

An aerial photograph of a large-scale open-pit mine. The mine is characterized by numerous terraced levels, or benches, which are separated by narrow roads. The rock faces of the benches are dark and appear to be composed of a hard material. At the bottom of the mine, several pieces of heavy machinery, including excavators and trucks, are visible, engaged in mining operations. The overall scene is one of intense industrial activity and significant earthmoving.

PART

A

Introduction

This part of the document gives an introduction, background, and definitions to help you use it. It includes a discussion of what quarries and mines this document applies to, and a guide to the overall practice of hazard management.

PART A

01/

INTRODUCTION

IN THIS SECTION:

- 1.1 How to use this guidance**
- 1.2 Background**
- 1.3 Purpose**
- 1.4 Scope and application**
- 1.5 Interpretation**
- 1.6 Safety-critical roles**

This guideline is about helping you implement hazard controls for risks commonly associated with opencast mines, alluvial mines and quarry operations.

1.1 HOW TO USE THIS GUIDANCE

This document has four parts:

PART A: INTRODUCTION

This part gives an introduction, background, and definitions to help you use this document. Part A includes a discussion of what quarries and mines this document applies to, and guidance on the overall practice of hazard management.

PART B: PLANNING AND DESIGN

This part provides guidance on planning safety into mine and quarry operations. It describes in detail how to plan excavations, tips, ponds, dams, roads, and vehicle operating areas.

PART C: OPERATIONAL SAFETY FOR MINING AND QUARRYING

This part sets out site safety practices for working with explosives, managing ground instability, tipping and dumping material, storing water and tailings, and managing traffic.

PART D: EMERGENCY MANAGEMENT AND OPERATIONAL SAFETY FOR EQUIPMENT AND PEOPLE

This part provides guidance on managing machinery, worker health and training, and emergencies.

1.2 BACKGROUND

The Health and Safety in Employment (Mining Operations and Quarrying Operations) Regulations 2013 (the Regulations) have specific provisions for safety in mining operations, including opencast (or surface)

metalliferous and coal mines. The Regulations only address competency requirements for quarrying and alluvial mining operations.

The *Health and Safety at Work Act 2015* is due to come into effect on 4 April 2016, along with new regulations (including updated mining regulations to align with the new Act and fix some drafting errors). While the law change will involve some quite significant differences (eg, how duties are framed, what injuries and incidents are notifiable, worker engagement and participation, and clearer regulations) and changes in terminology, this document will still provide sound practice guidance for ensuring health and safety in opencast mines, alluvial mines and quarries.

WorkSafe is, in consultation with the industry, updating codes of practice and guidance and producing new ones. The intent is to provide a series of documents the industry can use to comply with the new regime.

It was recognised in the Ministry of Business, Innovation and Employment's *Safe mines: Safe Workers – A quick guide for mine operators* publication that quarries would need specific health and safety guidelines.

Guidance for alluvial mines is included in this document. This is because the hazards in opencast mines are similar to those in alluvial mines, and guidance on opencast mines is provided.

1.3 PURPOSE

This document has been developed to assist opencast mines, quarries and alluvial mines

in developing, implementing and maintaining hazard controls for common risks and to meet their obligations under the *Health and Safety in Employment Act 1992* (the HSE Act) and its associated regulations.

1.4 SCOPE AND APPLICATION

This document applies to opencast mines, alluvial mines and quarries. This document is mainly for operators, mine and quarry managers, employers and site health and safety representatives. However, employees, contractors, health and safety advisers, consultants and engineers may also find it helpful.

This document does not apply to underground mines or tunnels.

The precautions required in a situation will depend on the extent and nature of the risks involved. High-risk situations require higher standards of precautions than low-risk situations. Examples given do not cover every possible situation and may not be relevant to all sites. You should complete your own risk assessments and take competent advice when implementing health and safety management systems.

1.4.1 WHAT IS A QUARRY?

The HSE Act defines a quarrying operation as:

- (1) *In this Act, quarrying operation -*
- (a) *Means an activity carried out above ground for the purpose of -*
 - (i) *extracting any material, other than coal or any mineral, from the earth; or*
 - (ii) *processing any material, other than coal or any mineral, at the place where the material is extracted; and*
 - (b) *includes the place where an activity described in paragraph (a) is carried out; and*

(c) *Includes any place in which any material extracted or processed in a quarry is crushed or screened.*

- (2) *Subsection (1) applies whether or not the material is to be extracted or processed for commercial gain and whether or not the material is extracted or processed by the use of explosives.*

Quarry operators must notify WorkSafe of the manager or acting manager of a quarry (the Regulations, Regulation 24).

