SUBMISSION OF

THE NEW ZEALAND MINING INDUSTRY

SAFETY COUNCIL (MinEx)

TO WORKSAFE

ON

SECOND DRAFT BEST PRACTICE GUIDELINES - HEALTH AND SAFETY AT SURFACE MINES, ALLUVIAL MINES AND QUARRIES 2014

28 OCTOBER 2013

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Submission

WorkSafe Draft Best Practice Guidelines - Health and Safety at Surface Mines, Alluvial Mines and Quarries 2014

INTRODUCTOIN

MinEx[1] welcomes the opportunity to submit on the second draft of the WorkSafe discussion document "Health and Safety at Surface Mines, Alluvial Mines and Quarries November 2014". We note the extended submission deadline of 28 October 2014.

EXECUTIVE SUMMARY

The second draft of the guidance is a significant improvement over the first draft and it is pleasing to see that WorkSafe have responded to our first submission in a positive way.

Our submission consists of two parts:

- General comment on each section; followed by,
- Detailed comments on the complete document.

This submission is the result of consultation with the industry via a number of channels:

- The AQA website and an email to AQA members;
- The IOQ website and an email to IOQ members;
- An email to MinEx members;
- An email to AusIMM members; and,
- Liaison with Minerals West Coast who canvassed their members.

A review group was established by MinEx for the first draft of the guidance and this same group, apart from a change in the stone cutting representative, reviewed this second draft. The review group appears in Attachment I.

Attachment II lists the other parties that WorkSafe has been consulting with on the guidance. MinEx asked these groups to participate directly in the MinEx process. Civil Contractors NZ (previously the Contractors Federation) and the EPMU elected to participate with us in the review of the document. The other groups were provided draft and final copies of this submission. The Forestry Owners Association supplied their brief email submission to us.

From the 13 October industry review group meeting and the detailed submissions supplied by the companies in Attachment III, MinEx developed the detailed submission that appears in Attachment VII which is summarised below.

Overall the document:

- Is a significant improvement over the first draft; but it,
- Contains some sections that are written at a technical level well above what is considered appropriate for the target audience;
- Uses confusing language to deal with the issue of coverage of the 2013 regulations which can be easily corrected; and,
- Contains some guidance that the industry does not agree with.

[1] MinEx is MinEx is a national Health & Safety Council for the New Zealand minerals industry. Its main purpose is to help industry to improve its health and safety performance, and to provide centralised industry representation on matters relating to health and safety.

OTHER SUBMISSIONS

We have received an email submission from the Forest Owners Association. They commented that the document was overly prescriptive in places which aligns with our view. They questioned the need for fire suppression on all mobile vehicles as does MinEx.

We have included all of the Civil Contractors' submissions here.

RECOMMENDATIONS

Section 1 - Introduction

1 Needs to address the issue of coverage explicitly and in a simple manner that makes it clear throughout the document how those covered by the 2013 regulations and those not covered should respond to the guidance.

2 Needs to exclude civil earthworks from the scope of the guidance and some wording is supplied.

Section 2 - Identify, Assess and Control Hazards

3 Needs to be completely rewritten to remove the confusion caused by poor use of language and confusion over risk management concepts and how they fit into the regulations.

Section 3 - Planning for Excavation

4 Needs to be completely rewritten as much of the content is excessively technical and beyond the level of understanding, indeed the need for understanding, of the target audience and as detailed in the following recommendations.

5 Needs simple guidance on a hierarchy of geotechnical assessment as risk and complexity increases and which deals with what is required as well as who is a competent person to perform the geotechnical assessment and this needs to be integrated into the risk assessment process.

6 The prescriptive and arbitrary parameters around triggers to complete a geotechnical assessment in 3.2 need to be removed and the process managed according to recommendation 5.

7 The technical detail on geotechnical modelling needs to be simplified and addressed at the target audience.

8 The arbitrary slope criterion in 3.6.1 of 27^{o} needs to be removed.

9 The arbitrary storm event criterion of 1 in 100 in 3.6.5 needs to be removed.

Section 4 - Planning for Tips, Stockpiles, Ponds and Dams

10 The confusing and inconsistent language used needs to be improved.

11 The arbitrary criteria in 4.1 and not contained in the regulations used to trigger a principal hazard management plan for tips, ponds and voids need to be removed.

12 Because the section deals with planning for tips, the material on end tipping, which is operational, needs to be shifted to section 10.

Section 5 - Planning for Roads and vehicle operating areas

13 The confusion over edge protection for roads and windrows for end tipping needs to be resolved by explaining the two applications.

14 The prescriptive 1.5m height on edge protection should be removed and the height established by a risk assessment.

15 The requirement for lighting of all intersections should be removed and replaced with a need to complete a risk assessment for intersection lighting.

Section 8 - Explosives

16 This whole section needs to be rewritten as it contains far too much detail, lacks sufficient information on transport and storage, some of the terminology is confusing, there is no guidance on what is required in the PHMP-Explosives and it does not address the most commonly used initiating systems.

17 The section, or a new section, needs to address drilling.

Section 9 - Controlling Ground Instability in Excavations

18 The section needs editing to remove the excessive detail at a level higher that that suited to the target audience.

19 There is insufficient guidance on mining through underground workings.

20 In particular, the section on monitoring is too detailed and too technical for the target audience and the need for and level of monitoring is a matter for risk assessment.

