

Resources

# Safety matters

VOL. 1 NO. 2 MAY 2013

ISSN 2201-5604



Government of Western Australia  
Department of Mines and Petroleum  
Resources Safety

## Clamping down on dangerous goods transport

SAFETY OF DRIVERS WORKING ALONE

TAKING CARE OF TRAILING AND REELING CABLES

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Simon Ridge (second from left) with JKTech staff (left to right: Phillip Turner, Jim Joy and Simon Thompson)

**W**elcome to the second issue of *Resources Safety Matters* — the Department of Mines and Petroleum’s flagship safety publication covering mining, dangerous goods, petroleum and geothermal energy.

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## LEGISLATION UPDATE

Firstly, I have some news on the harmonisation of occupational health and safety and where Western Australia is positioned. The Department of Mines and Petroleum has formed a six-person task force within Resources Safety to develop proposals for the resources safety legislation review process in Western Australia. This group will consider the model work health and safety legislation and its impact on the various pieces of legislation that Resources Safety administers.

The intention is to develop a firm proposal for a future Ministerial Advisory Panel, comprising appropriate stakeholders, to consider prior to the undertaking of a Regulation Impact Statement and the passage of any new legislation through the Western Australian Parliament.

## KEEPING THE SAFETY CONVERSATION GOING

On another topic, in a supplement to IFAP’s February 2013 issue of *SafetyWA* magazine, Corrie Pitzer, CEO of SAFEMap International, described seven delusions of safety management. Are we really deluded about safety?

Here are some of my thoughts at this point in time (I reserve the right to change my mind should I subsequently be convinced otherwise!). What do you think?

### 1. The delusion of compliance

Does compliance with rules and reliance on technology make workers complacent and reduce their responsiveness to risk? Corrie suggests that a prevailing workplace culture that installs rules for any situation is harmful because it encourages them to switch off their common sense. The potential for slight variations from the norm may require people to respond in a complex way – quickly and without careful thought. This responsiveness is therefore critical to their safe working conditions.

My thoughts? Complacency is indeed an ever-present concern, especially when you combine it with a less experienced workforce. Workers need to be equipped with competencies in hazard recognition, risk management and a mindset that continually questions the status quo of their work environment.

### 2. The delusion of risk control

Corrie states that one of the ways organisations promote safety is by controlling or mitigating risk. He believes that while such systems are largely successful, they also create complexity and extensive risk-mitigation measures can lead to a false sense of control, collective comfort and the belief that incidents are less likely to occur. Corrie says that when people think they see risk, they tend to act more cautiously. If they don’t, their tolerance for risk rises.

My thoughts? You can never “know what you do not know”. Our approach to tasks should never assume that we know everything about the risks present at that place at that time. Wariness is a good habit to cultivate, especially for less familiar tasks such as those involved in major shut-downs.

### 3. The delusion of predictability

Corrie says that the notion that risk is predictable is a delusion. Personnel make subjective guesses about risk that can easily be manipulated to meet organisational needs. This means there are few, if any, contingencies in place to account for variations, and when deviations do occur, workers can be exposed to new adverse outcomes that are frequently catastrophic. Organisations may also become obsessed with tracking predicted, known risks.

My thoughts? Our workplaces are dynamic and there is often a multitude of tasks being performed by multiple work groups or contractors. This is especially true for shut-downs, during which additional precautions need to be taken to manage potential interactions between separate work groups and activities. Many of us will have seen the so-called organised chaos that such complex maintenance activities seem to be. Enhanced wariness in such environments is essential. Workers and supervisors need to ask the questions, and double check and check again to ensure that interactions between work groups and potential changes in the environment are anticipated.

### 4. The delusion of consistency

According to Corrie, the term “situational judgement” is often bandied about in safety circles as something to be eliminated, since safety procedures should account for and control all risks — and therefore eliminate the need for improvisation in a time of apparent danger. However, Corrie argues that consistently observing rules is not the sole component in the safe behaviour equation. Humans have learned to deal with risk through a highly complex process of cognitive adaptation that has honed an intuition and competence that defies reasoned thinking and allows a varied response to risk.

According to Corrie, the consistency and compliance in the workplace that results from modern risk-control logic is counter to such human nature. He says that organisations erode the most potent safeguards in their safety systems by limiting the innate abilities of workers to respond to crises in variable ways. In effect, humans are the strongest link, not the weakest, in the safety chain.

My thoughts? Our most precious resource is our people, and they are good at their jobs. We need to recognise that, under normal circumstances, the workers on the job will know more about the risks involved than most others and, given the right tools and risk management competencies, they can effectively anticipate changes in the work environment and manage them safely. This can only happen where the straight jacket of procedures is not so tight as to require nothing but a robotic response.

### 5. The human-error delusion

It is an oversimplification to suggest that human error leads to accident, Corrie argues, given the myriad interactions between workers and their complex and dynamic environments. An over-reliance on workplaces that are over-simplified by technological advances, he suggests, may prevent us from responding appropriately when the system fails. Human error may be the most visible cause for an accident, but it is seldom the only factor.

Corrie contends that an accident results when a set of related events occur and stack upon one another — and one wrong decision from the millions made each day can be catastrophic.

My thoughts? It is a simple fact that “to err is human” since we all make mistakes and will continue to do so. This being the case, our systems need to be robust enough to protect us from our human frailties. In the mining sector, we are over reliant upon administrative controls and therefore exposed to human error. We will only get the next step improvement in safety outcomes by moving up the hierarchy of control, implementing engineering controls where substitution and elimination are not practical.

### 6. The delusion of quantification

Corrie notes that the safety industry’s new buzz term is “trend to zero”, which holds that workplaces and industries can reach goals of zero accidents. “If we can do it for a day (or a week or a month), we can do it forever” is the most popular argument, according to Corrie.

Corrie believes that statements such as “process safety accidents can be prevented” are founded on overly simplistic thinking, and promote inherently false goals. The paradox is that if this statement is false, then someone is acknowledging

that there will be failures and someone will eventually be killed on the job. However, if it is true, it means that all accidents will have been eliminated, including near misses.

This would mean “situations of zero hazards and zero risks”, according to Corrie. He sees this as a problem because safety is being viewed as a key performance indicator, and zero is a delusion that runs contrary to the second law of thermodynamics — essentially, perfection is impossible.

My thoughts? “Zero harm” is a worthy aspirational target and it is essential that all practical tools are applied in an effort to minimise the impact of risk in our work places. There is no such thing as a risk-free environment at work nor, for that matter, at home. It has even been noted by leaders in safety performance that the impact of home-based risks is greater than those at work.

No-one in the minerals industry would deny that there are significant risks associated with its activities, but we should also acknowledge that they therefore require a suitable response in the provision of high-level mitigating controls. Recently, in a conversation with Professor Jim Joy, it was noted that there is nothing wrong with being in the red section of a five-by-five risk matrix — it simply demands a much higher level of control.

### **7. The delusion of invulnerability**

Corrie says that companies can fall into the trap of believing they are invulnerable when they enjoy long periods without reported workplace accidents. Zero seems possible and their view might be that risks are controlled, human error has been curtailed, compliance is achieved, and behaviour is now consistent and predictable.

Corrie sees this as particularly dangerous because managers may believe that nothing is wrong because there is no evidence to argue otherwise. Such a culture might discourage people to speak up when something is wrong because it erodes the company’s hard-won reputation of realising zero accidents.

Accidents are not preventable and they will happen, Corrie observes, but this does not lead to the acceptance of death as inevitable. Rather, it is the start of an appreciation of the complexity of workplace safety.

My thoughts? There is a school of thought that it is risky to fly Qantas as statistically it is approaching the inevitable event. This is the “lie” of statistics — after all, there are lies, damned lies and statistics. The reality of risk management is to have robust systems that, should a failure occur, minimise the harm caused. This, of course, is the very basis of risk management tools such as the so-called bow-tie model.

At the end of the day, all of us need to keep asking the questions “What could happen here?” and “What have we put in place to manage that event?” We should remember the Piper Alpha testimony from a senior manager who inspected the platform between shifts — when nothing much was happening and no problems were observed or reported!

### **Dispelling delusions**

Corrie’s closing words are that the key to promoting workplace safety and dispelling organisation delusions is to balance risk rewards with potential harm. People will require the skills to deal with risk competently and explore new and better ways to engineer and build things. Safety should be a key part of a strategic approach, and be fully integrated into the business so it is a seamless and automatic consideration before decisions are made.

My thoughts? The Department of Mines and Petroleum recognises the importance of an effective risk management approach that incorporates both human factors and safety systems. The risk management training that Resources Safety has commenced for industry participants and inspectorate staff is a milestone on the road to integrating strategic risk management within all work processes in the Western Australian minerals sector.

I commend you to read the full article by Corrie Pitzer. Contact IFAP (1300 432 700, [ifap@ifap.asn.au](mailto:ifap@ifap.asn.au)) for further information.



**Simon Ridge**  
*Executive Director, Resources Safety*



# IS RADARS GAINING TRACTION WITH INDUSTRY?

**In 2010, the Department of Mines and Petroleum (DMP) started implementing the State Government's safety reform strategy (also referred to as Reform and Development at Resources Safety or RADARS). For the safety regulator, this initiative addresses issues of legislation, staff capacity and competency, and introduces a cost recovery approach to fund safety regulations of the resources industry in Western Australia. It also aims to support positive cultural change across the industry.**

The RADARS initiative is now over two years into a plan expected to take five or six years to be fully rolled out across the three regulatory areas covering mining, petroleum (and geothermal energy), and dangerous goods. The major changes have been implemented and will be consolidated in the coming years. The biennial stakeholder perceptions survey is conducted to evaluate changes in industry's perception of Resources Safety's performance as a safety regulator prior to, during, and at the completion of the RADARS strategy. The survey specifically addresses:

- importance of the roles of a safety regulator and how well Resources Safety performed those roles
- perceptions of Resources Safety's performance when working with industry to reduce the likelihood and consequences of serious incidents
- perceptions of the value that various initiatives could add to clients' safety outcomes.

The survey also seeks industry's view of its own performance in achieving "a proactive, consultative safety culture" and how advanced it is in having the attributes of a resilient safety culture.

The original survey was conducted in 2010 to establish a baseline against which to measure progress. A range of anecdotal and informal feedback suggests that industry has observed a marked improvement in the way Resources Safety conducts its business activities. However, not all the results from the 2012 perceptions survey reflect that view. While there

have been improvements in some areas, the shift in ratings is not always to the degree expected, although it is recognised that attitudes change slowly and tend to endure so there is likely to be a lag in changing perceptions.

When the perceptions survey was constructed in 2010, it was decided to include a specific measure for respondents to assess roles, services and functions as a score out of ten. The benchmark for industry satisfaction was set as a score of eight or more as these levels indicate a degree of excellence that reflects the aspirational goal of being a leading practice safety regulator. The number of respondents who score Resources Safety at this level is pleasingly high. However, the average ratings have not achieved the level we would like to see in all areas.

Unfortunately, for some representative groups, it was difficult to obtain a statistically valid sample size due to the small number of stakeholders in some areas and a low response rate from those to whom the survey was distributed. Changes in the industry's workforce, and not being able to guarantee that the same respondents are completing the survey at the different stages, also makes comparison between survey cycles difficult. Nevertheless, the implications of the 2012 perceptions survey are discussed below for the three regulatory areas.

## MINING

When RADARS was implemented in 2010, the highest priorities were the regulatory activities undertaken to administer the *Mines Safety and Inspection Act 1994*. The initial focus was to address issues of capacity and competency, and continue to promote a risk-based approach to occupational safety and health.

An extensive recruitment campaign and competency-based training and development program have led to an increase in the number of inspectors and a broader mix of skills and experience. A team-based structure and focus groups have been established and are implementing more consistent approaches to raising awareness, seeking compliance and enforcing the legislation. The development of the online

Safety Regulation System (SRS) is providing enhanced data management and analysis.

The Department believes that, under RADARS, there have been significant improvements in the delivery of mines safety regulatory services but this is not yet fully recognised by all stakeholders. However, using the results of this survey, the inspectorate is targeting areas where improvements can be made to address areas of continuing concern.

It was accepted in 2010 that the Department's relationship with safety and health representatives needed to improve and a specific focus group was established to support this important role in the mining industry. It is recognised that, because they now number over 2,200, it is difficult to interact personally with each of the State's safety and health representatives and consequently some may feel neglected. However, a range of strategies and resources has been developed to overcome this issue, and it is hoped that the positive effects will be reflected in the 2014 survey results.

## PETROLEUM

The RADARS reform program for the petroleum and geothermal energy sectors commenced in the third quarter of 2011. On 1 January 2012, Resources Safety also assumed the safety regulatory responsibilities for all State coastal water offshore petroleum operations from NOPSA, the Commonwealth regulator. This presented additional challenges given the number of major projects underway on and around Barrow Island and adjacent Onslow, and the complexity of water activities in the area. Cost recovery for coastal waters safety regulatory services was introduced in late 2012.

At the start of 2012, a more client-focused approach was introduced to the operational structure. A significant recruitment campaign was undertaken to ensure the three new teams were properly resourced with appropriate competencies and skills. This was supported by an extensive training regime implemented during the year. There was also increased focus on regular and more comprehensive liaison with industry stakeholders and scheduled auditing of activities across the industry.

Over time, SRS development will also provide an online interactive interface for petroleum and geothermal energy safety regulatory services such as the lodgement, assessment and review of safety documentation. There will be a concurrent review of internal administrative procedures, guidelines and systems to ensure consistency.

Although there is a way to go to increase the proportion of respondents giving excellent ratings, it is pleasing that industry's perception is that the petroleum safety regulator's performance has improved since 2010. In 2013, as more RADARS objectives are achieved, increased efficiencies and improvements in overall service delivery to industry should see this positive trend continue.

## MAJOR HAZARD FACILITIES (MHFS)

The relationship between MHF operators and the dangerous goods regulator is still developing and therefore so are industry expectations. This was complicated in 2012 by two factors. Firstly, there was an increase in fees to near full cost recovery. Secondly, there was a significant switch away from assessment activities to the commencement of formal compliance audits.

The increase in fees was universally opposed and this issue generated considerable debate about the value-for-money of regulatory services. There was also much discussion about the audit program, how it would be conducted and what it was intended to achieve. In this context, the visibility of RADARS-related activities and changes in the approach of the dangerous goods officers was low, and this is reflected in the survey results.

As the MHF audit program is stabilised and entrenched, it is expected that the nature of the ongoing relationship between MHF operators and regulators will become clearer and, consequently, the value of the regulator's contribution will be more objectively assessed by industry. For example, a regular discussion forum held in March 2013 was attended by more than two-thirds of MHF operators and the feedback on audits was positive.

## 2012 PERCEPTIONS SURVEY RESULTS

The full survey report is available online at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) in the section covering safety reform in action.



## INTRODUCING THE NEW MINISTER FOR MINES AND PETROLEUM

**The Hon Bill Marmion MLA was elected to the Western Australian Parliament in 2008 as the member for Nedlands. Since then, he has served in a range of roles including Parliamentary Secretary to the Premier and Minister for Commerce; Science and Innovation; Housing; Minister Assisting the Treasurer; and Minister for Water and the Environment.**

His current portfolios are Mines and Petroleum, and Housing. As the Minister for Mines and Petroleum, he is committed to ensuring a stable regulatory environment to maintain the expansion of the crucially important resource sector in Western Australia. The mining and petroleum industries in Western Australia underpin the State's economy with resources sales valued at A\$106 billion in 2011-12.

An engineer by profession, Mr Marmion has extensive experience working in the public sector for Main Roads and the Department of Premier and Cabinet. Before entering Parliament he was a principal of a consulting company that provided strategic planning advice to the private sector and Government.

At the Chamber of Minerals and Energy's recent Safety and Health Conference, Mr Marmion noted that the former Minister for Mines and Petroleum, Norman Moore, had been staunchly committed to overhauling the way safety and health were regulated in the resources industry.

"Through my previous position as Minister for Environment, and my experience as a civil engineer, it goes without saying that I will also dedicate myself to this cause," the new Minister said.

"I can only hope that 2013 brings us another year where every resources worker returns home safely from their shifts."

## RADARS STALWART RETIRES

Norman Moore, Western Australia's Minister for Mines and Petroleum from 2008 until early 2013, played a pivotal role in the approval and implementation of the Reform and Development at Resources Safety (RADARS) strategy, including the cost-recovery approach to maintain the reform process.

His commitment to mines safety had an early genesis. When he was very young, his father worked in a gold mine and the family lived in Bullfinch. A next-door neighbour was killed in an underground mining accident, leaving five children fatherless. This had a lasting effect on the former Minister.

Whether speaking with the regulator, workers or companies, Mr Moore's view has always been that work safety is important and it is about keeping people alive. He was particularly pleased that in 2012 — his last full year in office — there were no work-related fatalities in Western Australian mines.



# SRS RAMPS UP

## ACHIEVED

### Mining audits and inspections go live April-May 2013

An online system allowing the mining industry to:

- view any audits related to the company or site
- provide Resources Safety with comments related to the audit.

### Mining notices go live April-May 2013

An online system allowing the mining industry to:

- view any improvement or prohibition notice issued to the company or site
- request a review of an improvement or prohibition notice
- notify Resources Safety regarding compliance with an improvement notice.

## IN PROGRESS

### New field (operational areas) added to occurrence and injury forms goes live April-May 2013

A new field has been added to the injury and occurrence report form to allow the mining industry to specify the operational activity being carried out at the time of an incident, occurrence or injury.

### Notification form refinement due to go live June 2013

A series of enhancements to better align the online injury and occurrence report form notification submissions with the legislation, reducing ambiguity or confusion that the mining industry may encounter when reporting accidents, occurrences and injuries.

Most changes will occur to the occurrence notification form, with a name change to notifiable incident report form, and amended form layout.

### Exploration radiation management plans due to go live June 2013

A full online system allowing the mining industry to:

- lodge exploration radiation management plans (RMPs)
- communicate online with Resources Safety.

### Project management plan refinement due to go live June 2013

The online lodgement system for mining project management plans (PMPs) has been enhanced to allow the mining industry to provide details of the type of construction activities taking place.

## FINDING OUT ABOUT SRS

Over 180 mining industry representatives attended SRS information sessions held in Perth between 25 February and 3 April this year. Resources Safety presented the half-day sessions to showcase the current functionality of SRS and give a glimpse into the future, as well as provide practical tips on how to use the system more effectively.

Attendees were instructed in the use of the notifications module, which includes monthly status, injury and occurrence reporting, as well as how to handle the communications and task management capabilities functions. Security aspects and the approvals process were also covered.

Sessions are planned for Collie and Kalgoorlie later this year. Subscribe to Resources Safety's news alerts to receive further information as it becomes available.



## WANT TO KNOW MORE BUT CANNOT ATTEND AN INFORMATION SESSION?

A toolbox presentation based on the information session can be downloaded from the Resources Safety website in the mining safety section.