If you are unsure whether your operation is a quarrying operation, as defined by section 19N of the HSE Act, you should get legal advice. For the purposes of this document, a quarry includes:

- > all the surface extraction workings including preparatory and abandonment works
- > tips (or dumps) associated with and in the vicinity of the site where the material is extracted, crushed or screened
- > working stockpiles associated with and in the vicinity of the site where the material is extracted, crushed or screened
- > settling ponds associated with and in the vicinity of the site where the material is extracted, crushed or screened
- > areas used for processing extracted materials (including washing, drying and bagging), where the processing is carried out on site where the extraction is undertaken
- > areas used for crushing or screening extracted or processed materials, regardless of whether it is at the place the material was extracted
- > the buildings and structures at the quarry used for the working of the quarry
- > common areas (eg quarry roadways and railways, but not public roads or railways under the control of a rail company)

- > quarries in a forest, on a farm or on Crown or public land (eg council reserves or river beds) regardless of whether the extraction is of an intermittent nature or not.

1.4.2 WHAT IS NOT A QUARRY

For the purposes of this document, the following are not considered to be quarries:

- > civil or building construction sites (both residential and commercial) where cut to fill is undertaken unless the construction is associated with the development of the quarry
- > manufacturing that involves processing extracted material (eg hot mix or concrete) – although, a quarry’s crushing or screening facility is covered, even if at a different location
- > recycling aggregate plants
- > stockpiles at dormant quarries and dormant river gravel extraction sites
- > small scale, non-complex extraction carried out on farmland solely in support of farming (ie no tips, highwalls, explosives or processing)
- > small scale, non-complex extraction carried out in forests solely in support of forestry operations (ie no tips, highwalls, explosives or processing)
- > non-complex extraction of gravel from river beds where there is no mechanical processing.

1.4.3 WHAT IS AN ALLUVIAL MINE?

The HSE Act defines an alluvial mining operation as:

a mining operation carried out above ground and associated with-

- (a) *The extraction of gold from river deposits of sand or gravel:*
- (b) *The extraction of iron sand from sand or gravel.*

Alluvial mine operators must notify WorkSafe of the manager or acting manager of an alluvial mine (the Regulations, Regulations 24).

If you are unsure whether your operation is an alluvial mining operation as defined by section 19L of the HSE Act you should get legal advice. For the purpose of this document, an alluvial mine includes the following:

- > all the surface extraction workings including preparatory and abandoned works
- > tips (or dumps) associated with and close to the site where the material is extracted
- > working stockpiles associated with and close to the site where the material is extracted
- > settling ponds or tailing dams associated with and close to the site where the material is extracted
- > areas used for the preparation of extracted materials (including crushing, screening, washing, drying, bagging and ore processing)
- > the buildings and structures at the mine that are used for the working of the mine
- > common areas (eg roadways and railways, but not public roads or railways under the control of a rail company).

1.4.4 WHAT IS AN OPENCAST MINE?

The HSE Act defines a mining operation as follows:

In this Act, mining operation-

- (a) *Means the extraction of coal and minerals and the place at which the extraction is carried out; and*
- (b) *Includes any of the following activities and the place at which they are carried out:*
 - (i) *Exploring for coal:*
 - (ii) *Mining for coal or minerals:*
 - (iii) *Processing coal or minerals associated with a mine:*

- (iv) *Producing or maintaining tailings, spoil heaps and waste dumps:*
 - (v) *The excavation, removal, handling, transport and storage of coal, minerals, substances, contaminants, and wastes at the place where the activities described in subparagraphs (i) to (iv) are carried out:*
 - (vi) *The construction, operation, maintenance, and removal of plant and buildings at the place where the activities described in subparagraphs (i) to (iv) are carried out:*
 - (vii) *Preparatory, maintenance, and repair activities associated with the activities described in subparagraphs (i) to (iv); and*
- (c) *Includes-*
- (i) *A tourist mining operation:*
 - (ii) *A tunnelling operation; but*
- (d) *Does not include-*
- (i) *Exploring for minerals:*
 - (ii) *An alluvial mining operation:*
 - (iii) *A mining operation wholly on or under the seabed on the seaward side of the mean high-water mark:*
 - (iv) *A quarrying operation.*

The Regulations have definitions for two types of opencast mining operations:

- > **Opencast coal mining operation** means any mining operation associated with the extraction of coal and where no person works underground.
- > **Opencast metalliferous mining operation** means any mining operation associated with the extraction of minerals and where no person works underground.