Section 10 - Tipping (or Dumping)

21 The material on end tipping included in section 4 needs to shift to this section.

22 The confusion caused by including material that permits end tipping and then including, at a paragraph in 10.2.4, a comment on best practice that essentially rules out end tipping, needs to be removed by deleting the reference in 10.2.4.

23 More material is required to address reclaiming from live stockpiles as against dumping on a tip.

Section 12 - Traffic Management

24 The requirement for all mobile plant to have fire suppression fitted should be replaced with a requirement to address this need through a risk assessment.

25 The requirement to park plant up with CCTV and proximity sensors fitted when this equipment is not operating should be removed.

Section 17 - Emergency Management

26 The relatively minor edits supplied by Mines Rescue should be taken up.

Missing Section

27 A section on cranes and lifting would be useful and in particular the use of front end loaders and excavators as lifting tools. This is an area where potentially fatal incidents have occurred in the past.

SECTION BY SECTION DISCUSSION

1. Introduction

There is inconsistent use of terms to describe the various surface mines and we suggest you stick to the three used in the section heading – opencast mines, alluvial mines and quarry operations.

The introduction needs to deal with the issue of coverage of the 2013 regulations. Quarries and Alluvial mines are not covered while all other sectors are. There is confusion in the document around the terms *must, should, highly recommended* and so on which needs to be resolved by defining these in terms of sector coverage for the 2013 regulations.

Having done this some discipline needs to be applied in how these words are used throughout the document. It might be best to dispense with the *must/should* distinction and simply use *should* after defining that this means different things to sectors covered and sectors not covered by the 2013 regulations.

This would be strengthened by a clear statement that the Quarry and Alluvial mine sectors should treat the 2013 regulations as best practice guidelines as this then has some legal standing. It is after all what they are.

The definitions for mines, quarries and alluvial mines are included but in our submission on the first draft we sought guidance on the issue of facilities associated with surface mines that are:

- On the site but not under the direct control of the quarry operator like a concrete plant purchasing aggregate from the quarry operator or an explosive batching plant supplying explosives to the surface mine operator; and,
- Off the site and under the control of the operator like a processing plant linked to the operation by a conveyor that uses the operation's output as most of its feed or a blending plant located some distance away that uses more than one operator's material as feed.

This has not been provided and is already an area of confusion.

Section 1.3 is problematic for our industry and for general contractors. The first draft had an exclusion for civil earthworks which has been removed. The problem for civil contractors lies in the definition of a quarry:

> ***19N Meaning of quarrying operation***
>
> *(1) In this Act,* ***quarrying operation*** *—*
>
> *(a) means an activity carried out above ground for the purpose of—*
>
> *(i) extracting any material, other than any coal or any mineral, from the earth; or*
>
> *(ii) processing any material, other than any 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.*

Subsection (2) highlighted is the problem since it brings in civil earthworks for a wide range of situations into the meaning of a *Quarry Operation*. Section 1.3 needs to include an exclusion for these types of activities and we suggest the following:

> ***Excavations associated with construction work***
>
> *These guidelines do not cover excavations made solely for the purpose of carrying out any building, civil engineering or engineering construction work including where the extracted material is used on the site at which the extraction has taken place except where the extracted material used is rock which is processed into aggregate and is used on the site or exported for use elsewhere*

2. Identify, Assess and Control Hazards

This section contains much new material not included in the first draft.

The current H&S Act is written around controlling hazards. The 2013 Regulations are written around controlling risk. The new H&S Act will be written around controlling risks since that is the language used in the Australian model legislation which is what our new Act is derived from.

This whole section is confusing:

- Due to poor use of language;
- A lack of clear definitions of the terms being used; and,
- Indicates a lack of understanding of the subject matter.

This section is very important as it sets the scene for the rest of the document. The key message to get across is that the new regime is risk based. Everything you do in health and safety management needs to be driven by this principle.

2.1 Health & Safety Management Systems: This section is very confusing because the language is confusing & inconsistent with the subject matter. It needs to be rewritten to make it clearer.

2.2 Identifying Hazards and risk appraisal: This section is crying out for some definitions. Risk appraisal is hazard identification so the title is wrong but then the content doesn't reflect the title anyway. I think this heading needs to be Risk Management followed by sections on:

Risk appraisal - defined by regulation 54 as the process of identifying hazards but which needs to do more than this. The risk appraisal should in fact be a **Broad Brush Risk Assessment**. This looks at the whole of the mining operation at a high level to identify hazards. A risk register is developed and used as a baseline with which to further develop more detailed risk assessment and controls. This process identifies critical hazard areas that require principal hazard management plans (PHMPs), principal control plans (PCPs) and standard operating procedures to be developed.

Risk identification - defined by NZS/AS 31,000:2009 as determining the risks that are associated with the hazards

Risk analysis - defined by NZS/AS 31,000:2009 as determining the likelihood and consequences for each risk

Risk evaluation - defined by NZS/AS 31,000:2009 as determining the risk rankings to determine which need treating and with what priority

Risk assessment - defined by NZS/AS 31,000:2009 as being risk identification, analysis and evaluation

Risk treatment - defined by NZS/AS 31,000:2009 as being the assessment and selection of appropriate risk controls based on the hierarchy of controls

This is what NZS/AS 31,000:2009 contains which is the risk management standard.