### Online submission of statutory positions due to go live June 2013

An online one-stop-shop for the mining industry to:

- notify Resources Safety of appointments to statutory positions
- receive electronic acknowledgement of submissions.



## JIM TORLACH SCHOLAR GRABS HER OPPORTUNITY

*Samantha Pollock, 21, was the 2012 recipient of the Jim Torlach Commemorative Scholarship, established by the Mining and Resource Contractors Safety Training Association (MARCSTA). The scholarship not only covers her course fees for the duration of her three-year degree, but also provides valuable employment in the mining industry. From November 2012 to February 2013, Samantha undertook ten week's of practical work experience with Resources Safety. Here she tells us about the scholarship process and how she made the most of her time with the safety regulator.*

**I am well prepared for the second year of my degree in the Bachelor of Science (Health, Safety and Environment) at Curtin University after spending the 2012-13 summer break with Resources Safety gaining on-the-job experience as part of the Jim Torlach Commemorative Scholarship.**

I applied for the scholarship in 2012 as a first year university student. The application process included submitting a statement about how I would apply the knowledge gained from my graduate work as an occupational safety and health professional in the resources industry. My statement focused on improving the way that learnings from hazard and near-miss reports can be communicated and used to improve

safety before someone is injured. The final stage was a panel interview, which included representatives from MARCSTA, the Department of Mines and Petroleum, and industry partners.

During my time at Resources Safety, I was able to work with staff in the areas of mines safety, dangerous goods safety, petroleum and geothermal energy safety, and safety communications. I was involved in a variety of learning opportunities including one-on-one sessions, accompanying inspectors on site visits, participating in the drafting process for the guideline on the management of diesel emissions, and assisting in the research and development of a fatigue management guideline for Western Australian conditions.

I completed a diverse range of site visits with mines inspectors including a nickel refinery, iron ore and alumina port operations, a salt mine and construction activities. My knowledge and practical understanding of mine sites have expanded dramatically, and I have a greater appreciation for the diversity of processes, equipment and hazards involved.

Inspections with dangerous goods officers increased my knowledge about their roles. I was involved in a storage inspection, visited a Government explosives reserve, and observed a transport audit as well as on-the-road enforcement.



Visiting Fremantle Port's Kwinana Port Operation

By accompanying Resources Safety staff, I saw the practical application of the various acts and regulations I was reading about in the office.

I also undertook a project to assist in the research and initial development of a guideline aiming to prevent and manage fatigue at Western Australian mining operations. This involved compiling feedback from workshops held during the 2012 Mines Safety Roadshow and incorporating good practices from other State guidelines. I researched current mining practices in Western Australia and the appropriate legislation to ensure the guidance was both practical and relevant. I then drafted the guideline structure and completed additional research on a risk factor to recommend effective and suitable control measures.

Numerous staff took the time to teach me and answer my questions. I thank all those who made my placement in Resources Safety such a valuable experience by providing a variety of exciting and challenging learning opportunities. There is a wealth of knowledge within the Department of Mines and Petroleum, and I look forward to using my contacts as a resource for my future studies and career.

I also thank MARCSTA for supporting the Jim Torlach Commemorative Scholarship and organising my work experience with Resources Safety.

## ABOUT THIS SCHOLARSHIP

Curtin University of Technology offers this scholarship to support and reward students interested in pursuing an occupational health and safety career in the mining industry upon graduation.

James Milne Torlach (1938-2006) made an outstanding contribution to the improvement of safety and health in the mining industry in Western Australia, being responsible for the complete overhaul and modernisation of mine safety legislation culminating in the passage of the *Mines Safety and Inspection Act 1994*. This perpetual scholarship honours his memory.

The Jim Torlach Commemorative Scholarship is sponsored by MARCSTA.

Information about the 2013 scholarship will be posted at [www.scholarships.curtin.edu.au](http://www.scholarships.curtin.edu.au) when available.



Lou Tolomei and Darlene Mola



Receiving their certificates from Norman Moore

## WHO LET THE DGOS OUT?

**F**ive new Resources Safety staff members were recently gazetted as Dangerous Goods Officers. This represents another successful outcome from the Reform and Development at Resources Safety (RADARS) strategy.

Darlene Mola and Lou Tolomei are Reserve Officers based at the Baldy State Explosives Facility. Their duties include inspecting explosives magazines and enforcing dangerous goods and explosives transport rules for vehicles coming in and out of the reserve. Their regulatory training has focused on these specific enforcement activities.

Tiffany Croxon, Scott Coleman and Jon Palfreyman are located at Resources Safety's Cannington office. They will eventually be trained across the full spectrum of dangerous goods safety enforcement, including explosives and transport but their initial focus is on dangerous goods storage and handling. With over 2,400 licensed storage sites around Western Australia, there is plenty for them to do.

These three officers have received the most organised and demanding training ever offered to new dangerous goods officers. Stretching over a six-month period, the training included theory, observation, supervised inspections, answering general inquiries and three exams.



Director Dangerous Goods, Philip Hine, said that all of these officers should be justly proud of their achievements.

“RADARS, the safety reform program, is demanding higher standards of performance from all of us. The dangerous goods training program has been completely re-worked, expanded and improved. To successfully come through this program is an outstanding accomplishment, and I congratulate them all.

“Darlene and Lou will be keeping a keen eye on magazines and vehicles at the reserve to help maintain the high safety standards we expect at these facilities.

“Tiffany, Scott and Jon are now conducting their own solo inspections and expanding their expertise to more complex sites and dangerous goods transport before moving on to explosives.”



## DANGEROUS GOODS SAFETY

The major focus of the RADARS safety reforms for dangerous goods safety regulation in next few months is implementing the next round of legislative reform and commencing the statutory review of the *Dangerous Goods Safety Act 2004*.

### LEGISLATIVE REFORM

In addition to the ongoing whirl of core business, it is intended to bring in a number of regulatory reforms over the next few months. The reforms listed below took effect in May 2013:

- The second round of fee increases for explosives reserves brings them to full cost recovery. This ensures the Department of Mines and Petroleum has the financial resources to provide the administrative and infrastructure services required at these facilities.
- The second round of fee increases for major hazard facilities (MHFs) brings them to near full cost recovery. This ensures the Department can employ the high quality technical staff necessary to provide these facilities with the requisite assessment and auditing support.

The following changes should take effect in July 2013:

- Rules for responsible persons under the explosives and security risk substances regulations will be changed so it will not be necessary to continually update the licence with personnel details. This should considerably reduce the administrative burden on both industry and the Department.
- Rules for secure “employees” will be made more flexible and allow for subcontractors to come under a security management plan for explosives and security risk

management licence holders. This will reduce the need for many service providers to be separately licensed.

- Licensing of dangerous goods storage at ports will be introduced so rules at ports are the same as at all other storage sites. Special berth rules will be transferred to the storage and handling and explosives regulations and the goods in ports regulations repealed.
- Accredited consultants will be allowed to endorse explosives and security risk substances licence applications. This will allow consultants to provide a complete service to clients where multiple licences are required.

In January 2014, non-MHF licence fees will be rationalised and reduced fees applied where a licensee holds multiple licences.

### STATUTORY REVIEW OF ACT

The statutory review of the *Dangerous Goods Safety Act 2004* commences mid-2013. It will be included in a broader review of resources safety regulation in the context of Western Australia’s safety regulation needs and the national occupational safety and health legislation.

### RECRUITMENT

The Department will shortly be advertising several vacancies in dangerous goods safety — looking for a mix of youth and experience to supplement and enhance the existing workforce.

Philip Hine, Director Dangerous Goods



## PETROLEUM SAFETY

The Department of Mines and Petroleum, through Resources Safety, administers the onshore and offshore (within three nautical miles adjacent to the coast of Western Australia) safety and structural integrity provisions of the State's petroleum and geothermal energy legislation. Geothermal energy operations are sometimes overlooked in the scheme of things.

### APPLICABLE LEGISLATION

The *Petroleum and Geothermal Energy Resources Act 1967* (PAGERA) covers onshore petroleum and geothermal energy operations.

The *Petroleum Pipeline Act 1969* (PPA) covers onshore pipeline operations.

The *Petroleum (Submerged Lands) Act 1982* (PSLA) covers offshore petroleum and pipeline operations.

The primary functions and powers of these Acts are to regulate duty of care, occupational safety and health (OSH), and the integrity of petroleum and geothermal operations.

The PAGERA attendant regulations are:

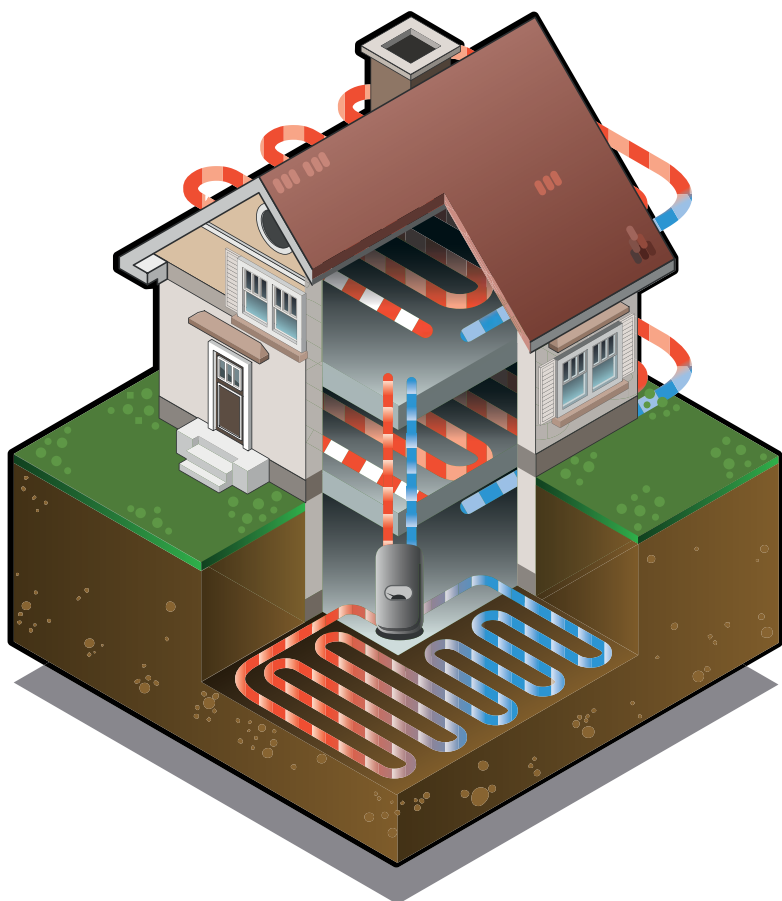
- Petroleum and Geothermal Energy Resources (Management of Safety) Regulations 2010 (PAGER MOS)
- Petroleum and Geothermal Energy Resources (Occupational Safety and Health) Regulations 2010 (PAGER OSH).

The PPA attendant regulations are:

- Petroleum Pipelines (Management of Safety of Pipeline Operations) Regulations 2010
- Petroleum Pipelines (Occupational Safety and Health) Regulations 2010.

The PSLA attendant regulations are:

- Petroleum (Submerged Lands) (Diving Safety) Regulations 2007
- Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 2007
- Petroleum (Submerged Lands) (Occupational Safety and Health) Regulations 2007
- Petroleum (Submerged Lands) (Pipelines) Regulations 2007.



In administering the above Acts and regulations, the primary functions of staff in Resources Safety's Petroleum Safety Branch are to:

- manage the assessment, review and acceptance of safety documents for safety case, safety management systems, pipeline management plans and diving safety management systems
- undertake inspections with regard to OSH legislation, including compliance, possible contravention, investigations and enquiry
- provide specialised safety and risk management advice to Government agencies
- promote safety and health outcomes, including education and information.

### LEGISLATIVE SITUATION REGARDING GEOTHERMAL ENERGY SAFETY

Currently, most activities under the PAGERA centre on petroleum operations. However, in the coming years, it is expected that more geothermal energy operations are likely to come on line as a sustainable and low-emission alternative to fossil fuels.

The PAGERA and attendant PAGER MOS and OSH regulations apply to commercial geothermal energy operations. A commercial purpose would be one:

- with a separate legal entity (a natural person is not a separate legal entity)
- set up to yield or make a profit
- designed for a wide, popular market
- for business instead of private use.

An example of a commercial purpose is an enhanced geothermal system comprising two deep bores up to 5 km deep. Water is pumped down the injection well from ground level, through very hot fractured rock (typically granite or sandstones), up the production well to the surface. The water at the surface is very hot and is moved through a turbine to generate electricity.

The PAGERA and attendant PAGER MOS and OSH regulations do not apply to geothermal energy operations that are small-scale ground source heat pumps or involve small-scale recovery of geothermal energy not for a commercial purpose, such as to heat a domestic dwelling.

Alan Gooch, Director Petroleum Safety



## MINES SAFETY

### PRESENTING THE TOP TEN

Resources Safety is committed to consulting with the minerals sector when setting priorities for its annual operational plans in mines safety. Over the past year, over 400 industry respondents provided feedback on what they saw as priority safety and health issues for the regulator.

Surveys were completed by those attending the Chamber of Minerals and Energy's 2012 Safety and Health Conference, as well as Resources Safety's 2012 Exploration Safety Roadshow series presented in Kalgoorlie and Perth. Mine managers and safety and health representatives within Resources Safety's databases were also consulted.

By combining the survey results with staff responses at the Mines Inspectors Forum held in November 2012 and feedback from the Mining Industry Advisory Committee (MIAC) meeting held on 22 November 2012, Resources Safety senior management determined the following list of ten priority issues, in no particular order, for the mines safety regulator in 2013-14 and beyond.

- Construction
- Maintenance
- Exploration
- Safety culture
- Management and supervision
- Safety and health representatives
- Risk management training

- Implementation of principal hazard management plans (PHMPs)
- Fatigue prevention and management
- Safety in design

The operational planning process begun at the Mines Inspectors Forum held in March 2013 will ensure these priorities are addressed by safety awareness programs, with teams' inspection and audit schedules fine-tuned as necessary.

### IMPORTANCE OF RISK TRAINING

Along with Executive Director Simon Ridge and 12 other Resources Safety senior staff, I recently attended a two-day risk management training session equivalent to the Global Minerals Industry Risk Management (G-MIRM) G4 for Executives course. The aim was to gain a strategic understanding about how the five-day G3 for Managers course might apply to mines inspectors and industry participants, and determine the requirements for tailoring the G3 courses to be delivered in Western Australia.

Presented by Professor Jim Joy of JKTech, the course:

- explored our understanding of risk management concepts, terminology and methods
- outlined the G-MIRM principles for good practice in operational risk management, with four levels of risk assessment ranging from full site to individual or "at the workforce"





PP

- challenged traditional thinking about risk and safety, and emphasised the importance of making a personal commitment and determining accountability, with both leading to better decision-making about risk
- discussed how a risk assessment is scoped and the appropriate use of tools for good practice
- described practical ways to improve risk management and move forward on the safety maturity journey.

I noted a synergy between the safety maturity journey presented by Professor Joy and the safety culture spectrum adopted by Resources Safety, with both striving for resilience.

One of the workshop exercises looked at why site risk management might fail to be effective. Some of the issues identified by Resources Safety staff as being problems for industry included:

- failing to recognise or appreciate the hazard
- being driven by forms and not outcomes
- playing the numbers game and relying on the five-by-five risk matrix as a tool for establishing acceptable risk, rather than using it as a priority-setting tool
- not focusing on the controls and their ongoing effectiveness
- uncertainty about or lack of ownership of the risk management process.

Resources Safety's first G3 for Managers course was presented to mines inspectors and industry representatives in Perth from 15 to 19 April and was very well received.

The next G3 course will run in Perth from 24 to 28 June, with further G3 courses scheduled for Kalgoorlie from 12 to 16 August and Bunbury from 21 to 25 October. A G4 for Executives briefing for industry leaders will be held in Perth from 13 to 14 June 2013. Contact JKtech (07 3365 5842, [jktech@jktech.com.au](mailto:jktech@jktech.com.au)) for further information about any of these courses.

As Simon Ridge said in his *From the Executive Director* contribution, risk management training is an important milestone on the road to integrating strategic risk management within all work processes. By the time the Bunbury course has finished, over 60 mines inspectors and some 50 industry representatives will have an improved understanding of the practice of risk management, and practical tips for making better decisions about risk.

Andrew Chaplyn, Director Mines Safety



## 2013 EXPLORATION SAFETY ROADSHOW

**T**he 2013 Exploration Safety Roadshow, which will be held in Kalgoorlie and Perth in July, is the sixth in an annual series presented by Resources Safety.

Key features of this year's program will be discussions about the recently released exploration drilling code of practice and exploration audit tools.

Presentations and workshops will also focus on:

- recent audits undertaken by Resources Safety, and what the results mean for the exploration industry
- fibrous minerals management
- the requirements for high-risk work (lifting, rigging, dogging)
- the problems with improvised tooling, especially for drilling
- stored energy hazards associated with exploration activities.

The roadshows are an opportunity to confer with Resources Safety staff on issues of concern, hear the latest news about safety performance, and network with other industry participants.

Lunch and refreshments are provided, as well as a roadshow pack of guidance material. There is no registration fee but you do need to register your intention to participate.

Visit [www.dmp.wa.gov.au/events](http://www.dmp.wa.gov.au/events) for more details or use the QR code.



### 2013 EXPLORATION SAFETY ROADSHOW

#### Kalgoorlie

Date: Wednesday 24 July 2013  
Time: 8.00 am to 2.30 pm  
Venue: WA School of Mines (WASM)  
Macdonald Street, Kalgoorlie

#### Perth

Date: Friday 26 July 2013  
Time: 8.00 am to 2.30 pm  
Venue: Burswood on Swan  
(Burswood Water Sports Centre)  
1 Camfield Drive, Burswood

### 2013 MINES SAFETY ROADSHOW

Dates are provisional. Details will be provided at [www.dmp.wa.gov.au/events](http://www.dmp.wa.gov.au/events) and in the Resources Safety news alerts.

**Geraldton**  
4 October 2013

**Port Hedland**  
8 October 2013

**Karratha**  
9 October 2013

**Newman**  
10 October 2013

**Bunbury**  
15 October 2013

**Kalgoorlie**  
17 October 2013

**Perth**  
22 October 2013

## KEEP THIS SAFETY GUIDE IN YOUR GLOVE BOX

Designed to fit in a vehicle glove box for easy access in the field, Resources Safety's latest field guide will assist those involved in remote mineral exploration and drilling to manage operational risks by providing prompts for hazard identification and risk assessment.

Printed in a handy A5 size on water-resistant paper, the glove box guide is wire-bound, making it easy to use.

Attendees at the 2013 Exploration Safety Roadshow will not only receive the glove box guide but also a complimentary holder that can be used to hold other field safety manuals such as a first aid book, and the company's emergency response plan and communications information.