In this document, these types are collectively called “opencast mines”.

You should get legal advice if you are unsure whether your operation is a mining operation

or a particular type of mining operation as defined by section 19M of the HSE Act or the Regulations. For the purpose of this document, an opencast mine includes:

- > all the workings when exploring for coal
- > all the surface extraction workings, including preparatory and abandonment works, associated with the opencast mine
- > tips (or dumps), including stockpiles, associated with the opencast mine
- > settling ponds or tailing dams associated with the opencast mine
- > areas used for the processing of extracted materials (including crushing, screening, washing, drying, bagging and ore processing)
- > the buildings and structures at the mine that are used for the working of the mine
- > common areas (eg roadways and railways, but not public roads or railways under the control of a rail company)
- > an opencast tourist mining operation.

For the purpose of this document, tunnelling operations and underground mines are not considered opencast mines.

1.5 INTERPRETATION

The HSE Act requires duty holders to have effective ways of managing health and safety. Duty holders are not legally required to use this guidance, but it will help them to comply with the intention of the law. Alternative methods may be used, but these should be at least as safe, or better, than those set out within.

This document brings together legal obligations with other recommendations that are not legal requirements but are good practice. For the purposes of this document “must” means the instruction is a mandatory legal obligation. Should means it is recommended to be adopted where practicable.

The requirements for PHMPs and PCPs within the Regulations do not apply to alluvial mines and quarries.

1.6 SAFETY CRITICAL ROLES

OPENCAST MINES

MINE OPERATOR

The mine operator must appoint a site senior executive (SSE) who has responsibility for managing health and safety at the operation. The SSE may be appointed to more than one mine if the mine operator is responsible for more than one operation or site. The SSE's responsibilities include appointing other safety critical roles.

SITE SENIOR EXECUTIVE

The SSE must hold a certificate of competence as a site senior executive. The SSE's duties include:

- > developing, implementing and maintaining the HSMS at the mining operation
- > making sure a risk appraisal and risk assessment process are developed and used in the HSMS
- > appointing other safety critical roles.

The mine operator must provide the resources so the SSE can carry out his or her duties.

MINE MANAGER

A mine manager for an opencast coal mine or a mine where more than 4 workers ordinarily work at any one time must hold an A-grade certificate of competence as a mine manager. Otherwise, they must hold a B-grade certificate of competence as a mine manager. The mine manager's duties include:

- > managing the mining operation
- > supervising the health and safety aspects of a mining operation.

OTHER SAFETY CRITICAL ROLES

The SSE must appoint staff to carry out other safety critical roles including:

- > ventilation officer
- > electrical superintendent
- > mechanical superintendent.

QUARRYING AND ALLUVIAL MINES

Quarrying and alluvial mining operators must appoint a quarrying or alluvial mine manager, as appropriate. Their duties include:

- > managing the mining operation
- > supervising the health and safety aspects of a mining operation.

A quarrying manager at a site where more than four workers ordinarily work at any one time must hold an A-grade certificate of competence as a quarry manager. Otherwise, they must hold a minimum of a B-grade certificate of competence as a quarry manager.

An alluvial mine manager at a site where more than four workers ordinarily work at any one time must hold an A-grade certificate of competence as an alluvial mine manager. Otherwise, they must hold a minimum of a B-grade certificate of competence as an alluvial mine manager.

More information on what is required for a certificate of competence is available on the WorkSafe website.

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HAZARD MANAGEMENT SYSTEM

IN THIS SECTION:

- 2.1 Applicable legislation: hazard management in the HSE Act and the Regulations**
- 2.2 The health and safety management system (HSMS)**
- 2.3 Identifying hazards and analysing risk**
- 2.4 Risk assessment**
- 2.5 Principal hazard management plans and principal control plans**
- 2.6 Hazard control**
- 2.7 Hazard monitoring**
- 2.8 Responding to hazard reports**
- 2.9 Accident recording, notification and investigation**

Ensuring hazards do not cause harm is the basis of health and safety in any workplace. A hazard management system is how you identify and control hazards in your workplace.