You can then introduce the PHMP & PCP concepts as part of the risk assessment process - they will throw up the significant/principal hazards. (principal = significant). Then deal with explaining what the regulations have to say about PHMPs & PCPs.

Sections 2.3 to 2.6 need quite a bit of work to better explain the concepts.

2.7 Hazard Control: The Australian system uses a slightly different hierarchy which is not inconsistent with our Act. The preferred order of control measures, which range from the most effective to the least effective is:

> *Elimination* - removing the hazard or hazardous work practice from the mine. This is the most effective control measure;
>
> *Substitution* - replacing a hazard or hazardous work practice with a less hazardous one;
>
> *Isolation* - stopping persons from interacting with the hazard eg machine guarding, remote handling;
>
> *Engineering Control* - if the hazard cannot be removed, replaced or isolated, an engineering control is the next preferred measure. This may include changes to tools or equipment, providing guarding to machinery or equipment.
>
> *Administrative Control* - includes introducing work practices that reduce the risk. This could include limiting the amount of time a person is exposed to a particular hazard; and
>
> *Personal Protective Equipment* - should be considered only when other control measures are not suitable or to increase protection.

If a hazard, significant or otherwise, cannot be eliminated or isolated, you will need to set up controls to minimise the likelihood of harm occurring to workers.

When selecting controls, you first need to look for controls that will prevent the incident occurring (preventative). Any controls that minimise or otherwise lessen (mitigate) the consequences of the incident are only supplementary to prevention.

3. Planning for Excavation

Suffers from being poorly written which confuses the reader. It needs to be completely rewritten and needs better definitions. Figure 1 incorrectly labels the batter as a vertical dimension instead of the sloping face between catch benches. Figures 3 and 4 are poorly labelled and are confusing.

3.2 Ground or strata instability principal hazard: This section is poor written especially paragraphs 1, 2 and 3. Why the need to add *strata instability* to the term when *Ground instability* is sufficient?

Paragraph 3 sets out some prescriptive criteria on when you need to do a geotechnical assessment which are quite arbitrary. The additional criteria do not make geotechnical sense if you treat weak rock exactly the same as strong rock as stated in item (a). There are examples of strong rock where existing faces in the same material show that stable heights are possible at greater than 15m.

There is no sound basis for treating the grouping of *weak rock to strong rock* the way you have. The NZ Geotechnical Society Incorporated *Field description of soil analysis guideline (Dec 2005)* Table 3.5 Rock Strength classifications that you have grouped together cover a range from *Extremely strong to weak*. Geotechnically, there can be no justification for treating these materials in the same manner from a slope design perspective. You are grouping a very strong granite with weakly cemented gravel.

The way the need for a geotechnical assessment is presented is confusing. The term *geotechnical assessment* can cover a range of assessments, each of which requires more and more technical skill and knowledge as the risk increases.

Regulation 71 is the key here and this states:

> ***71 Principal hazard management plans for ground or strata instability***
>
> *(1) Following the identification of ground or strata instability as a principal hazard at a mining operation, the site senior executive must ensure that a geotechnical assessment is completed by a competent person to determine the level of ground or strata support required to safely conduct the mining operation.*

I have highlighted the important words:

- First complete the risk appraisal to identify principal hazards including whether this includes ground instability: and then,
- Complete a geotechnical assessment using a competent person.

This concept needs to be covered in the guidance with a geotechnical assessment ranging from:

- The preliminary risk appraisal stage which needs to consider what information is available on ground stability, and considering this and the nature of the geology, use an appropriate competent person to complete the assessment. This may not require a geotechnical engineer or an engineering geologist. A person with good mining operating knowledge of the material being excavated may well suffice at this stage.;

- A more in-depth assessment with the appropriate competent person involved if ground instability is identified as a principal hazard. This will be a more detailed study that would require an appropriate geotechnical expert and may well require investigations such as examining existing slopes in detail for back-analysis and drilling for collection of rock strength parameters and structural features; and,

- An even more in-depth investigations if risks of fatalities, structural damage to mine or other infrastructure or surface drainage features is high.

In order to ensure the reader understand the importance of selected the correct appropriate person they need guidance on this selection process as well as the need to document the process. Mine operators need to understand they need to make a proper assessment of the technical level of the competent person and document their rationale behind this.

3.3 Ground or strata instability principal hazard management plan (PHMP): The initial list has many overlapping points and so is confusing.

3.4 Site Planning: This is where the material starts to get far too technical for the target audience.

3.5 Formulation of a geotechnical model: Again too much detail. Not every site needs to create all these models and this is not clear and very few of the readers need to know this level of detail.

3.6.1 Overall slope stability: This contains a completely arbitrary slope guideline of 27^{o} which has no place in a risk management system.

3.6.2 Batter and bench design: Describes being able to use machinery to clean catch benches and being able to access monitoring stations on benches without any apparent consideration of risk and is highly inappropriate.

3.6.5 Water and surface water control: Has a completely arbitrary drainage design criteria which is well over what is normal practice in a mining operation. This is a matter for a risk appraisal and consent conditions. Regional councils have various guidelines around this. The reference to 1 in 100 year events should be removed.

4. Planning for Tips, Stockpiles, Ponds and Dams

This section suffers from the same problems as earlier sections due to confusing and inconsistent language.

