed to be non-compliant with the nominated controls on site	20
Poor standard of verifying compliance to nominated controls on site	14
Lack of controls to restrict unnecessary or unauthorised vehicles and persons from entering active production or work areas	8
Pre-use inspection checklists did not accurately specify safety critical components of the vehicle	8
Workers not familiar with nominated controls on site	8
Non-routine workers failing to receive safety information before entering active production or work areas	7
Opportunities for minimising and/or segregating vehicle interaction not adequately assessed or implemented	6
No formal requirement for supervisors to be trained in the relevant controls nominated for site	5
Training information for workers not clearly defined or detailed in relation to the hazard	4
Vehicles not fit for purpose	4

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	cau@planning.nsw.gov.au
Incident reporting	To report an incident or injury call 1300 814 609 or log in to the Regulator Portal
Website	www.resourcesregulator.nsw.gov.au
Address	NSW Resources Regulator 516 High Street Maitland NSW 2320

Appendix A. Legislative requirements and published guidance relating to the principal hazard of roads or other vehicle operating areas

The following is a list of certain legislative requirements for the management of risks associated with roads or other vehicle operating areas as provided by the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014. In addition, several guidance documents are also noted which have been published and are available for industry distribution.

Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

- Clause 28 - Movement of mobile plant
- Clause 103 - Duty to inform workers about safety management system
- Clause 104 - Duty to provide information, training and instruction
- Clause 107 - Review of information, training and instruction
- Clause 108 - Record of training
- Schedule 1, Part 2, Clause 4 - Roads or other vehicle operating areas

Coal Services - Order 34 – Training and Competence Management Systems

MDG 15 - Guideline for mobile and transportable plant for use at mines (other than underground coal mines)

MDG 28 - Safety requirements for coal stockpiles and reclaim tunnels

MDG 2007 - Selection of collision management systems

Safety Alert (SA20-09) - Operating mobile plant - Incidents and near misses

Safety Bulletin (SB19-09) - Lack of bunding on accessible edges

Safety Bulletin (SB18-11) - Windrow management and demarcation

Safety Bulletin (SB18-06) - Lack of positive communications

Safety Bulletin (SB17-01) - Industry reports more truck rollover incidents

Investigation Report - Maules Creek mine truck collision

Investigation Report - Investigation into a fatal collision between a Caterpillar 793D haul dump truck and a Toyota Landcruiser at Ravensworth open cut mine on 30 November 2013

Appendix B. Assessment system explained

The NSW Resources Regulator uses a bowtie framework to proactively assess how mine sites manage their principal hazards. Bowties are a widely used risk management tool that integrates preventative and mitigating controls onto threat lines that relate to a material unwanted event.

As part of program planning, controls were categorised by the NSW Resources Regulator's Mine Safety Inspectorate in accordance with the ICMM handbook. Only controls deemed critical[1] are assessed under a planned inspection program. For a control to be assessed as effective, each of its control supports must be in place and operational.

Assessment findings

During each mine's onsite assessment, inspectors rate each control support and record the findings. Points are awarded depending on whether there was evidence that the control support had been documented and / or implemented.

For the finding outcomes in this report, points were awarded for each control support identified within a critical control. An effective control support is allocated four points where the control was assessed as fully implemented and documented. An overall assessment result for the critical control is then calculated as a proportion of the maximum possible points for that critical control. For example, if ten control supports underpin a critical control and five were assessed as fully implemented ('documented and implemented') and five were found to be 'not documented and not implemented' then the overall assessment result for that critical control would be 50%.

Finding outcome and points

FINDING OUTCOME	POINTS
Documented and implemented	4
Implemented but not documented	2
Documented but not implemented	1
Not documented and not implemented	0

Critical control calculations also took into account instances where control supports were not applicable to the mine being assessed or when control supports were not able to be assessed during a site visit.

The overall assessment result for each critical control has been assigned a colour based on the assessment bands presented in the table below. The colour band results are then used to identify industry focus areas requiring improvement.

[1] Critical Control Management Implementation Guide, International Council on Mining and Metals (ICMM), 2015.

Assessment results colour code

CRITERIA	COLOUR
An assessment result of 100% of possible points	Green
An assessment result of ≥ 80% but < 100% of possible points	Yellow
An assessment result of ≥ 65% but < 80% of possible points	Orange
An assessment result of < 65% of possible points	Red