This section describes:

- > the legislative requirement to have a health and safety management system (HSMS)
- > the components your HSMS needs to have
- > the legislative requirement to identify hazards and manage certain hazards using a principal hazard management plan (PHMP)
- > the basic concepts of hazard identification, risk assessment, and hazard management
- > the legislative requirement to record and investigate accidents.

2.1 APPLICABLE LEGISLATION: HAZARD MANAGEMENT IN THE HSE ACT AND THE REGULATIONS

The HSE Act covers all workplaces and requires employers to take all practicable steps to ensure the health and safety of employees and others while at work. It also places health and safety duties on others, such as mine operators, principals, self-employed persons, and employees.

The Regulations have specific provisions for health and safety in mining operations. This includes opencast coal and mineral operations.

For quarrying and alluvial mining operations, the Regulations only address competency requirements. They should, however, be considered good practice.

The HSE Act refers to significant hazards and the Regulations refer to principal hazards. A significant hazard is a hazard that is an actual or potential cause or source of any of the following:

- (a) Serious harm.
- (b) Harm (being harm that is more than trivial) the severity of whose effects on any person depend (entirely or among other things) on the extent or frequency of the person's exposure to the hazard.
- (c) Harm that does not usually occur, or usually is not easily detectable, until a significant time after exposure to the hazard.

A principal hazard is defined in Reg 65 of the Regulations. In summary, a principal hazard is any hazard that could create a risk of multiple fatalities at a mining operation, either in a single accident or in a series of recurring accidents.

All principal hazards will be significant hazards under the HSE Act. However, there are likely to be many more significant hazards than there are principal hazards.

A mining operation must have a principal hazard management plan (PHMP) for each principal hazard, and a principal control plan (PCP) where specified in the Regulations.

While alluvial mines and quarries are not legally required to determine principal hazards, WorkSafe highly recommends you follow the guidance given for principal hazards, where risks at your operation could result in multiple fatalities. For the purposes of this guidance we will describe hazards that could create a risk of multiple fatalities as principal hazards.

2.2 THE HEALTH AND SAFETY MANAGEMENT SYSTEM (HSMS)

Mining operations must have a HSMS, including opencast mines. WorkSafe recommends alluvial mines and quarries have a HSMS.

The HSMS is to set out a level of detail appropriate for the nature, size, complexity and hazards of the mining operation, and any other relevant matters.

Different approaches and formats may be used to develop a HSMS. Regardless of the structure adopted for the HSMS, it must include a systematic approach to hazard management and should be part of, and integrated with, the overall management system.

Where the Regulations require an HSMS to be developed, it must include:

- > A health and safety policy.
- > The process used to identify hazards, assess the risk of harm, and to identify controls to manage these. This could include a standard operating procedure (SOP).
- > How reporting and recording health and safety information will be achieved, including setting of key performance indicators and investigation of accidents.
- > A description of the systems, procedures and other risk control measures in place to manage hazards and to respond to increased levels of risks. This could include a trigger action response plan (TARP).
- > How material changes that may create hazards will be identified.
- > The health and safety management structure, including competency requirements and how temporary and permanent vacancies will be filled, and competency requirements for acting positions in the structure.
- > Monitoring and audit matters as required by regulation 57 of the Regulations.
- > How monitoring of health and safety of mine workers will be performed.

- > The PHMPs and PCPs required.
- > How monitoring, assessment and inspections of working places will be undertaken.
- > Any other requirements of the Regulations.

For more detailed information on the content of the HSMS see regulation 56 of the Regulations. For more detailed information on developing HSMS, see the WorkSafe:

- > *Guidance for a Hazard Management System for Mines.*
- > *Fact Sheet: A Hazard Management System for Mining Operations.*
- > *Guide to Developing Safety Management Systems for the Extractives Industry.*

Further information can also be obtained from Standards New Zealand (*AS/NZS 4804 Occupational Health and Safety Management Systems – General Guidelines on principles, systems and supporting techniques* and *AS/NZS 4801 Occupational Health and Safety Management Systems – Specification with guidance for use*).

The HSMS must be developed in consultation with workers at the site. It must be easily understood and made available to all workers.

The HSMS must be in place for:

- (a) **Coal mines** – from the start of exploration activities until the abandonment of the mine.
- (b) **Metalliferous mines** – from the start of physical development, including construction of mining infrastructure and earthworks, until the abandonment of the mine.