Those managing exploration companies and drilling contractors should encourage its use as a communication tool for all field personnel, from new starters through to experienced workers. There is space for noting work activities, writing reminders and recording areas of concern, making it a useful resource when following up hazards or developing more effective controls.

The content has been extracted from Resources Safety's code of practice for mineral exploration drilling, and the code should be consulted for further guidance on possible control measures.

Email [RSDComms@dmp.wa.gov.au](mailto:RSDComms@dmp.wa.gov.au) or telephone 08 9358 8164 to pre-order the glove box guide — or better still, register for the roadshow!



### WHAT TOPS THE HIT LIST FOR DANGEROUS GOODS?

**E**nforcement is just one of the tools that a regulator has for controlling dangerous goods activities and seeking compliance with the *Dangerous Goods Safety Act 2004* and associated regulations.

However, improvements in safety practice are more likely to be achieved when companies effectively self-regulate by regularly reviewing and auditing their dangerous goods safety management systems. A proactive approach not only confirms compliance with the legislation, but it can also help to identify gaps and shortcomings that contribute to risk.

What might be the initial focus for an audit? A good starting point is to consider the most common deficiencies requiring enforcement action in 2012.

#### STORAGE AND HANDLING

Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007

- Manifest and site plan [r. 78]
- Risk assessment [r. 49]
- Fire protection system [r. 73]
- Emergency plan [r. 75]
- Dangerous goods licensing [r. 25]
- Staff training [r. 81]
- Impact protection for dangerous goods [r. 54]
- Dangerous goods placarding [r. 69]
- Signage [r. 68]
- Response equipment [r. 74]

#### EXPLOSIVES

Dangerous Goods Safety (Explosives) Regulations 2007

- Licensing for possession of fireworks [section 12 of the Act]
- List of secure employees [r. 24]
- HAZCHEM signage [r. 34]
- Compliance with the explosives management plan [Schedule 10(2)]
- Staff training [Schedule 10(2)]
- Packaging [r. 90]
- Control on the condition of stock [r. 90]
- Stock inventories [r. 179]
- Signage on magazines [r. 34]
- Control of ignition sources [r. 90]
- Control of quantities [r. 92]

#### TRANSPORT

Dangerous Goods Safety (Road and Rail Transport of Non-Explosives) Regulations 2007

- Servicing of fire extinguishers [r. 164]
- Emergency information door holder [r. 158]
- Transport document [r. 152]
- Emergency eye wash [r. 164]
- Initial emergency response guide [r. 158]
- Torch [r. 164]

## CLAMPING DOWN ON DANGEROUS GOODS TRANSPORT

**T**he Department of Mines and Petroleum regularly joins forces with Main Roads WA and WA Police to conduct dangerous goods transport operations across Western Australia. In 2012, there was a significant increase in the number of vehicles stopped for dangerous goods safety checks.

Philip Hine, Director Dangerous Goods, said that the latest figures showed the Department and other State agencies continued to work tirelessly to ensure roads remained safe.

"We are vigilant when it comes to dangerous goods transport safety across the State," he said. "While most drivers are doing the right thing, there is a minority that don't and if something goes wrong, the consequences can involve the general public."

One of the most serious transport incidents occurred in late 2012, when a truck containing chemicals rolled over. The truck had inadequate placarding and transport documents, which led to enforcement action against the company involved.

Philip said that incorrectly labelled dangerous goods loads added to the risk for emergency personnel and clean-up crews.

"A lack of proper information could result in incorrect clean-up operations, potentially causing safety hazards to clean-up crews and emergency services people and even serious harm to the environment," he said.

In early 2013, WA Police and Departmental dangerous goods officers investigated an incident in which 450 litres of highly toxic chlorine gas were transported without correct documentation or protective equipment. Contemplating this incident, Philip issued a stern warning to all dangerous goods transporters.

"I urge anyone driving around with dangerous goods – whether it is LP Gas, flammable liquids or even ammonium nitrate – to follow the rules and guidelines. It really is that simple," he said. "If you don't, not only can you endanger yourself but you can jeopardise the safety of your fellow road users – and nobody wants that."

During 2013, multi-agency transport operations are planned across Western Australia. Dangerous goods officers will also be visiting regional transport depots to conduct regulatory compliance audits of companies transporting dangerous goods. The aim is to fix transport problems at the source, but there will always be on-road checks to monitor and enforce compliance as necessary.



Photo courtesy Main Roads WA

## WHICH IBCS ARE SUITABLE FOR UN 3375 TRANSPORT?

**A**mmonium nitrate intermediates for blasting explosives have the four-digit dangerous goods UN number 3375. After sensitisation, they are used as bulk explosives in huge quantities in the mining industry and are just as essential to mining as ammonium nitrate fuel oil mixture (ANFO).

Until recently, UN 3375 could only be transported on the open road in tank vehicles or in multi-modal portable tanks. There was a need in the mining industry to transport UN 3375 in smaller packaging such as in intermediate bulk containers (IBCs). The necessary Government approvals were finally given in November 2012.

### WHAT WAS THE ISSUE?

The design type of dangerous goods packaging chosen for transport purposes must match the packing instructions that are allocated to the particular dangerous goods in column 8 of the Dangerous Goods List in the 7th edition of the Australian Code for the Transport of Dangerous Goods by Road and Rail (commonly known as ADG7).

For UN 3375, the allowable design types are coded by the packing instruction IBC99, which requires specific Competent Authority approval for each type of IBC. This packing instruction was not helpful since no approvals existed. Also, for an approval to be useful, it needed to be national and not state-based since dangerous goods commonly cross borders.

### HOW WAS THE PROBLEM SOLVED?

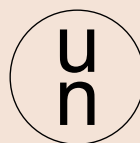
Last year, the manufacturers of IBCs approached the Department of Mines and Petroleum for help to obtain a national approval to override the unhelpful packing instruction IBC99.

In order to provide industry with the exact type of IBCs permitted for Australia-wide use with UN 3375, a national approval was formulated by Resources Safety and agreed to by the national Competent Authority Panel. This approval was published on 27 November 2012 in the Western Australian Government Gazette. The relevant extract states:

*The transport of UN 3375 — "Ammonium Nitrate Emulsion or Suspension or Gel, intermediate for blasting explosives" is permitted in Intermediate Bulk Containers of packing instruction "IBC02" instead of the current packing instruction "IBC99" with the exception that IBCs of type 31A and 31N are not permitted.*



### TYPICAL UN MARKING ON AN IBC SUITABLE FOR UN 3375



31HA1/Y/05 12/D/  
Muller 1683/10800/1200

#### What does this mean?

 is the United Nations packaging symbol for dangerous goods

**31 HA1** is the code for a composite IBC for liquids with a rigid plastic inner receptacle and a steel outer casing

**Y** denotes packing groups II or III

**05 12** is the month and year of manufacture

**D** is the state authorising the allocation of the markings (Germany), indicated by the national sign for motor vehicles in international traffic

**Muller** is the manufacturing company of the IBC

**1683** is the Government serial number

**10800** is the stacking test load in kilograms (this is "0" if the IBC is not designed for stacking)

**1200** is the maximum permissible gross mass in kilograms

### WHAT DOES THE NATIONAL APPROVAL MEAN FOR INDUSTRY?

Most importantly, the approval allows for the use of composite IBCs consisting of a rigid inner plastic container and outer protective steel-mesh casing. This is the most popular design for carrying these substances and has IBC design code 31 HA1.

However, not only must the dangerous good match an approved packaging design, but the design type must have undergone all performance tests required by ADG7 and have durable UN markings detailing the tests. Also, plastic IBCs cannot be used for more than five years from the date of manufacture.

## SENTENCE SENDS STRONG WARNING

**In February 2013, BHP Billiton Iron Ore was found guilty of failing to provide a safe working environment in relation to the death of a Port Hedland mining worker nearly five years ago. On 19 March 2013 at Perth Magistrates Court, the company was issued with a A\$130,000 fine and required to pay A\$300,000 in legal costs.**

Andrew McLaughlin died on 29 July 2008 after being crushed by a scissor lift at BHP Billiton's Nelson Point rail workshop.

Magistrate Peter Malone found that the company failed to provide instruction and supervision, or implement and enforce a suitable job hazard assessment (JHA), ultimately causing Mr McLaughlin's death.

The court heard that Mr McLaughlin's action — putting his body into the descent path of the scissor lift when a safety bar was not in place — was dangerous.

The Magistrate noted that Mr McLaughlin did so because he had not, through the process of JHAs and associated supervision, addressed the hazards and controls associated with the work he was carrying out.

In statements released at the time, BHP Billiton Iron Ore said that it remained committed to continually improving its safety performance across its business and its safety record in Western Australia had improved significantly since 2008-09. The company's objective was to ensure its people return home safely at the end of every day.

Following the Department of Mines and Petroleum-led investigation and prosecution, Resources Safety Executive Director Simon Ridge said that mining safety remained the Department's number one priority and this particular case highlighted the importance of safety at Western Australian mines.

"This has brought a conclusion to the unfortunate events that sadly cannot be reversed," he said.

"One death is one too many. We want every mining worker out there returning to their family and friends safe and sound at the end of their rosters. This successful prosecution should send a strong warning to mining companies across the State."



## REMEMBERING ANDREW

On 21 June 2009, the Port Hedland Youth & Family Centre was renamed to the Andrew McLaughlin Community Centre. According to Gymnastics Western Australia, this was to recognise the hard work, commitment and passion of Andrew McLaughlin, who championed the ongoing development and operation of the Centre for over 20 years. He had been a driving force for gymnastics in the North West.

## NEW SECURITY CODE FOR CHEMICALS

**T**he Commonwealth Attorney General's Department, in association with all State and Territory Governments, has produced a draft voluntary code of practice on chemical security.

The scope of this document is initially 11 explosive precursors but it can be applied equally to any of the 96 chemicals of security concern identified by the Council of Australian Governments (COAG) in 2008.

The code aims to promote effective chemical security management practices throughout the chemical supply and use chain. In particular, it seeks to:

- protect against the diversion of chemicals for terrorist or criminal purposes
- encourage cooperation between businesses and organisations that handle chemicals and law enforcement agencies on chemical security matters
- educate and train staff to be alert to warning signs and report suspicious behaviours.

To achieve these objectives, the code provides guidance and information on a range of practical security measures that businesses and individuals can take to address their specific circumstances.

The code covers the entire lifecycle of chemicals including import, manufacture, storage, transport, wholesale sales, retail sales and use.

The draft was available for public comment until 1 March 2013 and consultation meetings were held in all capital cities. Once revised in response to feedback, it will be submitted to government for approval and general release.

The code will be further supported by a range of sector-specific resources. For example, training DVDs on detecting suspicious behaviours have already been released for pharmacies and pool chemical retailers.

Information about the code and chemical security in general is available at [www.chemicalsecurity.gov.au](http://www.chemicalsecurity.gov.au)





# In the right hands, useful.

# In the wrong hands, lethal.



- Be aware** Some everyday chemicals can be put to misuse.
- Be responsible** Use, handle and store chemicals in a responsible way.
- Be alert** If you see anything unusual, report it to the National Security Hotline.



National Security Hotline  
**1800 123 400**

Trained operators take every call seriously.  
You can remain anonymous.

[hotline@nationalecurity.gov.au](mailto:hotline@nationalecurity.gov.au)

[www.chemicalsecurity.gov.au](http://www.chemicalsecurity.gov.au)

# DIESEL EMISSIONS IN UNDERGROUND MINES

**The potential hazard of diesel particulates in the exhaust emissions from diesel-powered equipment, particularly in the relatively enclosed environment of underground mines, was acknowledged during preparation of the *Mines Safety and Inspection Act* in 1994 and associated regulations in 1995.**

Part 10 of the regulations covers specific requirements for underground mines. Regulations 10.52, 10.53 and 10.54 are specifically designed to control and manage diesel particulate emissions by requiring minimum ventilation air volumes, exhaust treatment devices, and regular exhaust emission monitoring.

In 2012, the International Agency for Research on Cancer (IARC) announced that diesel particulates were a carcinogen. It is important to note that the Agency's findings were based on results from a study of mines with diesel particulate levels much higher than those measured in underground mines in Western Australia, and there is no evidence for lung cancer in Western Australian miners as a result of diesel particulate exposure at work.

## HOW IS EXPOSURE MONITORED?

The Department of Mines and Petroleum maintains a database of industry contaminant monitoring results. CONTAM is used to identify at-risk mines and track any trends.

Mines assess their risk of exposure and propose a monitoring program. The Department then confirms the number or quota of samples to be collected and analysed.

Diesel particulates were added to the CONTAM quotas for underground mines in 2005. CONTAM is very useful in telling us how many results have exceeded the accepted exposure limit for particular contaminants, and how high those exceedances were.

For diesel particulates, the accepted occupational exposure limit (OEL) is measured as elemental carbon (using NIOSH method 5040) and is 0.1 mg per cubic metre of air.

## HOW IS EXPOSURE REDUCED?

Regardless of whether the current exposure is considered harmful or not, the Department has a number of options to help industry achieve better practice and therefore reduce exposure to this recognised occupational health hazard.

The first is to raise awareness that diesel emissions are a potential hazard in underground mines through a program of education and information on the management of diesel emissions.

Mines inspectors can identify at-risk operations through the CONTAM system.

Mines are asked to demonstrate what measures they are taking to reduce or eliminate diesel particulates from their workplaces. Mines inspectors will also undertake audits to see whether mines have a diesel management plan, how well it is implemented, and whether it is effective.

## HOW CAN EXPOSURE BE MANAGED?

The Western Australian Chamber of Minerals and Energy, in conjunction with the Department, initiated the development of a guideline on managing diesel emissions. With input from industry bodies and experts in this field, the guideline offers a collective response to managing the issue.

Contributions to the document have come from occupational hygienists, engine manufacturers, mining contractors, regulators, and representatives from companies that supply exhaust treatment devices.

The guideline contains information covering the health effects of diesel emissions and the range of controls available for managing the problem. It has been endorsed by the Mining Industry Advisory Committee and is now available in hardcopy or to download at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) in the mines safety publications section.

The guideline will help industry to manage diesel emissions, particularly if management plans are developed based on the checklists in Appendix 2.

If the checklists, which provide a mini-audit, are systematically implemented, mine managers can be assured that they have adequately addressed relevant issues.

As for any hazard, addressing and managing diesel emissions early and actively will give the best results. For underground mines, once all practical emission controls have been implemented, the key is to control transmission, and this is done using ventilation. To be most effective, the Ventilation Officer should be involved early in any mine planning.

The Department expects to see an improving trend in CONTAM results for diesel particulates, and will be monitoring the situation closely — and auditing and responding as necessary.

## STAY ALERT

The safety alerts described below are reproduced at the back of this magazine, and can be downloaded from the publications section at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

### MANAGING DESIGN CHANGES

Mines inspectorate concerns about a recent incident involving maintenance jacking points on a reclaimer that could have resulted in a major structural collapse led to the issuing of *Mines Safety Bulletin No. 103*. Investigations by the original equipment manufacturer (OEM) found similar issues with three other machines where slight alterations to original design details raised the question as to whether they were still fit for purpose.

The bulletin recommends that, before commissioning, OEMs should ensure that the jacking points on stackers, reclaimers and shiploaders are suitable, and the maximum safe working load is identified. Where a copy or carry-over design is utilised, either all conditions of use are identical to the original design or variations have been identified and any issues addressed.

### HIGH VOLTAGE ELECTRICAL WORK

*Mines Safety Bulletin No. 104* was issued following concern about the effectiveness of personal protective equipment (PPE) used during high voltage (HV) switching operations that displays expired test dates. There is the potential for these critical control measures, such as insulating gloves and work sticks, to fail.

There is an obligation under regulation 5.27 of the Mines Safety and Inspection Regulations 1995 for the periodic examination and testing of all electrical equipment, including PPE. The bulletin continues by recommending some safe work practices when undertaking HV switching.

### LIFTING LOADS

The incident reported in *Mines Safety Significant Incident Report No. 180* illustrates the importance of assessing the competency of people to perform high-risk work using the equipment provided, regardless of any licensing requirement.

In this incident, a load fell when a combination extendable spreader and lifting beam failed due to incorrect use and rigging of the beam during a lift. The beam could have lifted the 7.2 tonne load if it had been rigged as a spreader beam. However, the combination spreader and lifting beam was rigged in the lifting configuration, which was rated to lift only 1.1 tonnes. Fortunately, no-one was within the drop zone when the beam failed and the load fell.



### HYDRAULIC HOSE FAILURE

*Mines Safety Significant Incident Report No. 181* is another report highlighting the significance of competent people performing tasks.

A dump truck operating at an open pit mine caught fire when a hose-end fitting separated and sprayed oil onto hot engine components in the engine bay. A hydraulic hose fitting had been incorrectly fitted to a hose assembly. There were also problems with the location of the machine's emergency controls and implementing the emergency shut-down procedure.

### HIGH WIND-LOADING

*Mines Safety Significant Incident Report No. 182* illustrates the need to incorporate site-specific wind-loading criteria in building and structure design.

In this incident, a whirlwind picked up and moved a transportable ablation block 50 metres.

### FALL FROM HEIGHT

In the incident reported in *Petroleum Safety Significant Incident Report No. 01/2013*, employers, supervisors and staff all missed the opportunity to identify and eliminate a fall-from-height hazard during an abandonment program on the platform of an offshore drilling rig.

A floorman stepped into a hole when he and another worker were moving a cover to place on the slot left after removing a casing string. He was not aware that, although unsecured, the cover had been protecting another opening. He fell 15.5 metres into the platform caisson and received serious but, fortunately, non-life-threatening injuries.

As well as having procedures that require platform activities to be directly controlled by a supervisor whose experience could help identify safety issues sooner, "hazard hunts" are recommended to help identify any changes when undertaking new platform activities.

# SEEKING INDUSTRY INPUT

## SECOND ROUND OF COMMENT SOUGHT FOR TAILINGS CODE

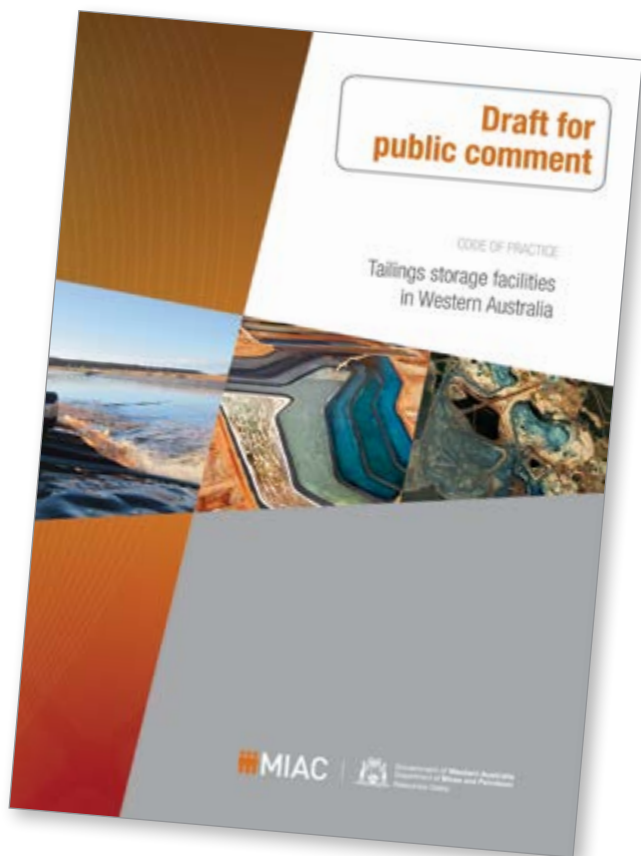
The Department of Mines and Petroleum is seeking further public comment on the second draft of the code of practice on tailings storage facilities (TSFs) in Western Australia.