Section 4.1 introduces a new list of arbitrary conditions to determine if a tip/pond/void is a principal hazard that are not contained in the regulations.

It needs to be made clear that much of this guidance is only relevant to tips/ponds/voids when they constitute a principal hazard otherwise the reader is left with thinking they need to do all of this for every such item.

Section 4.3 deals with overburden tips but does not make much use of the end tipping guidance material developed by the industry working group during 2013. Some of the material is used but it is in the wrong place. This section is headed *Planning and design criteria for tips*. The content relating to end tipping is operational and not design and should be moved to the appropriate section.

5. Planning for Roads and vehicle operating areas

There are a number of issues of detail here that are covered in Attachment VII

Of major concern is the confusion in the document over edge protection. This is partly due to the fact that the document does not distinguish between edge protection on roads and edge protection on active tip-heads.

Section 5.9.2 states:

> *Adequate edge protection should be provided where there is a drop, pond or other hazards which would put the driver, or others, at risk if the vehicle left the road or other vehicle operating area*.

This addresses the issue of risk relating to edge protection and so there seems to be little justification in then setting an arbitrary windrow height.

The height of the edge protection should be determined by a risk assessment process but the guidance at 5.3.9.2 introduces a minimum windrow height:

> *When using earthen windrows as edge protection on roads used by heavy vehicles, the minimum acceptable height of the windrow is 1.5 metres or half the wheel height of the largest vehicles – whichever is greater..*

Where does the 1.5m minimum come from? If this is purely arbitrary then why have a risk approach? We know the 1.5m is included in the UK guidelines but an arbitrary height has no place, unless qualified, in a risk management based guideline. What is a heavy vehicle? This will give rise to un-necessarily high windrows in some situations.

The words "which ever is the greater" must be deleted.

For a Cat 777 the half wheel height would make the windrow higher than 1.5m. For ADTs, the windrow may only need to be 0.9m high. For a 30in wheel the windrow would be about 0.5m high rather than 1.5m. If half wheel height has been and remains acceptable for large trucks, then the same should apply to small trucks. The windrow height should be proportional to risk based on vehicle size, and half wheel height of the largest vehicle fits all scenarios.

Also, for embankment construction using scrapers and other smaller mobile equipment, a 1.5m high windrow is neither necessary nor practical.

The requirement to light all intersections in 5.3.18 is impractical for most operations that have multiple roads and intersections. The lighting is primarily aimed at protecting pedestrians and so there is no issue with lighting around plant areas where pedestrians may be present. Similarly there is no issue with lighting at unloading and loading areas. With adequate vehicle lighting plus the use of rotating beacons the need to lighting at all intersections is not likely to increase intersection safety.

6. Worker Facilities

We have no major issues with this section.

7. Site security and public safety

We have no major issues with this section but suggest that it is not wise to advertise the fact that explosives are stored on the site at the mine gate since it may serve as an invitation. A more appropriate place can be found that both warns emergency personnel and visitors legally on the site of the use of explosives on the site.

8. Explosives

This is a new section which was not completed in the first draft of the guidance. The whole section needs to be rewritten:

- In places it contains far too much detail;
- There is insufficient information on transport and storage;
- Some of the terminology used is confusing;
- There is no guidance on what is required in the PHMP Explosives;
- It does not address some of the most commonly used initiations systems but contains material on safety fuse which very few operations use as it is not the safest initiation system; and,
- It doesn't address sleeping of loaded shots, which is a common industry practice that needs guidelines.

In our review of the first draft we recommended that this section also deal with drilling but nothing on drilling has been included in the second draft.

There is no link between this section and the regulations which requires the development of a PHMP Explosives apart from just a very brief mention of this in section 8.1. More is required.

We asked Orica to review the material and their comments are provided in Attachment VII. In summary their opinion was:

> If Section 8 is intended to be used as a "Best Practice Guideline" in the use of explosives at opencast mines, alluvial mines and quarries it has completely missed the point and needs to be re-written entirely to achieve this objective/outcome. For example, there are little or no references as to how explosives are to be stored or to be transported on these sites. It is also very brief in indicating and detailing what must be regarded as 'industry best practice' in using explosives on these sites. Security of explosives is not covered.
>
> The linkage between this document and the PHMP is unclear. The PHMP seems to be the overriding document with actual procedures in how explosives are to be managed on a site. Thus, the purpose of Section 8 is uncertain.
>
> The need or otherwise for a PHMP covering explosives and blasting should be emphasized and the broad requirements of the PHMP detailed.
>
> References are made throughout this section to other NZ regulations (eg "… in accordance with ….'; "… must comply with…"). If the requirements referenced are critical then they should be detailed in the Guideline.

9. Controlling Ground Instability in Excavations

While this section contains much useful information it contains far too much technical detail at a level higher than that which is required by most readers. The section needs to be completely rewritten. It would be better if the heading was written in the positive context, i.e. "Controlling Ground Stability in Excavations" in alignment with all other section headings. We should describe what we want, not what we don't want.

At the opposite end of the spectrum it contains far too little information on mining through underground workings which is now a common practice.

The section on monitoring contains far too much detail and fails to introduce the basic concept behind the new regulations – risk management. Most readers have been left feeling they need to do all of

this stuff but in reality a risk assessment will show that only some need to do this for parts of their operation and at a level matching the risk. In many cases slope monitoring is simple and in-expensive. In extreme cases where risk is high it can be complex and expensive.