2.3 IDENTIFYING HAZARDS AND ANALYSING RISK

You must ensure an effective method is in place to systematically identify and regularly assess hazards to workers at your site.

Section 7 of the HSE Act outlines the process for employers to identify and assess hazards.

Regulation 54 of the Regulations outlines the process of risk appraisal for mining operations, which are additional to section 7 of the HSE Act.

Regulations 65–66 of the Regulations outlines the process for identifying principal hazards in a mining operation.

There are a number of ways to identify hazards. Some of these include:

- > **Physical inspections:** inspect the workplace and assess where someone could get hurt.
- > **Task and process analysis:** identify the hazards involved in each task. This should include what happens when intervention is required (eg breakdowns). Identify hazards at each stage of the production process.
- > **Best practice guidelines and standards**
- > **Hazard and operability study (HAZOP)**
- > **Accident investigation analysis:** identify hazards and causes of harm from investigations involving similar types of work.
- > **Near miss, audit or inspection analysis:** trends or common problems can be identified from near miss reports, audits or inspections. Analysis of these reports may show locations that are more dangerous and indicate problems with the design and layout of that work area or the way work is carried out there.
- > **Work environment monitoring:** For example, noise assessment, air quality assessment.
- > **Analytical techniques for calculating the hazard:** For example, geotechnical data for ground stability.

2.4 RISK ASSESSMENT

A risk assessment involves considering what could happen if someone is exposed to a hazard and the likelihood of it happening. It is part of the requirements for all workplaces

under the HSE Act. The mine operator must ensure risk assessments are carried out, and the Site Senior Executive is responsible for carrying out the risk assessment.

A risk assessment can help you determine:

- > how severe a risk is
- > whether existing control measures are effective
- > what action you should take to control it
- > how urgently action needs to be taken.

Risk is a measure of the consequence and likelihood of a negative effect on the safety of people, equipment and infrastructure, or the environment. The likelihood of occurrence and consequences is generally used to estimate risk. Risk assessment can be either qualitative (ie rankings or descriptive indicators) or quantitative (ie numerical estimates).

Some hazards that have exposure standards, such as noise and airborne contaminants, may need scientific testing or measurement by a competent person. This is to accurately assess the risk and to check the relevant exposure standard is not being exceeded (eg noise meters to measure noise levels and dust deposition meters to measure airborne dust).

Similarly geotechnical or ground failure risk may be a complex issue and require a competent person for assessment.

1. Regulation 55 of the Regulations outlines the requirements for risk assessment for mining operations.
2. Regulation 82 of the Regulations outlines additional requirements for risk assessment for tips, ponds and voids.
3. Regulation 76 of the Regulations outlines additional requirements for risk assessment for work in the inrush control zone.
4. Regulation 80 of the Regulations outlines additional requirements for risk assessment for roads and other vehicle operating areas.

5. Regulation 105 of the Regulations outlines additional requirements for risk assessment for emergency management planning.

More detailed information on risk assessment is available in:

- > *AS/NZ 4804 Occupational Health and Safety Management System - General guidelines on principles, systems and supporting techniques Section 4.3.4.*
- > *AS/NZS ISO 31000 Risk Management - Principles and Guidelines.*
- > *MDG 1010 Minerals Industry Safety and Health Risk Management Guideline.*

2.5 PRINCIPAL HAZARD MANAGEMENT PLANS AND PRINCIPAL CONTROL PLANS

A principal hazard is one that could cause multiple fatalities, either in a single accident or in a series of recurring accidents. The Regulations list some things that may cause principal hazards, but is not exhaustive.

2.5.1 PRINCIPAL HAZARD MANAGEMENT PLANS (PHMP)

A PHMP sets out the measures that will be used to manage a particular principal hazard. A PHMP must be in writing and include:

- > the nature of the principal hazard
- > the roles, responsibilities and competencies required to implement the PHMP
- > any other matter required by the Regulations in relation to particular principal hazards.

It must also include a description of:

- > how risk assessments will be conducted and the result of any completed
- > the control measures to be implemented to manage it and the risk of harm it presents
- > how any specific requirements in the regulations (if any) will be complied with
- > emergency preparedness for the principal hazard

- > the review and audit processes for the PHMP.

See the Regulations for the full requirements, including requirements specific to each PHMP.