The Department has taken on board the feedback received early this year for the first draft and has added new content, particularly with regard to environmental requirements.

The draft code covers the life cycle of a TSF, including site location, design, construction, operating standards, emergency planning and closure.

“It is important that industry provides feedback on this second draft, as we expect companies to follow the code of practice to demonstrate their TSFs are safe, stable and non-polluting,” said Acting Resources Safety Executive Director Philip Hine.

“The main aim of the code is to describe the outcomes expected for those involved with the design, construction, operation and decommissioning of TSFs, using the best practice currently available.”



A package of more detailed guidance for submitting mining proposals, and plans and reports involving TSFs is being developed to support the code of practice, and will be released when the code is approved and gazetted.

Following this second round of public consultation, the code of practice will be submitted to the tripartite Mining Industry Advisory Committee (MIAC) for endorsement.

It will not be recognised as a formal code until approved by the Minister of Mines and Petroleum and gazetted in the Western Australian Government Gazette.

Submissions on the code of practice close 5pm, Friday, 24 May 2013. Please reference the page number if possible when making specific comments, or submit a track-changed version of the draft code.

You can access the draft code by checking out what's new in mining safety and health at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety)

## OTHER RESOURCES COMING SOON

Resources Safety is currently drafting and updating guidelines on:

- refuge chambers in underground mines
- prevention of fires in underground mines
- working at height in underground mines

and a code of practice on:

- safe use of outdoors fireworks.

If you are interested in any of these topics, make sure you have signed up to receive Resources Safety's weekly news alert so you are advised when they are released for public comment.

## KEEP UP-TO-DATE

Resources Safety's email alert service provides the latest news about safety regulation in the mining, petroleum, geothermal energy and dangerous goods sectors in Western Australia.

The weekly alerts include information about Resources Safety publications, safety alerts, events and opportunities to provide feedback.

Subscribe online at [www.dmp.wa.gov.au/subscribe](http://www.dmp.wa.gov.au/subscribe)

## CHAMBER LOOKING AT TYRE MANAGEMENT AND SAFETY

**In early 2013, the Chamber of Minerals and Energy WA's Tyre Management Working Group began work on a major project to improve workplace health and safety in tyre management. Resources Safety is represented on the working group.**

The six-month collaborative project commenced with a workshop involving 12 major stakeholders and tyre-handling experts from throughout Australia, including Dr Tilman Rasche, Acting Executive Director of the Safety in Mines Testing and Research Station (SIMTARS).

One outcome of the collaboration will be the drafting of a best-practice guideline, which will undergo wider industry consultation before being sent to the Department of Mines and Petroleum for final review and approval.

There have been some unfortunate incidents in the past involving heavy earth-moving equipment tyres, as well as tyre-handling machinery.

"Earth-moving equipment tyres, as well as rims and wheel assemblies, must be regarded as safety critical items that need to be maintained by competent persons in accordance with documented systems of work which address all of the risks involved," said Richard Wilson, the Chamber's Manager Workplace Health and Safety.

"This is a serious issue for our sector, with many CEOs and leaders identifying tyre management as a priority area.

"As such, our focus has been on creating a forum to gather numerous industry experts together to assist in the production of a new draft guideline to drive major improvements in tyre handling procedures.

"What we're aiming to produce is a user-friendly guideline which incorporates the various perspectives and collective knowledge within our industry. We don't want a document that just sits on the shelf. Instead, this will be a very practical guide to enable industry personnel to do their job as well and as safely as possible."

# TAKING CARE OF TRAILING AND REELING CABLES

**R**esources Safety has received a number of notifications of electrical incidents involving trailing cable damage, resulting in earthing faults and workers being exposed to electric shock hazards.

Incidents over the past few months involving trailing cables at surface mines are summarised below.

- A 6.6 kV trailing cable was damaged by an excavator bucket, exposing workers to arc hazards (Figure 1).
- A reversing shovel ran over a 6.6 kV trailing cable.
- A trailing cable left within the blast exclusion zone was exposed to fly rocks and explosive atmosphere, resulting in damaged to the cable insulation.
- A protection relay setting was not set to trip the circuit breaker in a minimum delay time, exposing workers to high touch voltage levels.
- A mobile machine damaged the outer sheath of a trailing cable, exposing the damaged area to water ingress.
- An operator was tramming a drill over a trailing electrical cable steel crossover mat when the mat moved, allowing the electrical cable to be damaged by the drill tracks.
- A trailing cable was damaged when the cable reeler on a shovel jammed as it came into contact with the mining bench floor. The cable reeler limit switch did not activate as the cable reeler was not jacked up sufficiently. The cable failed at the site of a previous repair due to excessive tension (Figures 2a and 2b).

It has long been recognised that trailing and reeling cables pose an elevated safety risk and require specific design mitigation measures, which are detailed in the Mines Safety and Inspection Regulations 1995. The requirements are explained below.

## WHAT IS A TRAILING OR REELING CABLE?

Trailing and reeling cables are electrical power cables for mobile apparatus, such as large excavators, draglines, stackers and reclaimers. The cable permits the mobile apparatus to move without disconnecting its electric power supply. A reeling cable is specifically designed to be frequently reeled on and off a cable drum or reeler (e.g. an iron ore rail-mounted reclaimer), whereas a trailing cable is specifically designed to be moved with the mobile apparatus (e.g. a coal mine dragline or mineral sands mobile processing plant).

## WHAT DESIGN STANDARDS APPLY FOR TRAILING AND REELING CABLES?

Regulation 5.21 requires that trailing and reeling cables must conform to Australian Standard AS 2802 and incorporate a pilot core arranged to cut off the supply of electricity in the event of a break in the earthing circuit. There are currently no underground coal mines in Western Australia so AS 1802 does not apply.

Once an earth continuity relay and associated connections of the protection system are installed, the pilot core allows pilot earth loop or earth continuity monitoring protection to function,

## WHY IS A PILOT CORE INCLUDED?

The inclusion of a pilot core allows pilot earth loop or earth continuity monitoring protection to function. It is important to realise, though, that this protection method is not the same as pilot wire differential protection (where the current entering and leaving a cable is measured and compared). Rather, earth continuity protection functions by establishing a loop current through the pilot core, returning through the cable earth. This is typically achieved using an earth continuity protection relay to apply a low voltage DC signal between the pilot and earth of the cable. By measuring this signal, the resistance of the circuit can be determined and protection operation initiated for variance from a pre-tested value. This variance is indicative of a break in the earth return path of the cable, and possibly the cable itself. With this arrangement, an end-of-line resistor is required to avoid a short circuit between the pilot cable and the earth.



Figure 1 Trailing cable damaged by excavator

## WHAT FUNCTIONS ARE REQUIRED FOR THE EARTH CONTINUITY PROTECTION SYSTEM?

For the overall earth continuity protection arrangement, the system must perform the functions listed below.

- The protection system must monitor the status of the earth continuity for any break in the earth return path. Typically, this will require a status indication of earth continuity healthy, open-circuit or short-circuit.
- In the event that the status of the pilot earth continuity circuit is open-circuit or short-circuit, an interlock must immediately initiate automatic de-energisation of the mobile apparatus.
- When a fault does occur, the system should require manual reset — the system should latch and thereby store the fault condition in order to prompt fault-finding and testing.
- The protection system should ideally interface with the control system of the mobile apparatus such that a healthy status indication for the pilot cable is required prior to start.

## WHAT COMMISSIONING AND TESTING IS REQUIRED AT INSTALLATION?

Earth continuity protection must be installed, commissioned and tested in accordance with the manufacturer's instructions and recommendations. Regulation 5.21 also requires that these instructions and recommendations conform to AS 1747.

Regulations 5.13 and 5.14 require that records and details of electrical installing work carried out at the mine are recorded in the electrical log book. This includes commissioning check sheets and test records, which must be kept — make an entry in the logbook indicating where they can be found. The earth continuity protection relay itself should have a label affixed indicating the test date and who conducted the tests, including company details.

## EARTH-CONTINUITY PROTECTION

Further information on earth-continuity protection is available in the NSW Department of Primary Industries publication on earthing integrity and associated protection for controlling touch voltages and arcing in trailing cable circuits.

Visit [www.dpi.nsw.gov.au/aboutus/resources](http://www.dpi.nsw.gov.au/aboutus/resources)

## WHAT SAFE WORK PRACTICES ARE REQUIRED FOR TRAILING AND REELING CABLES?

Regulations 5.19 and 5.21 require trailing and reeling cables to be installed, located, supported and protected in a way that:

- minimises the risk of damage to the cable and to any connecting or coupling device
- does not obstruct any access way (e.g. pit roadway)
- separates the cable from other services at the mine.

In practice, this may require the use of protective berms and the use of visible markers for trailing cables.

## WHAT ONGOING MAINTENANCE IS REQUIRED?

Regulation 5.27 requires mines to have an appropriate maintenance system to ensure that electrical equipment and installations are maintained in safe working order.

In this regard, a routine maintenance system must be implemented for testing earth continuity protection systems to confirm the integrity of the system and the pre-tested pilot and earth loop resistance value. This is critical because the system relies on the accuracy of this pre-tested value.

For surface operations, routine testing should be done every three months. For quarries, dredges (other than a floating treatment plant) and underground mines, this test must be done every month.

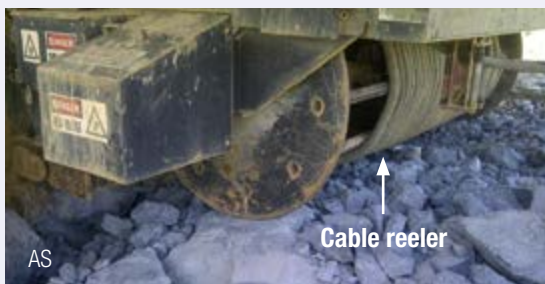


Figure 2a Cable reeler that jammed when it touched the ground



Figure 2b Cable failure due to excessive tension

# SAFETY OF DRIVERS WORKING ALONE

**A** coronial inquest into the death of 35-year old truck driver, Anthony Bradanovich, in January 2011 found that he died from exertion-induced heat stroke. He was found dead 30 kilometres from his bogged truck with a flat mobile phone.

The Coroner was particularly concerned that Mr Bradanovich was not expected at any specific time and that he was stranded “for some time” before the alarm was raised. The Coroner criticised the driver’s induction session with the transport company as inadequate, saying it did not provide him with sufficient information about emergency breakdown procedures.

The court heard that Mr Bradanovich had insufficient drinking water with him in the cab. His employer had not provided him with information about the need for water and had not determined whether he had any water with him. Nor did the transport company provide Mr Bradanovich with the means to communicate with anyone by satellite, even though it knew he was travelling into a remote area.

The Coroner said that it was not known why Mr Bradanovich had left his truck nor how much water he had been carrying. It also appeared that he was not given information about site-specific radio channels, nor was he told that they were constantly monitored.

The Coroner recommended:

- regional and remote drivers be provided with drinking water
- the provision of route-specific emergency breakdown cards for drivers, with instructions on how to get assistance in an emergency
- drivers travelling outside the metropolitan area be provided with maps and written directions to remote locations
- consideration be given to providing personal locator beacons for drivers
- auditing of procedures that should account for a driver’s anticipated time of arrival and establish their whereabouts if they are running late.

Although the incident was investigated by WorkSafe and the recommendations of the Coroner are consistent with the existing duties of employers under the *Occupational Safety and Health Act 1984* and associated regulations, the lessons learnt apply to anyone travelling to and from remote mine sites and exploration camps, regardless of whether the *Mines Safety and Inspection Act 1994* and its regulations apply.

An employee is considered isolated if they are alone due to the time, location and nature of their work. If a driver is isolated, employers need to:

- provide a means of communication so drivers can call for help in the event of an emergency
- implement a procedure to maintain regular contact with the driver
- train the driver in the communications procedure.

## DOES RESOURCES SAFETY HAVE ANY INFORMATION ON REMOTE TRAVEL?

Visit [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) or contact [RSDComms@dmp.wa.gov.au](mailto:RSDComms@dmp.wa.gov.au) to get copies of:

- Mineral exploration drilling – code of practice [see Chapter 21]
- Travelling in remote locations – Mine Safety Matters pamphlet





## WORKING ALONE CHECKLIST

From WorkSafe WA, [www.worksafe.wa.gov.au](http://www.worksafe.wa.gov.au)

	Yes	No	N/A
A risk assessment has been undertaken covering issues such as length of time the person is working alone, time of day, location and the nature of the work.			
Identified hazards have been eliminated or adequately controlled.			
The person working alone has been provided with adequate information and instruction to be able to work safely.			
There is a system in place for communication with workers working alone.			
The system ensures that workers have means of communicating in the event of emergency (e.g. mobile phones, duress alarms).			
If the means of communication is vehicle based, the system covers the person when they are away from the vehicle.			
The system requires regular contact to be maintained with workers to ensure safety and supervision.			
The employer has knowledge of the location of all workers at all times during work shifts.			
The worker is provided with emergency supplies such as adequate drinking water and first aid equipment.			
Machinery and equipment is regularly maintained.			





## STOPPING RUN-AWAY TRENDS FOR UNDERGROUND SERVICE VEHICLES

**T**here have been a number of serious and fatal accidents involving run-away vehicles operating on declines in underground mines throughout the world in recent times, so this is an area of concern to Resources Safety. We don't want to follow this trend in Western Australia.

Operators of underground service vehicles need to be more aware of the risks when operating in this environment, and ensure they have safe practices in place before there is another incident — but one that ends badly.

### SERVICE VEHICLES USED IN UNDERGROUND MINING OPERATIONS

A wide range of vehicles is used in service applications at mines. These include concrete agitator trucks (known as agi trucks), water carts, fuel trucks, explosive transporters, graders and stores trucks.

Many of these service vehicles are designed for use on normal sealed roads. A typical stores truck might be designed to deliver loads in metropolitan areas at speeds up to

110 km/h. Similarly, a concrete agi truck might be designed to haul concrete from a surface batching plant to a building site, and a grader might be used on highway construction.

The power rating, gear ratios and braking capability of surface machines are not necessarily suited to working in underground mines, where conditions can be wet and muddy, and gradients can vary. Decline mines invariably have speed and gear restrictions for vehicle operation, and service vehicles are often limited to first or second gear at speeds between 15 and 20 km/h. Administrative procedures, mechanical means or remote control devices may control this speed and gear selection of surface vehicles.

The simple act of changing gear from first to second has been the trigger to allow a vehicle to run away. This is especially so when carrying a heavy or variable load, such as concrete, water or fuel.

### RISK ASSESSMENT

It is clear that vehicles designed for normal road use should undergo detailed hazard identification and risk assessment process before undertaking underground service.



A key component of this risk assessment is the equipment selection process. Several vehicles may meet broad selection criteria, but some may have more features applicable to underground use. In all cases, the operating and maintenance manuals provided by the original equipment manufacturer (OEM) are a good starting point for a risk assessment.

The *Mines Safety and Inspection Act 1994* and the *Mines Safety and Inspection Regulations 1995* should be consulted in the early stages of the vehicle selection process. Regulation 6.17 covers the requirements for the hazard identification and risk assessment process for any item of plant introduced into a mine.

Regulation 10.38 addresses the specific requirements for braking systems on trackless units in underground mines. One of these requirements is to have a secondary or emergency braking system in the event that the service brakes fail.

Examine the maintenance standards carefully once a vehicle has been selected. While the braking system on a surface truck may only need a regular service every three months, a fortnightly service interval with a detailed brake study may be required for adverse underground conditions. The critical

components of the braking system should be identified and clearly detailed on service and maintenance sheets.

Pre-start checks conducted by the operator should require a test of the brakes on the flat, and on an inclined test ramp before heading underground.

## TRAINING

Automotive fitters from the general motor trade are often recruited to work in heavy- or medium-duty workshops for mine sites. Their training needs should be carefully assessed, and additional training provided in key areas such as compressed-air braking systems. Training courses available from the OEM might be a good idea for newcomers to the mining industry.

Careful consideration should be given to machine-specific training and assessment for operators to ensure they are competent in their use. This training should clearly outline any modifications to OEM designs and manuals. Site-specific standards for operating in declines should be detailed in training documents and all operators should be assessed as competent by suitably qualified staff.

# IS THE WATER FIT FOR HUMAN CONSUMPTION?

*Ryan Milne is Director of Ecosafe International. Here he discusses the merits of a holistic approach to the management of drinking water.*

**A**ccess to safe drinking water is essential to sustain life. A poorly designed and managed drinking water system can result in severe illness and even death.

Drinking water schemes in Australia should be managed under the framework outlined in the *Australian Drinking Water Guidelines 2011* (ADWG), which also provides standards upon which water quality can be assessed.

Drinking water monitoring provides a snapshot of the water quality at the time and location of sampling. A common misconception is that drinking water is safe when the water quality monitoring results are compliant with the standards. However, it is important to note that once laboratory analyses are completed and results received, the potential for consumer exposure has already occurred.

Moreover, even with frequent monitoring, most water distributed to consumers will never be tested, and it is not feasible to directly test for all pathogens. For example, *Cryptosporidium* may be present even if the indicator *Escherichia coli* (*E. coli*) is absent. The reliance on end-point monitoring can be expensive, time consuming and of limited benefit.

In light of this, the ADWG advocates a proactive approach to reduce risk and prevent contamination prior to consumption. This can be achieved by adopting a holistic risk-based approach to address potential risks throughout a drinking water scheme (catchment to consumer). A key tool to assist with this approach is the development and implementation of dedicated site-specific drinking water quality management plans.

Although mine sites and exploration camps are not water utilities, they often need to source, treat and manage their own drinking water systems in remote locations. Regulation 7.18(1) of the Mine Safety and Inspection Regulations 1995 requires the manager of a mine to ensure that potable water supplies are readily available to all employees at the mine. In other words, the water supplied to all site personnel is safe to use and drink.