Only a risk assessment will determine:

- If monitoring is required;
- Where it is required; and,
- What level of complexity is required?

This section leaves you thinking everyone needs lots of complex monitoring. Many surface mines have no slope monitoring because they have no need for it.

10. Tipping (or Dumping)

We have a major issue with the end tipping material. Despite the document containing some material suggesting that this practice is acceptable, the document at 10.2.4 then states:

> *It is worth repeating that to avoid the hazards associated with tipping near the edge of a pile, the best safety practice is to routinely tip back from the edge, and push the material over, preferably with a track-dozer. Track-dozers are preferred because they distribute the weight of the mobile plant over a greater area than a rubber-tyred dozer subsequently decreasing ground pressure. This practice should be encouraged. A good rule of thumb is to tip one truck-length back from the edge. Benefits of using this method are the truck drivers are not exposed to the potential hazards at the edge of the tip, and they can complete the haul quicker since they don't need to be as precise in backing and positioning the truck when they are tipping.*

This effectively states that end tipping is not best practice and should not be used. It also contradicts, through the dozer recommendation, the need to compact the outside edge of the tip-head.

An industry working group spent many hours on the subject of end tipping during 2013 and in the review of the first draft of this document we recommended that this material be used. Some has found its way into the document but all of it is negated by the statement in 10.2.4.

The statement in section 10.2.6 that “windrows should be seen as a safety extra” is a dangerous assertion and has no place in risk-based guidance.

End tipping and the controls suggested in the 2013 industry guidance are practiced extensively in the USA and Australia. Australian practice is particularly relevant since our 2013 regulations are based on the Australian mining legislation. We firmly believe that if the guidelines developed in 2013 are implemented then the risks associated with end tipping are controlled to an acceptable level.

One area of confusion is caused by a failure to distinguish between the two basic forms of tips/stockpiles:

- An overburden tip which is normally solely a dumping area; and,
- A stockpile where both dumping and reclaim occur and often at the same time.

There needs to be more guidance on stockpile management:

- To cover the situation where both reclaim and dumping occur on the same stockpile at the same time; and,
- Where road trucks are being loaded at stockpiles using frontend loaders and traffic management and loader procedures needs to be carefully controlled.

There are many matters of detail that need to be resolved and these appear in Attachment VII.

The section needs to set out clearly various responsibilities for end tipping as per the industry guidance from 2013.

11. Water or Tailings Storage

We have no major issues with this section but there are some language and detail issues.

12. Traffic Management

We have only the one major issue with this section and that relates to the requirement to fit fire suppression via 12.18.5:

> *On board Automatic Fire Suppression systems that can also be manually operated are readily available and cost effective. You should install a fire suppression system on all mobile plant and consider fitting to other vehicles as appropriate.*

Firstly the requirement is to install fire suppression on all mobile plant. Mobile plant means anything that moves under its own power so it includes trucks, excavators of all sizes down to 900 kg machines, shovels, front end loaders, drills, dozers, light vehicles and light trucks. Quite what *other vehicles* are is not defined. A vehicle has the same meaning as mobile plant (ve·hi·cle: *noun*: a machine that is used to carry people or goods from one place to another)

The matter of the need for automatic fire suppression can only be answered via a risk assessment. The issue here is entrapment by fire and for some vehicles this is very unlikely and can be controlled with less than full fire suppression on all plant. It might make sense for a large mining excavator or haul truck where getting out of the cab and off the plant is not easy.

This draft ignores our recommendation on CCTV technology relating to parking a vehicle up if it is fitted with CCTV and this is not working. It discourages companies from fitting this equipment.

The ignition key issue raised in our review of the first draft remains.

A number of other minor issues appear in Attachment VII.

13. Machinery and Equipment

We have no major issue with this section but there are many matters of detail we would like to see addressed and they appear in Attachment VII.

14. Worker Health

We have no major issue with this section but there are some matters of detail we would like to see addressed and they appear in Attachment VII.

We note that the section is more information than guidance.

15. Preventing Falls from Heights

We have no major issue with this section but there are a few matters of detail we would like to see addressed and they appear in Attachment VII.

16. Maintenance and Repairs

The content of this section is good although we have made some recommendations that should improve the content.

We note that DBT is not mandatory and Attachment V contains comment from Gough on this subject.

17. Emergency management

We asked Mines Rescue to review this section and Attachment VI contains a marked-up word version of their review.

18. Training and Supervision

Nothing major here although nothing on supervision despite the heading.

Les McCracken

CEO MinEX
28 October 2014

ATTACHMENT I – INDUSTRY WORKING GROUP

Sector	Name	Organisation/Company
All sectors	Les McCracken	MinEx
Alluvial quarry	Mike Higgins	AQA
Hard rock quarry	Chris Gray	Winstones
Hard rock quarry	Steve Ellis	Stevensons
Small scale quarries	Dean Torstonson	Orica (ex Rorisons)
Limestone quarries	Brian Roche	Ravensdown
Building stone quarry/cut	Robert Wilson	Parkside Quarries
Large scale coal	Gareth Thomas	Solid Energy
Small scale coal	Chris O'Leary	Kai Point
Large scale gold	Bernie O'Leary	OceanaGold
Large scale alluvial gold	Warren Batt	Waikaia Gold
Small scale alluvial gold	Brett Cummings	Minerals West Coast
Small scale alluvial gold and coal mines	Peter O'Sullivan	Minerals West Coast
Minerals sands mining	Andrew Gooley	NZ Steel Mining