A PHMP is required for each principal hazard regardless of the likelihood of an accident.

A PHMP should show the risk, after controls and monitoring, is reduced by “all practicable steps” as per the HSE Act.

If a particular principal hazard is not present, a PHMP will not be required for it. A PHMP is still required for mining operations where:

- > explosives are used
- > a tip is located on a slope, and is greater than 15 meters in height and 100,000 m³ in volume.

2.5.2 PRINCIPAL CONTROL PLANS (PCP)

The purpose of a PCP is to link the duties and functions of the people, the equipment and the environment in which they operate. Some control measures may be used to control the risks associated with more than one hazard. This may include principal hazards and significant hazards. These can be put together as a PCP which will set controls for the whole mine. The PCP must explain the control measures to be taken.

A PCP will not necessarily provide all the controls for a particular hazard. For example, the controls needed for a principal hazard may be provided by one or more PCPs, plus specific controls in a PHMP.

A PCP should show the risk, after controls and monitoring, is reduced by “all practicable steps” as per the HSE Act.

Not all PCPs are required for all mining operations and you will need to refer to the Regulations for specific details.

The following is a list of PCPs that may be required for opencast mines:

- > mechanical engineering
- > electrical engineering
- > emergency management
- > worker health.

Although not required by the Regulations, WorkSafe recommends that surveying requirements should be covered by a PCP.

2.6 HAZARD CONTROL

The ways of controlling hazards are ranked from the highest level of protection and reliability to the lowest as shown in Figure 1. This is known as the hierarchy of control. Sections 8-10 of the HSE Act require employers to work through this hierarchy when managing significant hazards (which includes principal hazards).



Figure 1: Hierarchy of controls

LEVEL 1 CONTROL METHODS - ELIMINATION

The most effective control measure is to eliminate the hazard and associated risk. You must always aim to eliminate a hazard, where reasonably practicable. The best way to do this is by not introducing the hazard into the workplace. For example, you can eliminate the risk of a fall by doing the work at ground level.

Eliminating hazards is often cheaper and more practical to achieve at the design or planning stage. In these early stages, there is greater scope to design out hazards or incorporate risk control measures that are compatible with the original design and functional requirements. For example, a noisy machine could be designed and built to produce as little noise as possible, which is more effective than providing workers with personal hearing protectors.

You can eliminate risks by removing the hazard completely; for example, by removing trip hazards on the floor or disposing of unwanted chemicals.

It may not be possible to eliminate a hazard if doing so means that you cannot make the end product or deliver the service. If you cannot eliminate the hazard, then eliminate as many of the risks associated with the hazard as practicable. This may include substituting the hazard with something safer; for example replacing solvent-based paints with water-based ones.

LEVEL 2 CONTROL MEASURES - ISOLATION

If it is not reasonably practicable to eliminate a hazard and associated risk, you must reduce the risk by isolating people from the hazard. This involves physically separating the source of harm from people by distance or using barriers. For example, you could install guard rails around exposed edges and holes in floors, use remote control systems to operate machinery, or store chemicals in a fume cabinet.

Isolation controls can include engineering controls. Engineering controls are physical in nature, including a mechanical device or process. For example, you could use mechanical devices such as trolleys or hoists to move heavy loads, place guards around moving parts of machinery, install residual current devices (electrical safety switches) and so on.

LEVEL 3 CONTROL MEASURES - MINIMISATION

Minimisation control measures do not control the hazard at the source. They rely on human behaviour and supervision, and used on their own, tend to be least effective in minimising risks. Two approaches to reduce risk in this way are:

- > Administrative controls: work methods or procedures that are designed to minimise exposure to a hazard; for example, developing procedures on how to operate machinery safely, limiting exposure time to a hazardous task, using signs to warn people of a hazard.

- > Using Personal Protective Equipment (PPE): for example, ear muffs, respirators, face masks, hard hats, gloves, and safety glasses. PPE limits exposure to the harmful effects of a hazard, but only if workers wear and use the PPE correctly.

Only use administrative controls and PPE:

- > where no other practicable controls are available (as a last resort)
- > as an interim measure until a more effective control can be used
- > to supplement higher level controls (as a back-up).

When a significant hazard can only be minimised, section 10 of the HSE Act requires employers to monitor employees' exposure to the hazard and monitor their health. Employers must take all practicable steps to get their employees informed consent to conduct this health monitoring. They can only perform monitoring with this informed consent.