## STEPS TO MITIGATING RISK

Risk mitigation associated with self-managed drinking water systems starts with the need to understand the system — to identify and be aware of the system-specific risks and practical control measures. Once the risks are understood, a site-specific management plan can be developed and implemented. It should be supported by system-specific monitoring programs, incident response protocols and a formalised audit program.

## WHAT CHALLENGES DO REMOTE SITES FACE?

Typical areas of concern relating to self-managed drinking water systems at remote mine sites and exploration camps include:

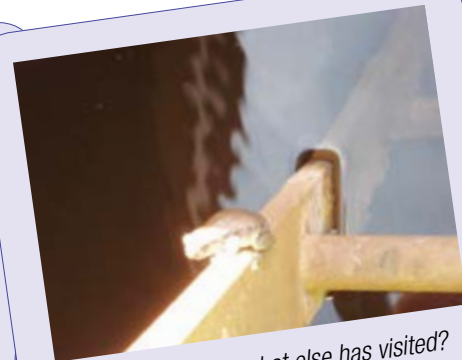
- effective disinfection of microbiological pathogens that pose the greatest risk to any drinking water system
- the lack of a dedicated system-specific drinking water quality management plan and associated Western Australia Department of Health (WA Health) approval
- lack of reporting to WA Health
- limited competency-based training for the management, operation and maintenance of on-site systems
- inadequate monitoring programs
- lack of formalised review programs
- turnover of personnel
- timeframes associated with remedial actions.



Sediment build-up within a drinking water system can shield pathogens from disinfectants



Unsealed bores provide an opportunity for direct pathogen contamination



If a frog can get in, what else has visited?

Photographs courtesy Ecosafe International

## A STEPWISE APPROACH

Effective risk mitigation within a self-managed drinking water system should include the following steps.

### STEP 1 COMPREHENSIVE DRINKING WATER SYSTEM EVALUATION AND RISK ASSESSMENT

- A hazard analysis and critical control points assessment should identify potential site-specific hazards, and provide the basis for the required management and control measures. A catchment-to-consumer approach includes an inspection of all key drinking water equipment, associated infrastructure, management practices and documentation.
- As part of the system evaluation, there should be a comprehensive assessment of raw water quality and the overall drinking water system to determine if current treatment systems are adequate. This should include the identification of critical control points in the treatment system.

### STEP 2 SITE-SPECIFIC DRINKING WATER QUALITY MANAGEMENT PLAN

- A site-specific management plan provides the foundation for effective management of a drinking water system, assists with the continuous operation of the system and provides the basis for the adherence to and compliance with the principles of the guidelines. The management plan consolidates all essential system-specific information and highlights the key management processes required to effectively operate the drinking water system.
- Within Western Australia, all mine sites and exploration camps with self-managed drinking water systems are required to submit and obtain approval for their management plan from WA Health.

### STEP 3 SITE-SPECIFIC DRINKING WATER MONITORING PROGRAM

- Drinking water quality monitoring is essential to verify that the drinking water system is operating effectively and supplying safe drinking water. Monitoring programs should be designed using a risk-based approach, with continual evaluation and review to ensure the required information is generated so issues can be addressed.
- A risk-based monitoring program takes into account the source water quality, system design and operation as well as relevant regulatory requirements. This includes the identification of drinking water zones and monitoring points to ensure a sufficient representation for water quality testing while avoiding unnecessary oversampling.

### STEP 4 SITE-SPECIFIC DRINKING WATER INCIDENT RESPONSE PROTOCOL

- Incident response protocols are crucial in the effective operation and management of a drinking water system and assist with the delivery of safe drinking water.
- It is important that incidents or trigger events that could indicate contamination, or a significant change within the system, are identified and remedial actions are clearly defined.
- The response protocols should complement the management plan and be consistent with relevant internal and external reporting and management processes.

### STEP 5 DRINKING WATER AUDITING AND IMPROVEMENT

- As with any management plan, the assessment of conformance to the plan is central to embedding the required management practices and identifying opportunities for improvement.

## WANT TO FIND OUT MORE ABOUT DRINKING WATER?

*Australian Drinking Water Guidelines* (2011) — the national guideline for drinking water quality management and endorsed by the WA Health

*Department of Health guidance notes* — a set of guidance notes and factsheets targeting drinking water systems at mine sites and exploration camps

*Operational and water abstraction licences* — in the case of sites where the abstraction of water is undertaken, the requirements of the licence to take water under the *Rights in Water and Irrigation Act 1914* need to be adhered to

*MineSafe Vol.17 No. 2 Quality of mine site drinking water* — an article covering the State Mining Engineer's advice for mine sites to:

- comply with the guidelines
- provide results of routine monitoring of water supplies to WA Health
- establish a drinking water quality monitoring program, including chemical and microbiological analysis of the drinking water.



## CONSTRUCTION ON MINING OPERATIONS FAQs

**W**hy is construction work at mine sites a priority target for Resources Safety? As outlined below, it makes a significant contribution in many ways.

Projects totalling more than A\$175 billion in value are either committed or under consideration for Western Australia during the next few years, and are expected to create more than 50,000 construction jobs.

Up to half of the mining workforce is doing construction-related work rather than the work typically associated with mining, such as such as extracting, hauling and processing ore.

The construction phase is a dangerous time for workers developing or upgrading mine site facilities and infrastructure. Accident statistics for the minerals sector have shown a consistently higher proportion of fatalities and injuries associated with construction activities.

Some frequently asked questions regarding construction work on mining operations are answered in the next page.

## WHAT IS CONSTRUCTION WORK?

Construction work includes activities such as:

- the construction, erection, installation, alteration, repair, maintenance, cleaning, painting, renewal, removal, excavation, dismantling or demolition of, or addition to, any building or structure, or any work in connection with any of those things, that is done at or adjacent to the place where the building or structure is located
- work on which a hoisting appliance or any scaffolding or shoring is used or intended to be used
- work in driving or extracting piles, sheet piles or trench sheets
- work in laying any pipe or work in lining pipes that is carried out at or adjacent to the place where the pipe is laid or is to be laid
- work in sinking, lining, altering, repairing, maintaining, renewing, removing, or dismantling a well
- roadworks, earthworks or reclamation.

## HOW DOES CONSTRUCTION WORK DIFFER FROM MINING?

There are specific Australian Standards, training and licences requirements for construction such as the “white” construction induction card and tilt up or precast training, of which mining organisations may not be aware or familiar with. Also, the safety culture at construction sites is probably not as well established as for mining operations, where the workforce is generally more permanent.

Unique safety issues and processes that can significantly increase the risk of injury to construction workers include:

- a “green” or inexperienced workforce
- longer rosters
- subcontracting and inadequate contractor management systems
- a “fast and furious” approach where workers and supervisors are working on tight completion deadlines
- large numbers of workers and machines concentrated in one area
- hazardous processes (high risk construction work) such as:
  - tilt-up and precast construction methods
  - scaffolding
  - elevated work platforms and cranes
  - rigging and dogging.

## MAY SAFETY OBLIGATIONS FOR CONSTRUCTION WORK BE DELEGATED?

No. Some mining companies think that they can contract out their safety obligations for the construction area by engaging an engineering, procurement and construction management (EPCM) company or construction contractor to build, maintain or construct infrastructures at the mine site. However, the mining company will, in most cases, retain the Principal Employer’s duty of care at the mine site, which includes responsibility for those doing the construction work on their mining lease.

## WHAT ARE THE SPECIFIC REQUIREMENTS FOR CONSTRUCTION WORK?

A number of regulations relevant to construction work at mine sites are found in Division 2 of the Mines Safety and Inspection Regulations 1995. These include the appointment of responsible persons to manage construction work at the mine, as well as ensuring that construction work is carried out by competent persons.

The regulations ensure that construction activities follow best practice. Recent amendments to regulation 4.22 should interest those managing construction or demolition on mine sites.

This regulation now requires such work to be carried out in accordance with the following Australian Standards:

- AS/NZS 1576.1 *Scaffolding – General requirements*
- AS/NZS 1562.3 *Design and installation of sheet roof and wall cladding – Plastic*
- AS 1674 *Set Safety in welding and allied processes*
- AS/NZS 1801 *Occupational protective helmets*
- AS/NZS 1873.1 *Powder-actuated (PA) hand-held fastening tools – Selection, operation and maintenance*
- AS/NZS 18911 *Industrial fall-arrest systems and devices – Harnesses and ancillary equipment*
- AS/NZS 1892.5 *Portable ladders – Selection, safe use and care*
- AS 2601 *The demolition of structures*
- AS 2865 *Confined spaces*
- AS/NZS 3012 *Electrical installations – Construction and demolition sites.*

### WHAT IS A CONSTRUCTION PMP?

Under the *Mines Safety and Inspection Act 1994*, the operator must prepare a project management plan (PMP) before any mining operation commences. This must be submitted for assessment to the State Mining Engineer, and approved prior to any construction activity at the mine site.

The plan is used to identify potential major safety risks for proposed construction and mining operations, and acts as a starting point for developing ongoing safety management strategies to address those risks.

### IS A HIGH RISK WORK LICENCE NEEDED FOR CONSTRUCTION WORK AT MINE SITES?

Yes. The National Standard for Licensing Persons Performing High Risk Work (National Licensing Standard) commenced across the Western Australian mining industry in July 2009. The certificate of competency previously issued under the National Certification Standard has been replaced by a licence under the National Licensing Standard.

Western Australian high risk work licences are now accepted throughout Australia, valid for five years and administered by WorkSafe WA. There are 29 classes of licenses covered by the National Licensing Standard including scaffolding, rigging, crane, forklift and elevating work platform.

Visit [www.dmp.wa.gov.au/8423.aspx](http://www.dmp.wa.gov.au/8423.aspx) for further information.

### WHAT IS VOC?

Competency is an important component of any job, and even more so for construction high risk work requiring specific skills and knowledge. Regulation 4.13 has specific requirements dealing with competency assessment at mine sites. Employees and contractors must be assessed as competent before operating equipment or plant at construction projects in mine sites even if they have a high risk work licence.

The competency assessment, or verification of competency (VOC), must be completed for any plant and equipment operated at the construction site — not only where high risk work licences are required.

The assessment level is not prescribed by regulation but a simple checklist confirming an operator has the licence is not enough. It is also important to ensure the assessment is done for the specific plant or equipment that the operator is expected to operate. For example, it is not appropriate to have an assessment done with an elevated work platform if the operator is expected to operate a crane.

### HOW CAN A SAFE DESIGN PROCESS IMPROVE CONSTRUCTION OUTCOMES?

Eliminating hazards is the most effective risk control measure. It is generally more practicable, more effective and cheaper to eliminate hazards at the design planning stage rather than retrofitting or redesigning when the hazards emerge.

Safe design supports a collaborative risk management approach and is particularly important for construction projects. This means that people with knowledge of each phase of the project — from design to use to demolition — should be consulted at the design stage to identify problems and solutions. Principal employers and users should provide information to designers, manufacturers and suppliers to help them achieve a safe design for the building or structure at the mine site, not only for those doing the construction, but those who will use, clean and maintain the building or structure, and, ultimately, decommission it.

Resources Safety has a code of practice for the safe design of buildings and structures available at [www.dmp.wa.gov.au/15551.aspx](http://www.dmp.wa.gov.au/15551.aspx)

### WHAT ARE INSTRUMENTS OF DECLARATION?

Construction work at some mine sites may be subject to an instrument of declaration under which provisions of the *Occupational Safety and Health Act 1984* apply rather than the *Mines Safety and Inspection Act 1994*. Declarations are published in the Government Gazette, available from the State Law Publisher at [www.slp.wa.gov.au/gazette/gazette.nsf](http://www.slp.wa.gov.au/gazette/gazette.nsf)

Further information and a list of current instruments of declaration are available from WorkSafe at [www.worksafe.wa.gov.au](http://www.worksafe.wa.gov.au)



## MAKE SAFETY THE BREAKFAST OF CHAMPIONS

Barry Healy is Resources Safety's Senior Education and Training Officer. He regularly contributes to the magazine's "Barry's bookshelf" series. Here he reviews two papers by Neil Gunningham of the National Research Centre for OHS Regulation:

- "Culture eats systems for breakfast": On the limitations of management-based regulation
- Building trust: OHS management in the mining industry

**T**he line "Culture eats systems for breakfast" has a distinguished pedigree. It is attributed to the great management and organisational thinker Peter Drucker (1909–2005). But surely it is counter-intuitive. After all, aren't good systems supposed to iron out individual differences in an organisation and bring everyone to the same level of excellence in occupational health and safety (OHS)?

Australian academic Neil Gunningham uses research into five coal mines owned by one company to show that culture does indeed win hands down in the battle with company policies.

Over a five-year period, the leadership of the company that he looked at threw everything at raising the bar on safety, including company-wide OHS standards, detailed safety management systems, key performance indicators (KPIs), regular reporting, auditing, safety observations and interactive databases.

However, as Gunningham notes, the company was "unable to achieve anything close to consistent safety performance across its various mine sites." The issue was the culture of each mine, and even sub-cultures within them.

The differences in culture showed up in the reporting of incidents, doing safety observations, communication and right down to the standard of housekeeping. The safer mines showed distinctive norms and values — the willingness to stop production over safety concerns, and a high level of trust between the workers and site management. The less safe mines had an us-and-them culture and were driven by a production-at-all-costs mentality.

How can operations get themselves out of such a cultural hole? By building a "virtuous cycle of trust", says Gunningham. His field research showed that safer mines had a cluster of characteristics, all associated with trust.

Trust started with corporate and mine site leadership to overcome middle management inertia. The object is to win worker buy-in through effective communication, consultation and feedback.

Sounds easy, doesn't it? However, Gunningham warns that building trust is a multi-faceted enterprise. Above all else, he says, we need a rational debate about building workplace relationship cultures that support OHS.

"Such a debate cannot take place until both sides let go of rhetoric, posturing and misrepresentation in favour of genuine efforts to improve trust in the interests of reducing the toll of work-related injury and death," Gunningham said.

Only then will we make safety systems the breakfast of champions!

### WHERE CAN I ACCESS THE WORKING PAPERS FROM THE NATIONAL RESEARCH CENTRE FOR OHS REGULATION?

"Culture eats systems for breakfast": On the limitations of management-based regulation. Working Paper 83, November 2011.

[regnet.anu.edu.au/sites/default/files/u86/WorkingPaper\\_83.pdf](http://regnet.anu.edu.au/sites/default/files/u86/WorkingPaper_83.pdf)

Building trust: OHS management in the mining industry. Working Paper 85, February 2012.

[regnet.anu.edu.au/sites/default/files/u86/WorkingPaper\\_85.pdf](http://regnet.anu.edu.au/sites/default/files/u86/WorkingPaper_85.pdf)



Empowering families  
in mining, oil & gas  
[miningfm.com.au](http://miningfm.com.au)

The new-look website at [www.miningfm.com.au](http://www.miningfm.com.au) has a variety of information for mining families, with the latest offerings including:

- practical advice for newcomers to FIFO life
- the fitness guru explaining how to find a healthier you
- a FIFO survivor's humorous account of how life sometimes can turn pear-shaped
- the careers specialist looking at 'career-limiting-moves' and explaining what not to do at work.

There's also a great read on making the most out of life in little (and big) Aussie mining towns.

# WHAT'S THE WORD ON MANAGEMENT AND SUPERVISION?

**A** workshop run during the 2012 Mines Safety Roadshow looked at the state-of-play for management and supervision in the Western Australian minerals industry. Some 253 employees and 72 supervisors completed targeted surveys handed out at the time. The surveys were also used to gather complementary information from mines inspectors during a forum held in November 2012.

## RESPONSES FROM EMPLOYEES

Almost all employees surveyed confirmed that they were aware of who their Registered Manager, department head and immediate supervisor were.

Employees also confirmed that they could approach their supervisor about work problems and typically supervisors would immediately rectify the hazard. They reported that most supervisors kept them informed of any hazards, and pre-start meetings were held each shift at most sites.

Management and supervisors did less well with regard to inspection of the workplace, where 30 per cent of employees reported that the frequency of inspections ranged from never to less than once per shift.

Just over 90 per cent of employees inspected their own workplace but only 38 per cent discussed the findings with a supervisor.

According to 54 per cent of respondents, both formal and informal approaches were used to measure their work.

Three-quarters of employees indicated that they had been given clear safety instructions for each task. Some 30 per cent of employees also reported that they were left to their own discretion with regard to work instructions. Only 45 per cent indicated that they had a general appreciation of what they needed to watch out for.

## RESPONSES FROM SUPERVISORS

Overall, supervisors also knew who the Registered Manager was, were confident that mine management was listening to their concerns and would support them if they stopped work if the workplace was unsafe.

About 80 per cent confirmed that their duties and responsibilities were clearly defined and they were provided with sufficient resources to achieve their tasks. Most supervisors confirmed

that they had received training in legislation requirements and key areas to perform their work.

Supervisors confirmed that only 35 per cent of their time was spent on inspection and supervision while 43 per cent was taken up with paperwork and meetings.

Some 89 per cent of supervisors surveyed ensured that their employees were competent and adequately trained to carry out their tasks. However, 27 per cent reported that they were not able to assess each task and issue instructions.

In line with the employee responses, 34 per cent of the supervisors said that they were unable to inspect their allocated workplace once a shift, and 16 per cent reported that no arrangements were in place to carry out the inspections when they were not able to. Thirty per cent indicated that inspections were not prioritised based on risk.

## HOW IS THE SITUATION LOOKING?

The survey results completed by the employees and supervisors were generally positive with respect to the management and supervision in the Western Australian mining industry.

However, some of the responses also reveal that many sites are vulnerable to accidents and incidents due to the lack of management and supervision control coupled with poor employee safety awareness.

The key areas for improvement suggested by the employees participating in the roadshow workshop included:

- better communication between the supervisor and workforce
- more training in supervisory skills for the supervisors
- less administrative work and less time spent in the office
- management to provide clear role descriptions and documentation of responsibilities.

Key areas for improvement suggested by supervisors included:

- more training in supervisory skills such as communication and managing people and resources
- clearer communication or direction and accountability
- leadership training
- less administrative work and more time in the field
- managers spending more time on site
- more on-site supervisors.

From the regulator's perspective, the key areas for improvement suggested by mines inspectors at their forum included:

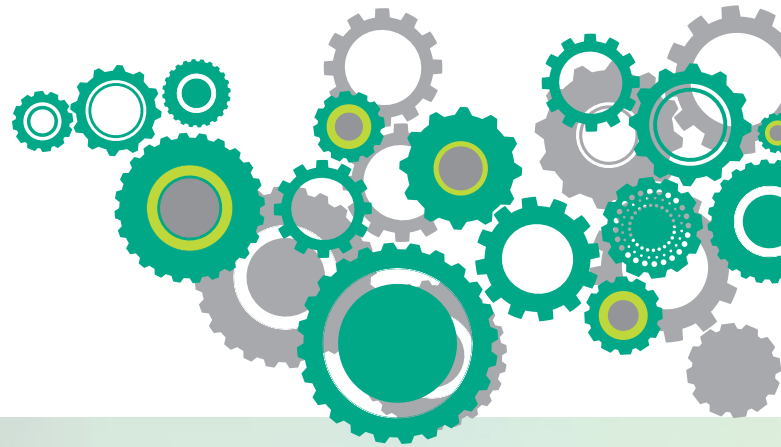
- relevant training for management and supervisors
- assessing management and supervisors' competency
- contractor management and supervision
- training and supervision of new workers
- inspections and auditing.