ATTACHMENT II – OTHER PARTIES

Group	Name	Organisation/Company
Cement	Clive Halliday	Golden Bay Cement
Unions	Fritz Drissner	EPMU
Unions	Ged O'Connell	EPMU
Unions	Ray Urquhart	EPMU
Unions	Maurice Davies	AWU
Contractors	Joe Edwards	Civil Contractors NZ
Contractors	Malcolm Abernathy	Contractors Federation
Forestry	Wayne Dempster	Forestry Owners Association

ATTACHMENT III – COMPANIES WHO SUBMITTED DIRECT TO MINEX

Solid Energy

OceanaGold

Isaacs Construction

J Swapp Contractors Ltd

Orica

Winstones Aggregates

NZ Steel

Fulton Hogan

Institute of Quarrying (who assembled all of the individual member submissions into one submission)

Minerals West Coast on behalf of their members

Civil Contractors NZ

ATTACMENT IV – MINEX MEMBER COMPANIES

This submission is made on behalf of the individual companies listed in Attachment III and the following list of MinEx members.

A B Equipment Ltd
A B Lime
Atlas Quarries Ltd
Bellingham Quarries Ltd
Birchfield Coal Mines Limited
Blackhead Quarries Ltd
Bradken Resources Pty Ltd
Brightwater Engineering
Buller Coal Limited
Burkes Creek Coal
Byfords Construction Co Ltd
Christchurch Ready Mix Concrete Ltd
CRL Energy Ltd
Digger School
Downer Edi Works Ltd
Envirofert Ltd
First Break Mining & Construction Ltd
Francis Mining Co Ltd
Fulton Hogan Ltd
Glencoal Energy Ltd
Goughs
Green Vision Recycling Ltd
Groeneveld New Zealand Ltd
H G Leach & Co Ltd
Harliwich Holdings Ltd
Hauraki District Council
Higgins Aggregates Ltd
Higgins Contractors Wairarapa
Holcim (New Zealand) Ltd
Holcim (NZ) Ltd Kiwi Point Quarry
Horokiwi Quarries Ltd
Huntly Quarries Ltd
Infracon Aggregates
J Swap Contractors Ltd
K B Contracting & Quarries Ltd
Kai Point Coal Co Ltd
Kaipara Excavators
Kenroll Industrial Coal (2011) Ltd
Lake Road Quarries
Liebherr Australia Pty Ltd
Longburn Shingle Company Ltd
Materials Processing Ltd
Maungaraki Lime Ltd
McCallum Bros Ltd
McGregor Concrete Ltd
Mike Edridge Contracting Ltd
MITO
Monovale Sand Quarry Ltd
New Creek Mining
Newmont
NZ Steel
NZ Steel
Oamaru Shingle Supplies Ltd
OceanaGold
ORICA Mining Services
Origin Quarries Ltd
Perry Resources (2008) Ltd
Porritt Sand
Porter Group
Prenters Aggregates Ltd
Pukepoto Quarries Ltd
Quality Roading & Services (Wairoa) Ltd
Rangitikei Aggregates Ltd
Ravensdown Fertiliser Co-op
RealSteel
RedBull
River Run Products Ltd
Roa Mining Co Ltd
Road Metals Co Ltd
Roading New Zealand
Rock Products Ltd
Rocktec Ltd

Sandvik Mining & Construction Ltd
Selwyn Quarries Ltd
Sibelco NZ Ltd
Solid Energy NZ Ltd
Southern Aggregates Ltd
Stevenson Resources Ltd
Stevensons Mining
Taupo Scoria Ltd
Taylor Coal Ltd
Taylor's Contracting Co Ltd
The Isaac Construction Co Ltd
Total Lubricants/Oil Imports
Transdiesel Ltd
Tyreline Distributors Ltd
Victory Lime 2000 Ltd
Waiotahi Contractors Ltd
WaterCare Laboratory Services
Wharehine Ltd
Winstone Aggregates

ATTACHMENT V – GOUGHS COMMENTS ON DYNAMIC BRAKE TESTING

Les

Following the release of the draft *Best Practice Guidelines for Health and Safety in Opencast Mines, Alluvial Mines and Quarries* I have reviewed section 16.4.1.2 Brake Testing and section 16.4.1.2.1 Brake System Maintenance Strategies. In general I see no concerns with these sections with the one exception being Dynamic Brake Testing (DBT). Typically DBT has not been performed on mining equipment in NZ on an ongoing bases, although I believe there are some exceptions to this. The main reasons for a lack of testing are listed below;

Test Environment

- The ability of a site to establish and maintain a suitable stopping distance test facility at any given site.
    - Stopping distance tests alone are considered to be inaccurate due to multiple variables and therefore difficult to replicate. Reasons for this are inconsistent ground conditions and operator reaction times being variable and difficult to replicate. Many sites would simply not have adequate space to safely carry out stopping distance testing or to do so would be to operate outside of their existing site safety standards.