With changes in technology and cost of controls over time, methods to eliminate and isolate a hazard may become practicable. You must continue to assess significant hazards that are being minimised to determine whether other methods are available to control them. For example, replace or upgrade older vehicles with ones with better safety devices such as anti-lock brakes, traction control and retarders.

2.7 HAZARD MONITORING

You must regularly review your operations to identify any new hazards that may have arisen. You must also review the controls you have in place to ensure the controls are still effective.

In addition to your duties under the HSE Act, mine operators, mining operations and SSE's have other responsibilities under the Regulations to audit and review hazard controls.

Regulations 57-59, 69, 70, 75, 82, 89, 94, 95 of the Regulations outline the process of review and auditing for mining operations.

2.8 RESPONDING TO HAZARD REPORTS

Mine operators must ensure hazards reported by mine workers are investigated. This must be completed as soon as practicable, with regard to the seriousness of the hazard (see the box below).

Regulation 115 Mine operator must investigate reported hazard

- (1) If a mine worker reports the existence of a hazard in the mining operation, including (without limitation) any action done or not done in contravention of any system, procedure, or other risk-control measure in place at the mining operation to control a hazard, the mine operator must ensure that the report is investigated.
- (2) The investigation must be completed as soon as practicable, having regard to the seriousness of the hazard.

Regulation 116 Mine operator must advise mine worker of result of investigation

When the investigation required by regulation 115 is completed, the mine operator must ensure that the mine worker who reported the hazard is promptly advised of the result of the investigation.

Hazard notices may be issued by trained site health and safety representatives in accordance with section 19ZF of the HSE Act.

2.9 ACCIDENT RECORDING, NOTIFICATION AND INVESTIGATION

Section 25 of the HSE Act outlines your duties regarding accident recording and notification. In summary you must:

- > maintain a register of accidents and serious harm
- > notify WorkSafe as soon as possible if serious harm or any of the accidents described in regulations occur

- > give WorkSafe written notice of the accident and the circumstances it occurred in.

The register of accidents must include accidents that might have harmed (eg near miss incidents).

Mine operators have additional duties described in the box below.

Regulation 226 Register of accidents and serious harm

- (1) The mine operator must record the particulars of the following in relation to any mine worker:
 - (a) every accident that harmed (or, as the case may be, might have harmed) the mine worker at the mining operation; and
 - (b) every occurrence of serious harm to the mine worker at work, or as a result of any hazard to which the mine workers was exposed while at the mining operation.
- (2) For each accident or occurrence of serious harm, the particulars prescribed in Schedule 7 must be recorded in a register of accident and serious harm maintained by the mine operator.
- (3) The mine operator must ensure that a copy of the register is provided to WorkSafe at intervals of not more than 6 months.
- (4) For the avoidance of doubt, a mine operator is not required, in relation to any mine worker, to maintain a separate register of accidents and serious harm under section 25(1) or (1B) of the Act.

Regulation 227 Notification of accidents and serious harm

- (1) For the purpose of section 25(2)(b) of the Act, every accident specified in Schedule 8 is required to be notified to WorkSafe if the accident occurs at a mining operation.

- (2) For the purpose of section 25(3)(b) of the Act, the mine operator must notify the following to WorkSafe:
 - (a) Every accident specified in Schedule 8 if the accident occurs at the mining operation; and
 - (b) Every occurrence of serious harm at the mining operation.
- (3) The mine operator must notify the accident or serious harm to WorkSafe by providing the particulars prescribed in Schedule 7 to WorkSafe.
- (4) The mine operator must also provide the particulars of the accident or serious harm, except for personal information about any mine worker, to every site health and safety representative at the mining operation.
- (5) WorkSafe must make the particulars of the accident or serious harm, except for personal information about any mine worker, available to industry health and safety representatives.
- (6) For the avoidance of doubt, a mine operator is not required, in relation to any mine worker, to separately notify the accident or serious harm to WorkSafe on the basis that the mine worker is an employee of a self-employed person contracted to the mine operator.

The HSE Act requires employers to investigate accidents or harm that have been recorded in the accident register (as per section 25 of the HSE Act) whether or not it was caused by or arose from a significant hazard. The Regulations place additional duties on mine operators to investigate accidents.

Accident investigations should identify controls to prevent the same or similar incidents reoccurring.

Employers must investigate any accidents or harm to determine whether a significant hazard was involved¹.