## WHERE TO NOW?

Overall, all groups recognise the importance of effective supervision and managing for improved safety outcomes in mining workplaces. While most workplaces are doing a reasonable job, there is still room for improvement. Some suggestions are listed below.

- Better training and assessment of competency of managers and supervisors to achieve the best outcomes in management actions and workforce interaction. This should include an understanding and application of the risk management process, understanding of their role and span of control, and having the necessary people skills such as leadership, communication and consultation.

- Reducing the administrative requirements and time spent in the office.
- Increasing the supervisor-to-employee ratio (i.e. reducing span of control).
- Improving task instructions, inspections and audit processes.
- Improving Principal Employer supervision of site contractor management.
- Adopting a management and supervision hands-on approach to work and any change of task or task environment, particularly if it involves high risk work.



## MANAGEMENT AND SUPERVISION OF WA MINES FAQs

### Who establishes the standards of safety within an organisation?

The duties of the Principal Employer, and any other employer as implemented by senior corporate management, are to develop, authorise, provide and maintain workplace safety and health systems to guide mine management and supervisors on how to run the mine safely.

The systems, standards and leadership style established by corporate management are fundamental in developing an appropriate safety culture. Corporate managers (e.g. chief executive officer, company directors, corporate advisors) must ensure that sufficient resources, both monetary and human, are available to operate the mine in accordance with the *Mines Safety and Inspection Act 1994* and *Mines Safety and Inspection Regulations 1995*, and the Principal Employer has the power to issue instructions to the manager of the mine.

### What key management and supervisory personnel are needed to operate a WA mine?

Before operations begin at a mine, the Principal Employer must appoint a Registered Manager for the mine. The Registered Manager is responsible on a daily basis for the control and

supervision of the mine and should reside close enough to the mine to provide effective daily control and supervision.

The Principal Employer must appoint a quarry manager for open pit operations and an underground manager where underground operations take place. The Principal Employer may authorise the Registered Manager in writing to appoint the quarry manager, underground manager, alternate manager and deputy manager positions.

Additional management appointments may be made by the Registered Manager to assist in maintaining compliance with the Act. Where additional appointments are made, the Registered Manager must carry out regular checks to ensure that the appointed persons carry out the delegated duties in accordance with the requirements of the law.

Under the duty of care legislation, supervision must also be provided for all employees carrying out work at the mine. Key management appointments specified in regulations include an electrical supervisor, mine surveyor, high voltage operator, ventilation officer, radiation safety officer and a person responsible for the general control of any construction work at the mine.

## **What about personnel for exploration operations?**

The Principal Employer (typically the tenement holder) must appoint an Exploration Manager to take control of exploration activities. As for a Registered Manager, the Exploration Manager must ensure compliance with the Act and accompanying regulations. Where the activities are associated with a mine, the Registered Manager of that mine may be appointed as the Exploration Manager.

For each field exploration operation, the tenement owner must also appoint a person who is responsible for the daily site management of activities at that operation. This position may be filled by the Exploration Manager if that person is on site managing the field exploration activities.

## **What statutory qualifications are required for a Registered Manager?**

There is no statutory qualification prescribed for Registered Managers. However, they need to be trained and assessed as competent to carry out the work. As a minimum, the Registered Manager should be conversant with the Act and accompanying regulations, the risk management approach and the hazards relevant to the operation, and have management and leadership skills.

## **What qualifications are required for the manager of an underground mine?**

For a mine employing 25 or more people underground, the manager must hold a First Class Mine Manager's Certificate.

For a mine employing fewer than 25 underground, the manager may be the holder of an Underground Supervisor's Certificate.

## **What qualifications are required for an underground supervisor?**

To be an underground supervisor (i.e. shift boss), the person must hold an Underground Supervisor's Certificate (i.e. shift boss's ticket).

## **How many underground supervisors are required for an underground mine?**

The number will depend on the size and nature of the mine and the number of shifts worked in a day.

## **What qualifications are required for a quarry manager?**

For a quarry employing 25 or more people where explosives are used, the manager must hold a First Class Mine Manager's or an unrestricted Quarry Manager's Certificate. Where no explosives are used, a Restricted Quarry Manager's Certificate is acceptable.

For a quarry employing fewer than 25, the manager must hold a First Class Manager's, an unrestricted Quarry Manager's or a

Restricted Quarry Manager's Certificate. For a quarry not using explosives, the Restricted Quarry Manager's Certificate may be annotated "Only for non-explosive quarries".

For a small quarry where explosives are not used, the District Inspector may approve the quarry to be operated without a quarry manager. Where explosives are used, the State Mining Engineer may approve the quarry to be operated without a quarry manager.

For the above-stated cases where a quarry manager is not appointed, the responsibilities of the quarry manager are undertaken by the Registered Manager.

## **What qualifications are required for surface supervisors?**

There is no specific qualification defined for a surface supervisor. Where a statutory qualification is not required, the supervisor is required to be competent to carry out the task. A competent person is defined in section 4 of the Act as a person who is appointed or designated by the employer to perform specified duties based on knowledge, training and experience.

## **May a mine be operated without the appointed key management personnel?**

No. In a commute schedule, alternate managers need to be appointed for the three key positions when the duty holders are rostered off.

In a residential situation, when a Registered Manager is expected to be absent for more than a day for any reason, other than being rostered off, a deputy manager needs to be appointed.

When a quarry manager or underground manager is expected to be absent for any reason, other than being rostered off, a deputy manager needs to be appointed.

The intent is that on any working day, these personnel should be present to provide control and supervision at the mine site. An accurate log of the periods of duty for each manager including the date, time and reasons for the absence needs to be kept in the mine record book.

## **What are the management requirements for the inspection of workplaces?**

The Registered Manager must ensure that each workplace at the mine is inspected at the prescribed intervals specified in the law. The regulations stipulate the minimum frequency of inspections required for certain areas.

For a quarry operation, at least one inspection in each working shift is required to be completed by the quarry manager or the appointed competent person.

For underground non-coal operations, at least one inspection in each working shift is required to be completed by a person

with a First Class Mine Manager's Certificate or an Underground Supervisor's Certificate. The underground manager may direct that more frequent inspections are required.

For all other workplaces, at least one inspection is required during each working day.

## May an employee carry out work without supervision?

No. The relevant employers must provide information, instruction, training and supervision to enable employees to work in such a manner that, as far as practicable, they are not exposed to hazards.

Under the employees' duty of care, they must comply with the employer's procedures and instructions, ensure their own safety, and avoid endangering any other persons by their actions or omissions.

## What level of supervision is required for work being carried out at the mine?

The level of supervision depends on the state of knowledge, qualifications, experience and training of employees, as well as the nature of the task and associated hazards.

Untrained employees should be under the close personal supervision of a competent person until they are trained and assessed as competent in the work being carried out.

Where employees have been trained and assessed as competent in dedicated safe work procedures, the employee may carry out the work without close personal supervision. However, the supervisor should oversee compliance with the procedures through task observation or other regular contact throughout the shift as required.

Where the work cannot be carried out in accordance with the procedures or a hazardous situation or occurrence occurs, the supervisor and manager must be immediately notified so that they can take control of the situation.

Where a task is ever changing and has a high risk potential, the manager or supervisor should be aware of the situation and be present on the job at the time the high risk work is being undertaken. Their primary role will be to assess the risk, issue clear safety instructions, protect employees from danger or injury and ensure the work is carried out safely.

## What considerations must both the manager and a supervisor make while allocating a task for its safe execution?

The details will vary depending on the complexity of the task but some general points to consider are listed below.

- Explain the task in sufficient details and check if the personnel involved have understood it.
- Ensure there is adequate number of people to do the task.

- Allocate personnel who are competent to do the job. Where necessary, they must hold the statutory licence or certificate to undertake the job.
- Allocate sufficient time to complete the task.
- Provide resources (e.g. space, equipment, tools, substances) that are suitable for the task.
- Consider environmental factors (e.g. light, wind, noise, dust, rain, contaminants) and adjoining activities as these conditions may change.
- Carry out a risk assessment to identify the hazards and unwanted events, determine the risks and establish the controls. The type and extent of risk assessment will depend on the nature of the task. The task is only undertaken if the control measures are adequate, implemented and maintained.
- Assess and provide additional assistance if required for some aspects of the task.
- Determine the level of supervision required and whether the task can be carried out safely until the next inspection.
- For an incomplete task from a previous shift, explain the correct status. Review and revise the original risk assessment if necessary.
- Develop and provide written procedures for non-routine tasks.
- Provide ongoing instructions to deal with changing conditions.

## What are the best safety controls that management and supervisors can use to provide and maintain safe workplaces, plant and systems of work?

The Act and accompanying regulations provide a framework to guide management and supervisors through their safety obligations.

The fundamental requirements are clearly summarised under the objects of the Act, which are contained in section 3. A primary aim of the legislation contained in section 3(1)(c) is to eliminate risks or provide and impose effective controls.

Where the risks cannot be eliminated, effective controls need to be developed and used. Management and supervisors should apply the hierarchy of control and strive to adopt higher order control measures rather than rely on administrative controls such as rules and procedures.

For controls to be effective, they also have to address and manage the potential for human error. Involving those undertaking the task in the risk assessment process will help the site ensure that hazards are recognised, understood and implemented.

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## CONFERENCE HIGHLIGHTS INNOVATION AND CRISIS MANAGEMENT

**L**essons learnt from the Beaconsfield and Pike River disasters were among key presentations delivered in April 2013 at the Chamber of Minerals and Energy of Western Australia's annual Safety and Health Conference.

Beaconsfield captured the attention of Australians during the 2006 mine disaster. Darren Flanagan, an explosives expert, told the conference about his role in the rescue, including the psychological effects from being so intimately involved in this extraordinary drama. Nicknamed "the Gun" by Todd Russell and Brant Webb, Darren charged and fired 65 shots of specialist explosives to blast his way towards the two men, who were trapped 925 metres underground.

The Pike River Royal Commission released its report in late 2012. Commissioner Stewart Bell presented the key findings and discussed management issues relating to ventilation, gas monitoring, training and emergency response.

The CME Safety and Health Innovation Awards 2013 were presented at the Conference Dinner. Open to all resource companies, operations and contractors based in Western Australia, the awards showcase the best in creativity and ingenuity with the goal of improving local workplaces.

Programs targeting the health of workers and the safety performance of contractors were among the winners. Rio Tinto Iron Ore was recognised for its mobile camp, CITIC Pacific Mining for its efforts in developing a new filtration system, and Tuff Industries for its lock ring catcher. Quiet Acoustics Pty Ltd was voted the People's Choice for its industrial noise control panel.

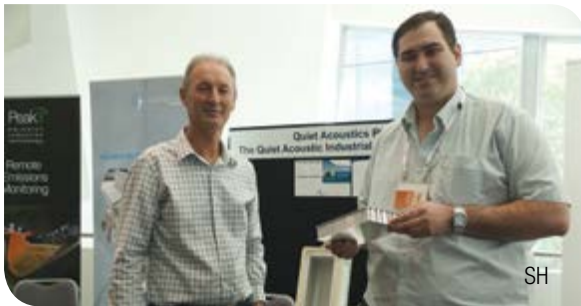
The Chamber's Chief Executive Reg Howard-Smith congratulated all winners and finalists.

"These companies are at the forefront of finding innovative solutions to improve workplace safety — industry's number one priority," Mr Howard-Smith said.

"It was pleasing to see that the WA resources sector was fatality free in 2012. Despite this great outcome, everyone acknowledges there is no room for complacency in regard to safety. The resource sector will remain vigilant and work hard to ensure everyone gets home safe and well after finishing work.

"Industry is always looking at ways of doing things better and these awards showcase that innovation," Mr Howard-Smith added.

*David Flanagan sets the scene for his involvement in the Beaconsfield rescue*



Mines inspectors David Graham and Andrew Martin check out the Quiet Acoustics panel



Kim Poland (Rio Tinto Iron Ore) finds out about the Tuff Lock Ring Catcher from Stuart Mangham

## CME SAFETY AND HEALTH INNOVATION AWARDS 2013

### People Category – Rio Tinto Iron Ore

*Resource Explorer Mobile Camp:* The Resource Explorer Mobile Camp is a 40-person mobile camp consisting of air-conditioned rooms, with en suite facilities, a fully equipped kitchen and laundry. The facility supplies its own power and potable water, and also provides first aid and project office facilities. This extremely robust facility can be transported by prime mover.

### Systems Category – CITIC Pacific Mining

*New HEPA Filtration System with Maintenance and Testing Program:* CITIC Pacific Mining, in a joint venture with Work Air Technologies, developed a robust HEPA filtration system and accompanying maintenance and testing program to address the issue of mineral fibres such as asbestos entering vehicle cabins at its Sino Iron Cape Preston mine site. The system has successfully undergone extensive field testing and is being applied to the entire mining fleet. CITIC Pacific Mining has developed a comprehensive testing regime that complements this system to ensure the integrity of the filter unit and cab are maintained during the life of the vehicle and allow for a formalised audit process.

### Engineering Category – Tuff Industries Pty Ltd

*Lock Ring Catcher:* The Tuff Lock Ring Catcher is designed to help overcome safety issues surrounding the removal and fitting of wheel lock rings on mine site haul trucks. The usual industry procedure when changing a vehicle tyre has been to allow the lock ring, after release, to eject from the wheel and fall to the floor. Lock rings can weigh as much as 60 kg on larger vehicles so there is the potential for injury when the lock releases. Using the catcher reduces the risk of exposure to a falling lock ring, creating a safer working environment.

Kwinana Industrial Services was highly commended by the judging panel in the Engineering Category for its portable pressurised self-cooling safety shower and eye wash.

### People's Choice Award – Quiet Acoustics Pty Ltd

*Quiet Acoustic Industrial Noise Control Panel:* The Quiet Acoustics panel is a locally owned and manufactured panel that uses the principles of resonance to cancel and control low frequency noise. It is the first of its kind and is being adopted globally across the minerals, oil and gas, and marine sectors. Its uses include equipment enclosures, wall construction on mine camp accommodation, oil and gas rigs, marine vessel interiors and outdoor noise barrier fences. The panel is made from aluminium honeycomb sandwich panels, not only cancelling noise but also providing a light, stiff and strong fibre-free building material.

# IMPROVING SAFETY (AND PROFITS) BY PLANNING FOR BUSINESS CONTINUITY

*Tairo Mundawarara is a consultant at Needhams 1834, based in London. He was a former safety and security manager for a major mining company in South Africa. Here he talks about the safety dividends that can come from effective planning to maintain business continuity after a major disruption. An extended version of this article was first published in the April 2013 issue of Mining, People and the Environment.*

**T**wo measures link mining companies the world over – their safety record and their profit levels. The manner in which a mine continues business during any form of disruption is one of the connecting factors between safety and profit, so it is surprising to see how little attention is sometimes paid to business continuity. An understanding of the nature of the potential impacts and how the operation would continue is important to maintain healthy safety records and profits.

.....

The following steps summarise what is considered to be best practice for business continuity and crisis management. These principles are based on the International Standard ISO 22301:2012 *Societal security – Business continuity management systems – Requirements*.

## SCOPE YOUR BUSINESS CONTINUITY MANAGEMENT SYSTEM

A well-defined scope enables a mine to allocate resources effectively. This frames and shapes subsequent work, and enables the management team to correctly apportion responsibility to relevant departments.

## UNDERSTAND YOUR ORGANISATION AND IDENTIFY YOUR CRITICAL ACTIVITIES

At a strategic level, take the time to appreciate the changing environment in which you operate. The orebody may have a projected working life of over 40 years, but over that period many factors may vary — host nation politics change, taxes increase and new resource discoveries attract more players into the market.

At your most senior management level, identify and understand the potential effects of these changes and plan for them accordingly. Preparing for disruptions improves your ability to respond should they happen.

## BUSINESS IMPACT ANALYSIS

To fully understand your business risks and the impact disruptions may have, conduct a business impact analysis. This is the foundation of business continuity and an effective method for assessing business-wide impacts. It identifies those activities that are crucial to the business and would need to continue if there was a disruption.

These critical activities could present a health and safety risk, or could cost money, and ultimately cause the business to fail. Understanding how fast and from what activities money can be lost, allows prioritising of recovery on both a departmental and site-wide basis. The business impact analysis also provides an understanding of the systems that support those activities, as well as any linked internal and external dependencies.

If used creatively, the business impact analysis process can be used to understand other aspects of the business, such as



process safety. Segmenting activities and understanding the relationship they have with each other can expose potential safety vulnerabilities as well as single points of failure that may exist in the supply chain.

### MANAGEMENT COMMITMENT

Upper management needs to understand the reasons behind business continuity and realise that, as much as it is a vessel to guide the mine through a disruption, it can be a catalyst to add value and gain a competitive advantage. A business impact analysis has many other uses, such as an addendum to a bankable feasibility study, or a document to take to insurers when renegotiating premiums or seeking a claim settlement.

### ACTIONS TO ADDRESS RISKS AND OPPORTUNITIES

Business continuity may be a response to a negative occurrence but it can also be about positive exploitation of opportunities from an incident. Being proactive, and a step ahead, is vital to exploit quick changes in the operating environment.

### INCIDENT RESPONSE STRUCTURE AND EXERCISING

In the business continuity world, the woodworking phrase “measure twice, cut once” means proper planning and preparation to ensure an effective response should an incident occur. Depending on the organisation, standard management structures may differ from incident response structures. Two points to remember are that there needs to be sufficient depth in the organisation and the teams have to be trained.

### BUSINESS CONTINUITY PLANS

Disaster management or contingency plans are commonplace in the mining sector. A shortcoming of these plans is that they often tend to narrow your focus by looking specifically at either the emergency response components or the resumption of disrupted assets or resource flows. Business continuity provides a structure for response plans to ensure key information is captured.

In summary, business continuity, if taken seriously, implemented appropriately and embedded in your culture, will help manage disruptions. A robust business continuity management system can improve daily operations at mine sites and in the boardroom, making it of strategic importance. This will equip the organisation with the tools to ensure disruptions do not become crises. Taking the time to identify the risks to which you are exposed allows you to address them effectively. Rather than categorising business continuity as simply a response to negative occurrences, it is of more value to identify the safety improvement and commercial opportunities it can expose.

## CALL TO REMAIN VIGILANT

**W**estern Australia's resources sector has achieved the first fatality-free year on record – a period of more than 100 years. The then-Minister for Mines and Petroleum Norman Moore congratulated industry during his closing address at the 2013 RIU Explorers Conference in February.