Test Accuracy

- The ability of a site to clearly establish the actual empty and fully laden weights of a machine being tested.
    - Stopping distances and general brake performance is significantly influenced by machine weight. To perform accurate testing you need to be able to establish the weight of the machine, both empty and loaded. Even empty weights often exceed published data due to modifications and site specific attachments in the form of different tyres and rims, bucket and G.E.T configurations, as well as body set up and wear packages. Accessibility of weighing equipment for larger equipment is often difficult and although most modern haul equipment have built in scales the accuracy of these systems still needs to be routinely checked using a weigh scale study.

Test Relevance

- The ability to obtain suitable baseline data.
    - There are published standards that can be tested against, for example ISO 3450 however it is accepted that some machines would comfortably exceed these generic minimum standards and often by a considerable amount. 'Best Practice' would be to check the equipment against OEM design standards therefore identifying any deterioration of the braking system from new rather than waiting for it to deteriorate to a generic limit. OEM design standards are often not published and therefore difficult to obtain. The road transport industry test to a published general standard rather than against the OEM design standard.

There are several standards available internationally for brake testing, these include;

- **AS 2958.1-1995** - Earth-moving Machinery – Safety, Part 1: Wheeled Machines – Brakes - This is a notably old publication. I also noted that the *Best Practice Guidelines* document referenced AS 2958.1 however Standards NZ refers to AS 2958.1 as being withdrawn and not replaced, however this standard does still appear to be current in Australia. I have informed Cathy Faulkner of this.
- **ISO 3450:2011** - Earth-moving Machinery – Wheeled or High Speed Rubber-tracked Machines – Performance Requirements and Test Procedures for Brake Systems - This standard appears to be aligned more to the manufacturer of equipment than for routine in service testing.
- **ISBN: 978 0 0947974 62 6** - Guidance on Brake Testing for Rubber-tyred Vehicles Operating in Quarries, Open Cast Coal Sites and Mines - Provides good guidance on electronic brake testing.

Another document of interest was Safety in Mines Research Advisory Committee, Brake Testing of Trackless Mobile Mining Machinery, Project Number SIM 04-05-02 - Published in 2005 this contained useful general information.

Caterpillar have published test procedures for in service testing of their brake systems. These are tests generally performed while the machine is stationary, referred to as 'static testing or drive through testing'. In addition normal tests would include the common brake wear checks as well as pressure tests of the systems. The static test applies load from the engine to the brakes, and an acceptable result of this test would be no movement of the vehicle or wheels. The desired test limit is usually defined as a given engine test RPM as the OEM knows the load being applied to the brakes at the given engine RPM. It is common place for a drive through test to be performed by the operator of a machine at the start of each shift. The advantage of the drive through test is that it eliminates variations caused by road conditions, operator variations and weight.

Caterpillar do not support dynamic brake testing, due to the increased brake wear and safety concerns for the operator. They stand by the static test as per the Operation and Maintenance Manual.

It is my opinion that the use of electronic brake testing equipment provides notable benefits over simply stopping distance tests. Electronic brake test equipment can compensate for factors such as grade and can also provide brake performance plateau levels.

It would be my recommendation that should DBT become mandatory that an industry group be established to look further into DBT and establish an accepted guide for this in NZ

Regards

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E: David.Baillie@goughcat.co.nz **| W:** goughcat.co.nz **|**

ATTACHMENT VI – MINES RESCUE COMMENTS & CORRECTIONS TO SECTION 17 EMERGENCY MANAGEMENT

17 EMERGENCY MANAGEMENT

To respond to an emergency a well thought out and practiced emergency ~~response~~ plan must exist together with sufficient infrastructure, training and resources.

To respond to an emergency a well thought out and practiced emergency management plan must exist together with sufficient infrastructure, training and resources.

Comment [t1]: Use of the words emergency management plan important for consistency (EMP used elsewhere in this document

Emergency events will occur. Every site must plan for these events~~. They are generally incidents that may seem unlikely to occur but with potentially high consequences.~~

An emergency is defined as a situation that poses immediate risk to life, health, property or the environment. Emergencies range from minor to potentially high consequence incidents.

Emergency management has four main components known as the '4R's' ~~cycles~~ which can take place singularly or simultaneously. The standard pattern is risk reduction, ~~mitigation,~~ readiness, ~~preparedness,~~ response and recovery.

Comment [t2]: these words are consistent with emergency management terminology (i.e. CIMS)

~~**Mitigation**~~ **Risk Reduction** includes the activities that prevent or reduce emergency impacts and eliminate treat risks. It is the starting point for emergency management but can be part of the other three phases.

Comment [t3]: not sure if eliminate is the correct word in this context.

~~**Preparedness**~~ **Readiness** focuses on plans for effective emergency response. This is a continuous cycle of planning, organising, training, exercising and evaluating for effectiveness to prevent, protect against, respond to, manage, recover from and mitigate the effects of emergencies.

Response is the immediate reaction to an emergency. Response includes mobilisation of emergency services, on site first responders and emergency response teams and activation of the emergency ~~response~~ management plan.

Recovery continues beyond the emergency period. Recovery focuses on restoring critical functions to normal and managing reconstruction. Rebuilding efforts include mitigation practices to reduce the risks in the future.

A fifth 'R' is now being referred to in emergency management and that is **Relationships**. Establishing relationships with emergency services that may be required to respond to your mining operation is considered to be an important element of each of the four components detailed above. Development of emergency management plans in consultation with emergency services is considered to be best practice.