Regulation 228 Accident Investigation

- (1) The mine operator must ensure that-
 - (a) any accident at the mining operation is investigated; and
 - (b) the investigation findings are made available to the mine workers at the mining operation.
- (2) If the accident is a notifiable accident, the mine operator must ensure that a report of the investigation findings is provided to WorkSafe within 30 days of the date on which the accident occurred.
- (3) A procedure for making findings available to workers must be included in the health and safety management system.
- (4) Nothing in this regulation affects section 7(2) of the Act.

2.9.1 OTHER NOTIFICATIONS

Mining operations must notify WorkSafe of a number of matters, including:

- > the commencement, recommencement, installation or cessation of the operation
- > the proposed date of installation of:
 - a shaft
 - a winding system
- > the appointment of
 - an SSE
 - an acting SSE
 - a mine manager
 - acting mine manager
- > any of the notifiable accidents set out in Schedule 8 of the Regulations
- > any of the high-risk activities set out in Schedule 9 of the Regulations.

¹ The HSE Act, section 7

Mine operators also have obligations to submit draft PHMPs and PCPs to WorkSafe.

Quarries and alluvial mines must notify WorkSafe about the nature of the operation, its location, and the name of the relevant manager for the operation. The zone of operation for mobile crushing plant operating over an area should be notified to WorkSafe, along with the details for the relevant manager.

More details of what must be notified, as well as the contact details, and notification form, are available under the Extractives section of the WorkSafe website.

2.10 HAZARDOUS SUBSTANCES

Many chemicals and fuels used in extractive operations are hazardous and are controlled under the Hazardous Substances and New Organisms Act 1996 (HSNO).

Hazardous substances used in the extractive industry include:

- > explosives and detonators
- > compressed gases
- > petrol, diesel and liquefied petroleum gas (LPG).

2.10.1 HAZARD CLASSIFICATIONS, APPROVALS AND CONTROLS

Hazardous substances are classified according to their hazardous properties. Hazardous substances may have one or more the following properties:

- > explosive – hazard class 1
- > flammable – hazard classes 2, 3 and 4
- > oxidising – hazard class 5
- > toxic – hazard class 6
- > corrosive – hazard class 8
- > toxic to the environment (ecotoxic) – hazard class 9.

All hazardous substances must be approved by the Environmental Protection Authority (EPA) under HSNO. An approval lists the controls, or rules, that apply to the substance so that the risks to people and the environment are safely managed.

Controls cover:

- > packaging and labelling
- > information about hazardous substances – safety data sheets
- > protective clothing and equipment
- > safe storage of hazardous substances including:
 - warning signs
 - container types
 - storage location and construction
 - certification of storage locations and containers
- > training and certification for people who use hazardous substances, including approved handler certification and controlled substance licenses
- > tracking the most hazardous substances, including explosives
- > emergencies including:
 - fire extinguishing
 - spill and leak control
 - planning for emergencies.

2.10.2 PERSON IN CHARGE

HSNO requires a person in charge at all workplaces to manage hazardous substances. They must make sure that the HSNO controls are complied with.

2.10.3 STAYING SAFE WITH HAZARDOUS SUBSTANCES – WHERE TO START

You need to know what hazardous substances you have and how to manage them. Product labels and safety data sheets (SDSs) provide

information about the product's hazards and how to manage them. Manufacturers and suppliers must only sell correctly labelled substances and must provide compliant and up to date SDSs for hazardous substances.

SDSs contain important information about:

- > first aid
- > storage
- > cleaning up spills
- > the right protective equipment.

Make sure you have SDSs for all your hazardous substances. Contact your supplier who must provide them.

Which controls you have to follow depends on the type and amounts of hazardous substances you have. Make a list, or inventory, of all the hazardous substances you have, the amounts you have, their hazards and approval numbers. The approval number should be on the SDS. You can use the information in your inventory on the *HSNO Calculator* (www.hazardoussubstances.govt.nz) and the *Approved Hazardous Substances with Controls Database* with on the Environmental Protection Authority website (www.epa.govt.nz).

2.10.4 WHERE TO GET MORE INFORMATION

The Hazardous Substances website (www.hazardoussubstances.govt.nz) provides information on hazardous substances and controls. It also has the HSNO calculator.

The Environmental Protection Authority's website (www.epa.govt.nz) contains information about hazardous substance approvals.