"This is a very significant achievement and one the Western Australian resources industry should look to emulate in each and every year ahead," he said.

"It is particularly pleasing when you consider there are now more people than ever before working in the State's resources industry — some 98,000 workers."

Mr Moore said that the milestone could be attributed to the hard work of operators and companies to adopt resilient safety

cultures with the aim to achieve "zero harm", complemented by the high safety standards being enforced by the Department of Mines and Petroleum.

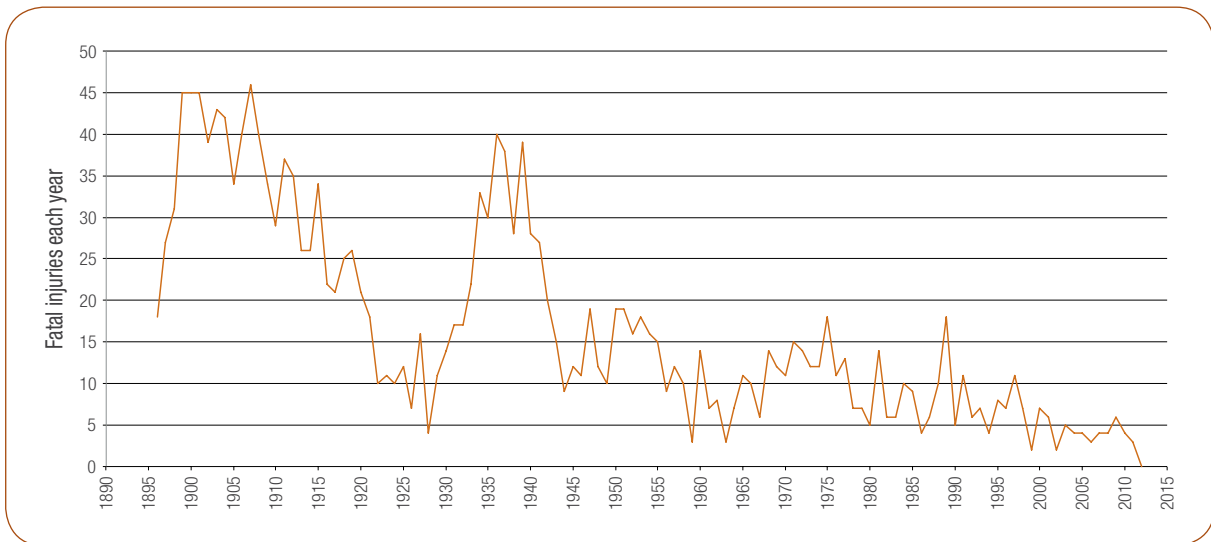
"I have no doubt the safety reforms, introduced by the department under the Reform and Development at Resources Safety (RADARS) strategy in 2010, have played an instrumental role in this achievement," he said.

"The strategy has helped to create an environment where companies, workers and the wider community are working together to ensure higher standards and better safety cultures."

While Mr Moore welcomed the State's first fatality-free year since records began in 1896, he reminded industry to stay vigilant.

"One swallow does not make a summer, so the challenge now is to ensure safety continues to have the highest priority across the industry," he said.

## NUMBER OF FATALITIES



## DANGEROUS GOODS ANNUAL INCIDENT REPORT 2012

The overview of dangerous goods reportable situations and incidents for 2012 is now available online.

The aims of this report are to provide:

- short summaries of all incidents reported to the Department of Mines and Petroleum during the year
- some historical information for perspective
- some analysis of trends.

The number of incidents reported varies from year to year but there has been a noticeable increase in the explosives area in the last few years owing to greater awareness and diligence in that industry.

Despite the uncertainties in the figures, given the quantities of dangerous goods being stored, handled and transported around Western Australia, the overall number of incidents is remarkably low. Any injuries received were mostly minor but there were several that were serious. Unfortunately, there was one fatality attributed to a dangerous goods storage and handling incident. There was also a fatality following a vehicle

crash involving dangerous goods transport, but the death was not caused by the dangerous goods.

The major challenges that emerge from the 2012 data are:

- unaccounted explosives and misfires at mine sites
- people using mechanical grinding equipment on disused petrol storage tanks
- dangerous goods vehicle roll-overs on long-haul trips.

Analysis of data from the last ten years indicates an ongoing trend that human error is a major contributor to incidents, representing 47 per cent of storage and handling incidents and 60 per cent of transport incidents.

Enforcement of the regulations can only address so many issues. The key message is that incidents can be avoided or reduced in severity if people are aware of the hazards and adopt safe practices to deal with them.

### HOW DO I GET A COPY OF THE REPORT?

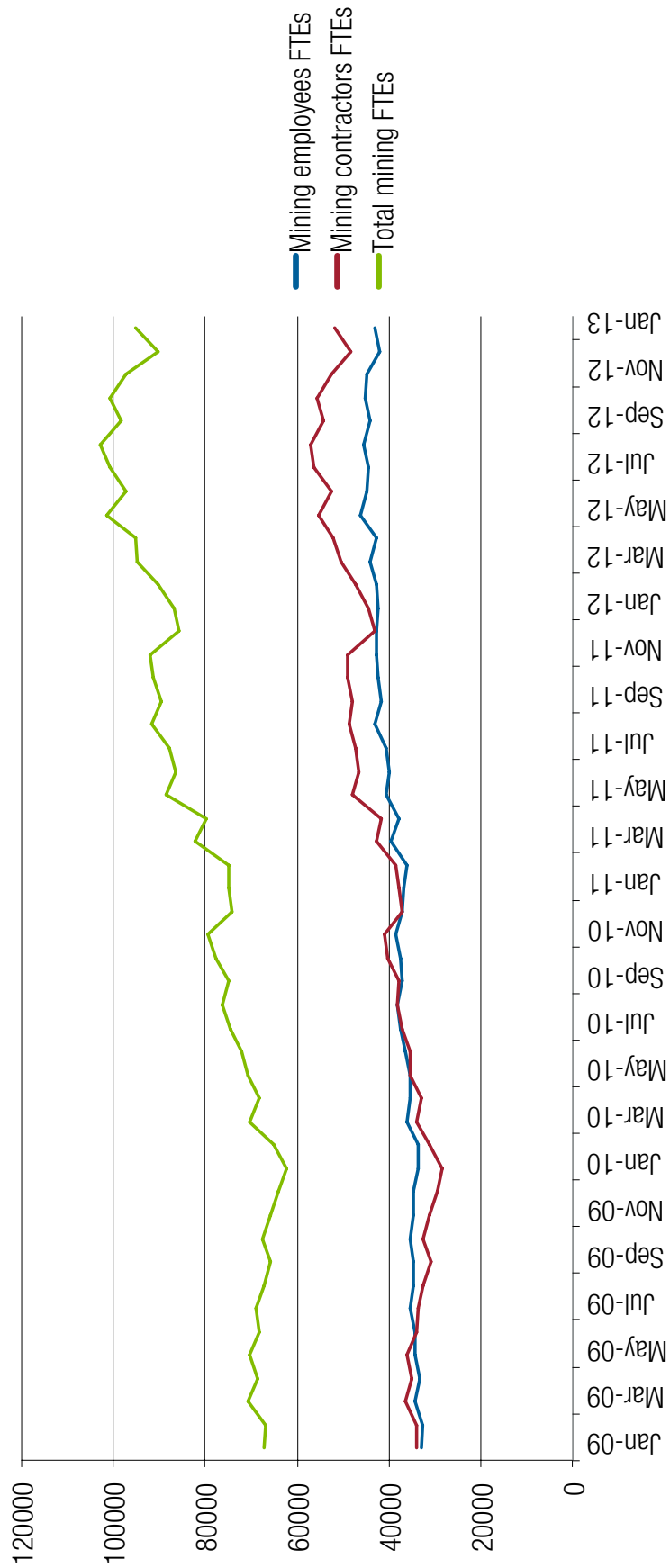
Visit [www.dmp.wa.gov.au/17158.aspx](http://www.dmp.wa.gov.au/17158.aspx) for the 2012 and past annual reports for dangerous goods.

**DANGEROUS  
GOODS**

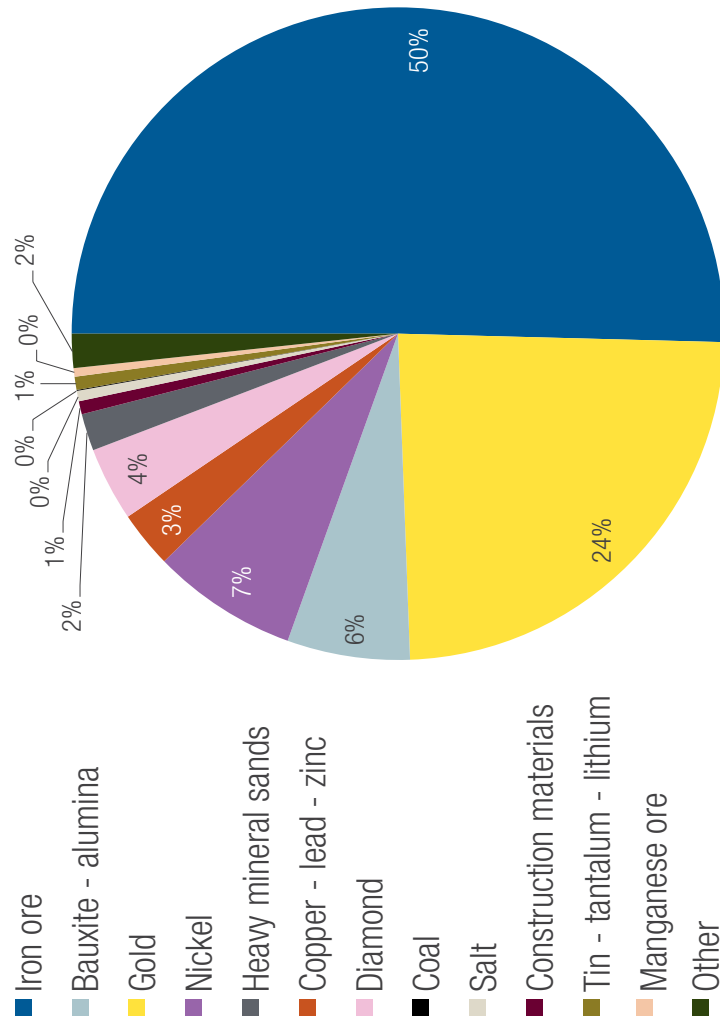
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## WA'S MONTHLY MINING WORKFORCE

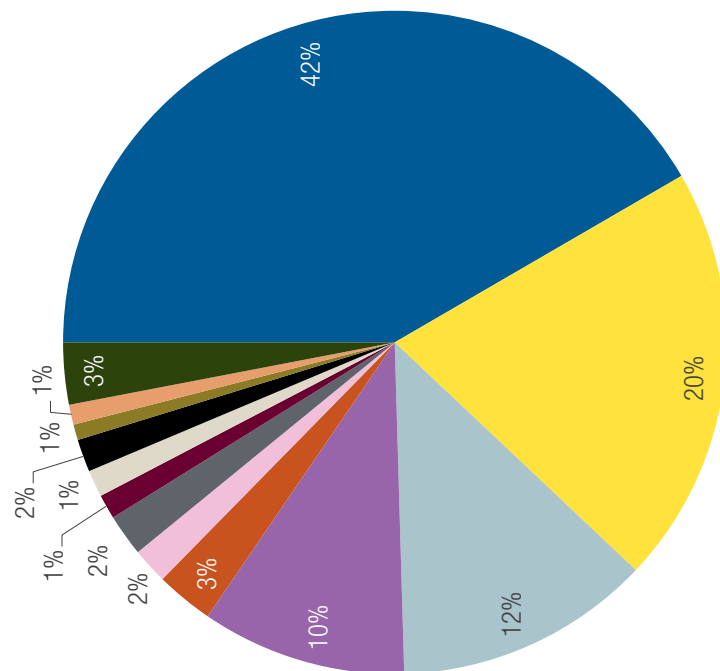
NOTE: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year



WA'S MINING WORKFORCE – PERCENTAGE BY COMMODITY (31 DECEMBER 2012)



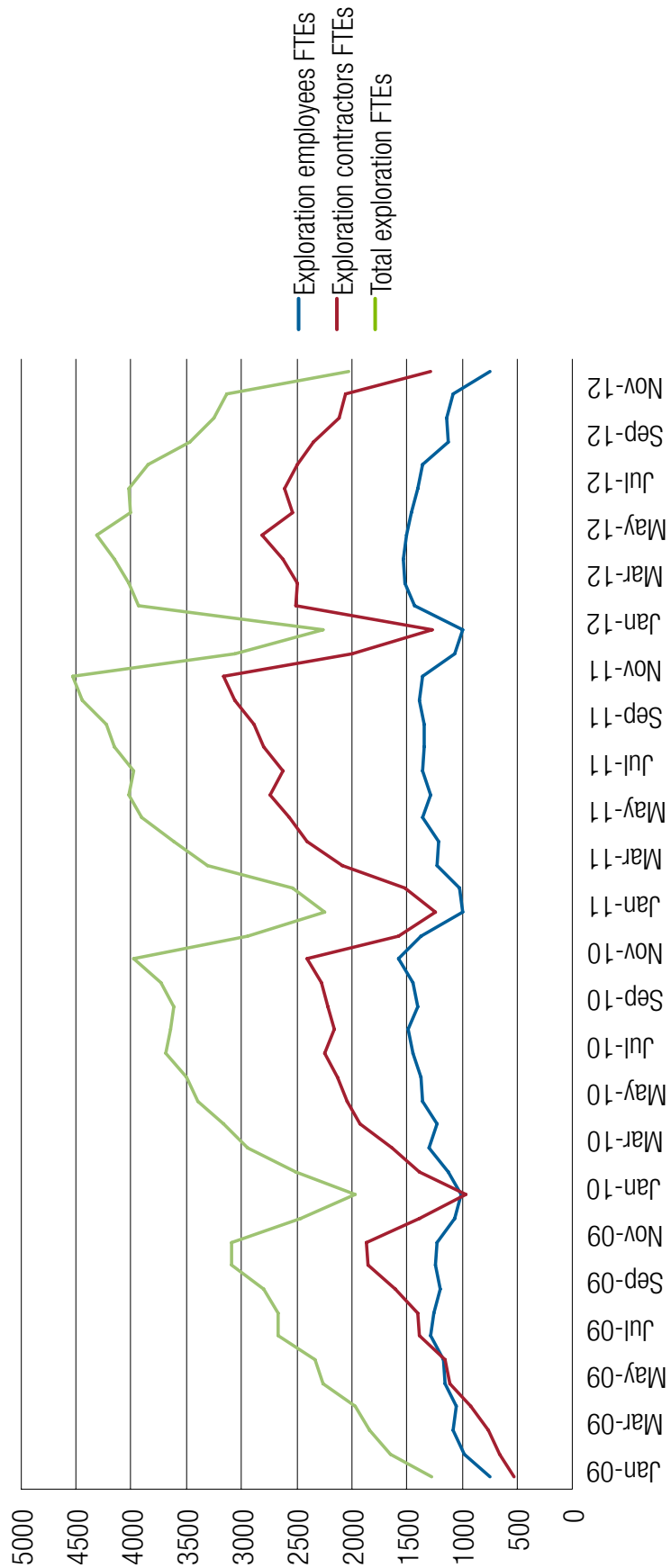
Mining contractors FTIEs



Mining employees FTIEs

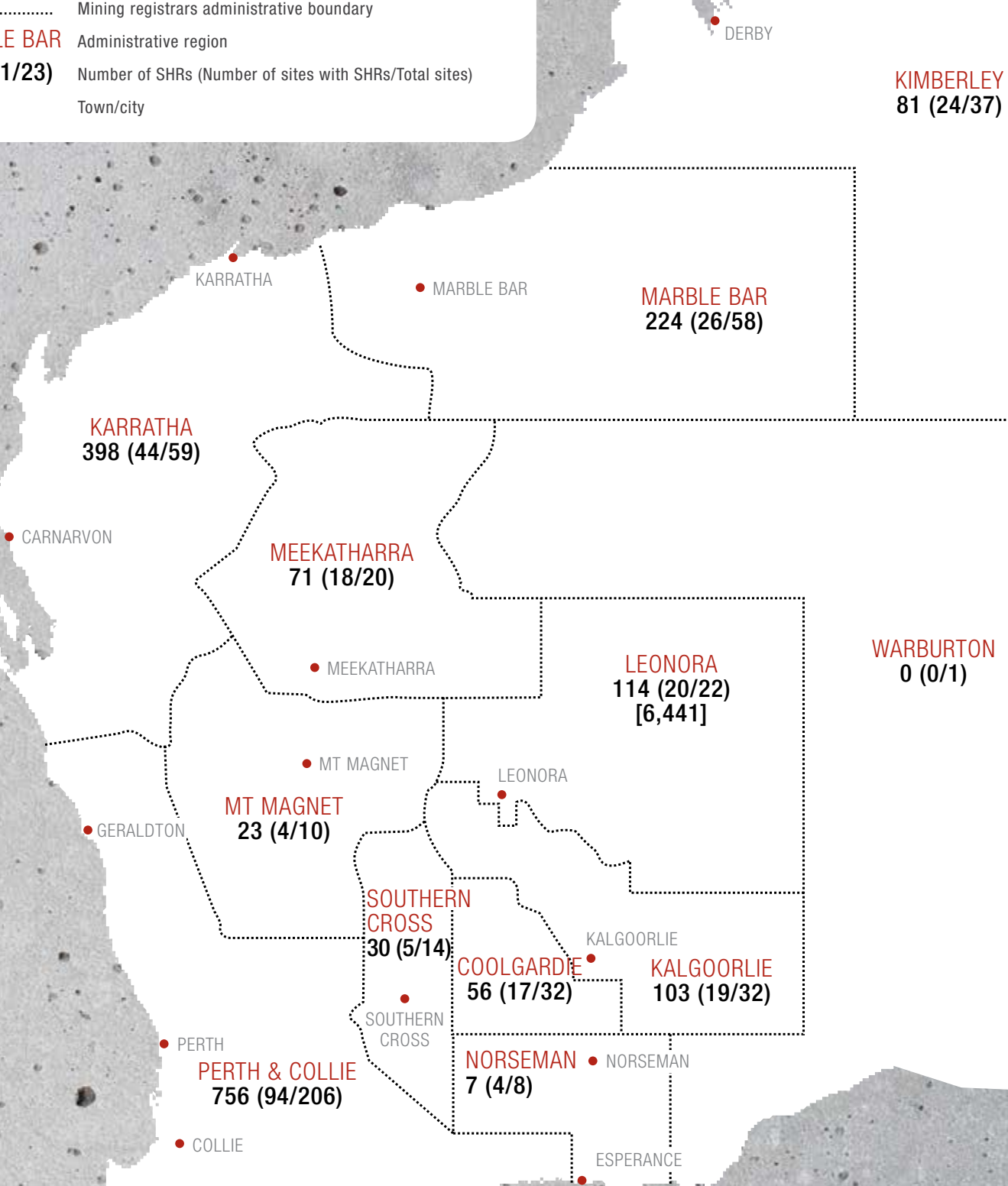
# WA'S MONTHLY MINERAL EXPLORATION WORKFORCE

NOTE: From 1 July 2009, monthly mining workforce figures are plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year



# DISTRIBUTION OF SAFETY AND HEALTH REPRESENTATIVES (31 MARCH 2013)

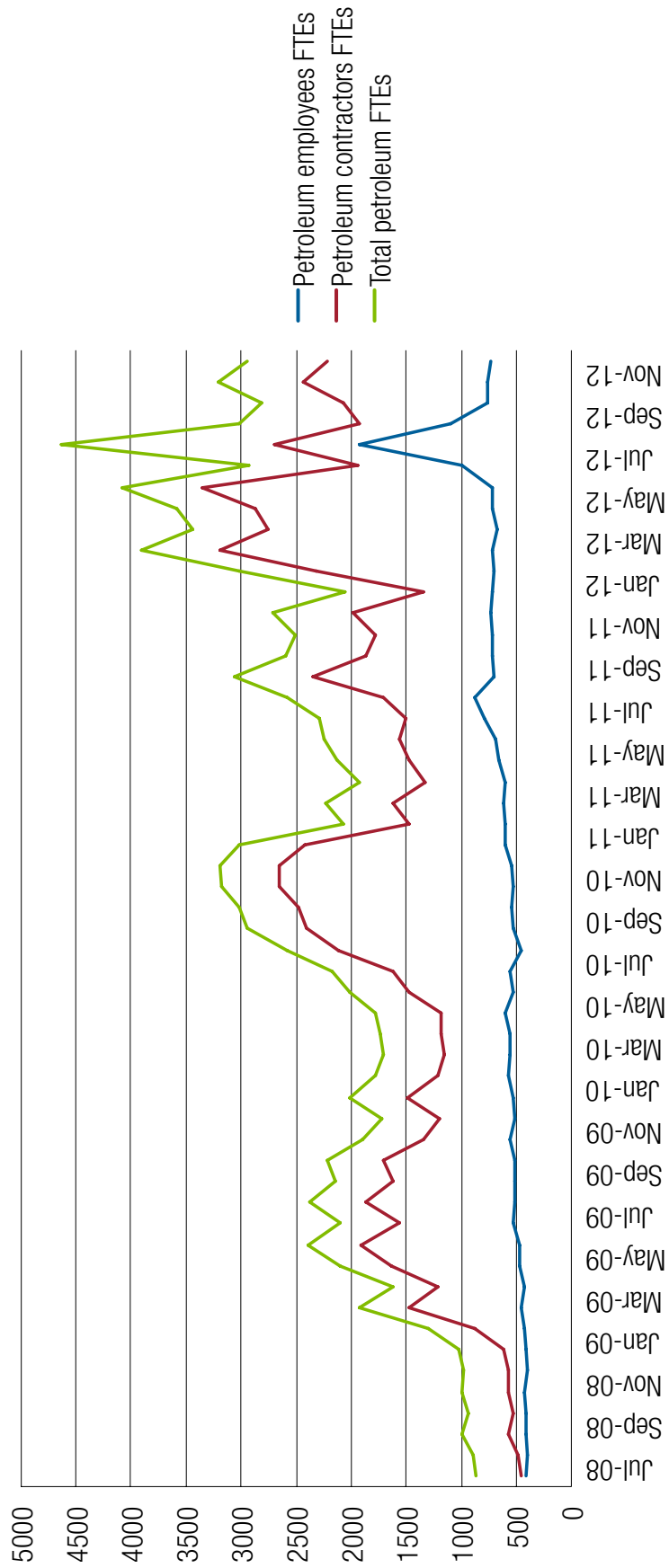
..... Mining registrars administrative boundary  
**MARBLE BAR** Administrative region  
**153 (11/23)** Number of SHRs (Number of sites with SHRs/Total sites)  
 ● Town/city



Total active (incl. C&M) mine sites = 499  
 Mine sites with SHRs = 275  
 Total SHRs = 2,300  
 SHRs attached to mine sites = 1,863  
 Others (e.g. exploration) = 437

## WA'S MONTHLY PETROLEUM WORKFORCE

NOTE: Monthly petroleum workforce figures reported as hours but plotted as full-time equivalent (FTE), where 1 FTE = 2,000 hours worked per year





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## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 180

### COMBINATION EXTENDABLE SPREADER AND LIFTING BEAM FAILS DURING LIFTING

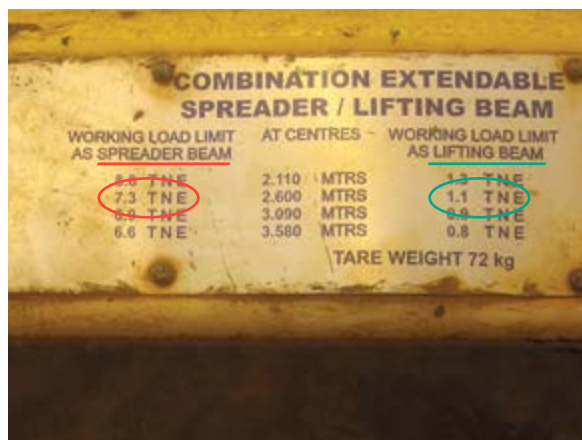
ISSUED: 28 FEBRUARY 2013

#### Summary of incident

A load fell when a combination extendable spreader and lifting beam failed due to incorrect use during a lift. At the 2.6 metres extension setting, the beam was subjected to a 7.2 tonne lift.

The working load limit (WLL) as a spreader beam is 7.3 tonnes, but the combination spreader and lifting beam was rigged in the lifting configuration. The WLL for a lifting beam is only 1.1 tonnes.

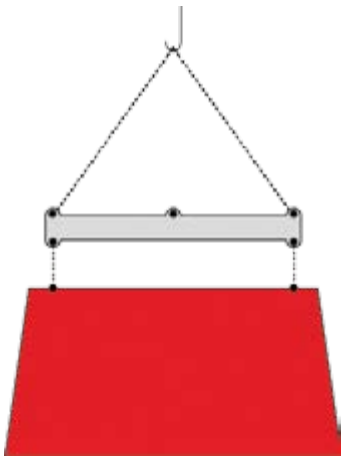
Fortunately, no-one was within the drop zone when the beam failed and the load fell.



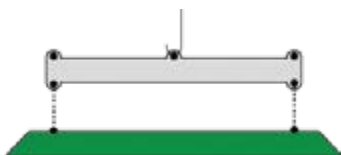
Photographs showing broken beam after lift (top) and placard indicating WLLs when being used as a spreader beam and lifting beam of various lengths

### Probable causes

This incident was caused by incorrect use and rigging of the beam.



As a spreader beam: **WLL = 7.3 tonnes**



As a lifting beam: **WLL = 1.1 tonnes**

### Action required

Under Regulation 4.13(1)(b) of the Mines Safety and Inspection Regulation 1995, employees at a mine must be assessed as competent to:

- perform the tasks they will be assigned, and
- operate any plant or equipment they will be required to use.

This means that, in addition to any required high-risk work licence, the person undertaking lifting operations must be assessed to ensure they are competent to use the equipment provided.

Where a combination spreader and lifting beam is used, the person doing the lift must ensure:

- the beam placard is reviewed and the relevant WLL is followed for the chosen configuration
- the beam is rigged in the correct configuration.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. **181**

### HYDRAULIC HOSE FAILURE LEADS TO DUMP TRUCK FIRE

ISSUED: 3 APRIL 2013

#### Summary of incident

A dump truck operating at an open pit mine caught fire when a hose-end fitting separated on a single-wire reinforced hydraulic hose. Oil sprayed onto hot engine components in the engine bay and ignited. The operator stopped the truck when steering was lost and the brake applied automatically due to fluid loss. The dump truck was not shut-down in accordance with the recommended procedures.

The truck had no fire-suppression system, and flames and thick black smoke prevented escape down the normal access ladder. The operator tried to access the vertical emergency ladder but pushed rather than pulled the gate and could not exit. The operator returned to the cab and called on the two-way radio for urgent assistance. The operator exited the vehicle by climbing over the rail and down the vertical emergency ladder while another person directed a fire extinguisher at the flames.

#### Probable causes

##### Direct

- A new double-wire hose-end fitting was incorrectly fitted to a single-wire hydraulic hose assembly.

#### Contributory

- The truck was not fitted with a fire-suppression system.
- The emergency shut-down button was not located in a prominent position on the truck dashboard.
- The operator did not follow the correct shut-down procedures.
- The operator, although regarded as experienced, was neither familiar with nor practised in emergency procedures.

#### Actions required

- Ensure the design of hydraulic hose assemblies complies with the requirements of the original equipment manufacturer (OEM) and the assemblies are fit for purpose.
- Use correctly rated and compatible fittings when maintaining hydraulic hoses.
- Ensure hydraulic hoses are assembled and installed by competent personnel.
- Undertake a fire risk assessment (e.g. Australian Standard AS 5062:2006 *Fire protection for mobile and transportable equipment*) to identify and implement control measures to prevent and mitigate vehicle fires.
- Ensure machine emergency controls are visible, clearly labelled and easily accessed.
- Ensure training and assessment for operation of mobile equipment includes emergency scenarios and procedures, including access and egress.
- Maintain regular emergency procedure drills, with documented reviews of outcomes.

## MINES SAFETY SIGNIFICANT INCIDENT REPORT NO. 182

### WHIRLWIND CARRIES TRANSPORTABLE ABLUTION BLOCK 50 METRES

ISSUED: 1 MAY 2013

#### Summary of incident

A whirlwind picked up a transportable abluion block and moved it about 50 metres to a vacant haul truck parking area.

Fortunately, both the building and parking area were unoccupied at the time and no-one was injured.

#### Probable causes

##### Direct

- The wind-load was higher than the building anchorage capacity.

##### Contributory

- Tie-downs were not used on the building.
- The design, including anchorage specifications, did not consider the effect of wind acceleration caused by other buildings, structures and clearings in the area.

#### Actions required

- Competent persons should develop and implement rigorous risk management processes for the safe design, construction and installation of buildings and structures, whether permanent or temporary, used at mining operations. Compliance with Australian Standards and the *Building Code of Australia* may not be sufficient to cover specific conditions encountered on mine sites. Standard design parameters may not consider abnormal conditions experienced as a result of terrain changes and building configurations at the mine.
- Incorporate site-specific wind-loading criteria for buildings and structures, based on the environmental and surface conditions present.

#### Further information

Visit the publication section of the Resources Safety website at [www.dmp.wa.gov.au/ResourcesSafety](http://www.dmp.wa.gov.au/ResourcesSafety) for the following safety alert and code of practice.

- Mines Safety Significant Incident Report No. 148 *Tropical Cyclone George*
- *Safe design of buildings and structures – code of practice.*

Also check the latest relevant Australian Standards and building codes, some of which are currently being updated with more accurate data for design loadings, such as:

- Australian/New Zealand Standard AS/NZS 1170.2:2011 *Structural design actions – Wind actions.*

## PETROLEUM SAFETY SIGNIFICANT INCIDENT REPORT NO. **01/2013**

### FALL FROM HEIGHT INCIDENT ON OFFSHORE PLATFORM

ISSUED: 13 MARCH 2013

#### **Incident**

An abandonment program was underway on the platform of an offshore drilling rig. The casing strings had been removed from the platform caisson, leaving five 20 inch-diameter conductor pipes. The first of the conductor pipes was raised to the rig floor. A floorman and assisting roustabout were asked to cover the opening (slot) in the platform cellar deck left by the removal of the conductor pipe.

The workers located a hole cover about the right size and proceeded to manually move it to cover the slot. Despite being unsecured, however, the cover was being used on another opening, which was then exposed. The floorman stepped into the newly exposed opening and fell 15.5 metres into the platform caisson. He received serious but, fortunately, non-life-threatening injuries including a dislocated ankle, fractured arm, two microfractures of the spine and a fractured sternum, as well as bruises and abrasions.

#### **Contributory factors**

- Previous inspections and planned maintenance routines did not identify that the hole cover was not secured.
- No job safety analysis (JSA) or other risk assessment was undertaken for abandonment work on the platform cellar deck.
- There were no operator's drilling representatives on the platform to supervise the operation.
- Pre-fabricated covers or barriers were not available to prevent inadvertent access to new openings.
- The work area was covered in mud.

#### **Preventative actions**

This incident illustrates a failure to consider safety at all levels. Employers, supervisors and staff all missed the opportunity to identify and remove the hazard. Preventative actions include:

- conducting an audit to ensure that the safety systems in place are adequate and robust
- developing and implementing a safety management plan to cover the arrival of a rig at a platform, including the need for a "hazard hunt" each time to identify any changes
- adopting safety procedures that require platform activities to be directly controlled by a supervisor whose experience could help identify safety issues sooner.

## MINES SAFETY BULLETIN NO. 103

### FAILURE OF MAINTENANCE JACKING POINTS ON STACKERS, RECLAIMERS AND SHIPLOADERS DURING REPLACEMENT OF SLEW BEARINGS

ISSUED: 22 JANUARY 2013

#### Summary of hazard

During the exchange of a reclaimer slew bearing, it was noticed that one of the three jacking points was yielding. Jacking ceased immediately and the original equipment manufacturer (OEM) was contacted. An investigation by the operator and OEM found that two of the three jacking points had yielded. If the jacking operation had not been terminated, major structural collapse would have resulted.

Further investigation by the OEM highlighted similar issues with three other machines in Western Australia.

#### Contributory factors

- The design was a duplicate of that for another reclaimer but the “park” or “service” position had been moved for operational reasons.
- The implications of changing the design details and whether it was still fit-for-purpose had not been recognised by any party.
- The necessary stiffeners or webs situated under the jacking points had not been installed in the appropriate locations in the modified configuration.

#### Recommendations

- Before commissioning stackers, reclaimers and shiploaders, the OEM should ensure that the jacking points are suitable, and the maximum safe working load is identified.
- Where a copy or carry-over design is utilised, ensure that all conditions of use are identical to the original design or variations have been identified and addressed.
- Australian Standard AS 4324.1:1995 *Mobile equipment for continuous handling of bulk materials* (Appendix K) recommends that a design audit engineer is engaged.
- The designer, OEM and client should ensure that their procedures for managing change are sufficient and executed correctly with regards to their internal processes and those of the other parties.
- Delineation of jacking points and their safe working loads is recommended.

## MINES SAFETY BULLETIN NO. 104

### USE OF PERSONAL PROTECTIVE EQUIPMENT FOR HIGH VOLTAGE (HV) SWITCHING

ISSUED: 12 APRIL 2013

Note: HV switching for energised overhead electrical equipment should only be carried out when the switching cannot be done de-energised and a risk assessment has been undertaken and appropriate control measures are in place. Appropriately rated and tested personal protective equipment such as HV insulating gloves, work sticks and insulating platform are required for switching of energised overhead electrical equipment.

#### Summary of hazard

Inadvertent contact with live electrical equipment indirectly through work sticks can be lethal. If the condition and test date of personal protective equipment (PPE) such as insulating gloves and work sticks are not verified before they are used for HV switching operations, there is the potential for critical control measures to fail. Five prohibition notices have been issued recently relating to the use of insulating gloves that displayed expired test dates, leading to uncertainty about their effectiveness during HV switching operations.

#### Contributory factors

- Lack of or inadequate safe system of work for HV switching.
- Failure to inspect and check the testing records of personal protective equipment before HV switching operations.
- An inventory management system that does not flag when equipment testing is due.



*Insulating glove with "next test due" date stamp that was out-of-date as at 15 December 2012*

#### Recommendations

Regulation 5.27 of the Mines Safety and Inspection Regulations 1995 mandates the periodic examination and testing of all electrical equipment (including PPE). In this regard, the appropriate Australian Standard is AS 5804:2010 *High-voltage live working*, which details the following test intervals:

- HV gloves every 6 months
- HV work sticks and insulating platforms (dry test) every 12 months.

Other recommendations for safe work practices are listed below.

- Treat all electrical equipment and conductors as energised, until proven to be de-energised.



- Undertake a formal risk assessment for HV switching operations to identify and consider all potential hazards, the risks associated with those hazards, including consequences, and the control measures that can be applied. The risk management process should eliminate, or reduce as far as reasonably practicable, risks associated with HV switching.
- Require a permit for HV switching, and cancel the permit upon completion.
- Before carrying out HV switching for energised overhead electrical equipment, identify the specific hazards associated with each job, considering risk factors such as:
  - the minimum approach distance from any exposed energised electrical equipment
  - the position of exposed energised conductors and live conductive parts
  - the access to insulating platforms
  - environmental conditions (e.g. hot, wet, humid) – fault levels (and their possible reduction)
  - the design of switches for operating under load
  - the capacity of personal protective equipment to withstand the fault current
  - automatic reclosing functions (e.g. disable to avoid reclosing after fault has occurred).If necessary, modify the risk control measures before starting the job.
- Where identified as a critical control measure by the risk assessment, provide a competent safety observer while performing HV switching.
- Include the inspection and checking of testing records of personal protective equipment in the HV switching procedure and work permit system. Before use:
  - air-test and visually inspect the entire surface of HV insulating gloves
  - thoroughly inspect HV work sticks for damage and deformity, and wipe them clean
  - ensure personal protective equipment is clean and completely free of moisture.
- Establish an inventory management system that prompts action when testing is due.
- Ensure the voltage rating of personal protective equipment is appropriate to insulate the HV operator from the energised part where the switching is performed.
- Implement an out-of-service tagging procedure for damaged personal protective equipment.
- Transport and store all HV personal protective equipment in suitable storage containers. Consult the original equipment manufacturer (OEM) for advice.

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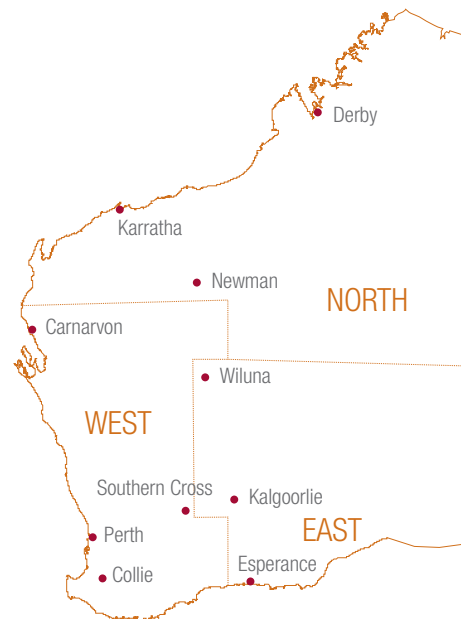
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