Comment [t4]: Included to reinforce the importance of engaging with emergency services

17.1 Responsibilities

You must develop procedures for dealing with emergencies that may arise while people are at work[65]. Task and risk assessment should indicate the emergencies which might arise and the action and equipment required to deal with them. In addition, mining operations where one or more principal hazards have been identified, must develop an emergency management control plan in accordance with Regulations 104 and 105 of the *HSE (Mining and Quarrying) Regulations*.

[65] HSE Act 6 (e)

Mining operations must also include a description of the emergency preparedness for the principal hazard in principal hazard management plans. This may be a cross-reference to the emergency management control plan.

The mine operator must ensure adequate resources are available for the mining operation to effectively implement the emergency management control plan and keep facilities and equipment regularly inspected and maintained in a fully operational condition.

If you are the owner of a building on the site, you must make sure the building complies with the *Fire Service Act 1975* and the *Fire Safety and Evacuation of Buildings Regulations 2006*. You may also be required to obtain an approved evacuation scheme from the Fire Service. Information on approved evacuation schemes is available from https://onlineservices.fire.org.nz/home/evacuationschemes.

For more information on emergency procedures see WorkSafe New Zealand *Guide to developing Safety Management Systems for the extractives industry* and the *Approved Code of Practice for Emergency Management*.

17.2 ~~Mitigation~~ Risk Reduction

When developing and implementing your health and safety management system and associated procedures you should consider ways in which emergencies may arise from the activities you are undertaking. Particular attention should be given to low frequency, high consequence events that can be difficult to predict.

Identifying potential emergency situations is the key to having effective emergency management plans. Developing the plan begins with emergency assessment. The results of emergency assessment will show:

- how likely an event is to happen and the possible consequences
- what means are available to stop or prevent the event; and
- what response is necessary for the event

It is important to include employees who have had experience in emergency work as they can help identify emergencies and the response procedures needed. Also look at other risk assessments that you have done and incident investigations.

17.3 ~~Preparedness~~ Readiness

Emergency management control plans 17.3.1

HSE (Mining and Quarrying) Regulation 105 requires specific information to be included in an emergency management control plan for a mining operation (refer section 17.3.2). Large scale quarries and alluvial mines may also find it helpful to develop an emergency management control plan based on the following:

- Command structure and site personnel
- Notifications
- Resources, facilities and equipment, and
- Procedures

The Site Senior Executive of a mining operation must ensure a copy of the current emergency management control plan is given to emergency services (i.e. fire, police and ambulance) and the Mines Rescue Trust.

Contents of emergency management control plan 17.3.2

The emergency management control plan must, at a minimum, address the following matters.

The coordination and control of emergencies: The plan should set out the incident control arrangements which should be as simple as possible. There should be a single person in overall charge of operations – this will normally be the manager but other arrangements may also be possible and should be considered. The plan will need to provide for who will be assigned roles if people are not available. You should also consider what other resources may be needed in order to effectively manage emergency situations.

The people (or positions) at the site who will have responsibilities in relation to emergencies and the detail of those responsibilities. These will vary with the circumstances of the site and the results of the risk assessment. These functions may include, but are not limited to:

- Coordinating the emergency response
- Alerting and liaising with rescue or emergency personnel
- Alerting and liaising with regulator personnel (e.g. H&S Inspectors, regional council staff, district council staff)
- Accounting for people at the site at the time of the incident
- Control of emergency supplies

Comment [t5]: This wording is used in the WorkSafe guide for developing an SMS and I think adds some value to this component

Comment [t6]:

- Provision and maintenance of facilities for rescue personnel where required
- Providing plans and other information to rescue personnel as required
- Providing transport of casualties, rescue workers and supplies where required
- Operation of communication systems
- Informing and consulting with worker representatives and next of kin where required
- Communication with the media where required
- Fire wardens
- Site emergency response teams

The availability of the Mines Rescue Trust and other emergency services to respond to an emergency: You must consider the distance emergency services will need to travel and the time it will take them to respond in an emergency.

A procedure to ensure prompt notification of all relevant emergency services and the Mines Rescue Trust: Your plan should list the details of all relevant emergency services, the mine rescue trust and any other specialist emergency response personnel. Details should include phone numbers and where relevant, roles within an organisation. Names will only be appropriate where you can be sure the most up to date information is always available.

The events that trigger the activation of the plan: Determine what emergency situations may arise and when an incident must result in the activation of the plan. For example during any site incident where the resources required exceed the capability of those on site.

The use of communication systems in emergencies: Determining how and what communication systems are used in an emergency. This can include for example, clearing radio channels, ending all non-essential phone calls, communication black-outs, the availability of additional communication devices such as satellite phones etc.

The giving of timely notice, information and warnings to anyone potentially affected, including the people nominated as next of kin by workers. You should consider:

- Developing a call tree so the right people are notified at the right time
- Determining how and when next of kin will be notified. This may be dependent on the severity of casualties and the location of the next of kin. Notification could be via support services (Police).
- Determining how and when neighbouring properties will be contacted
- Determining how and when status updates will be communicated

You must prepare, and keep updated, a list of emergency contact details for all workers.

Measures to be taken to isolate an area affected by an emergency: Measures will be dependent on the type of emergency. Some examples include barriers to block access to unsafe areas or posting sentries at the gate to stop vehicles entering an area.

The means to locate and account for people in the event of an emergency (refer section 17.4.2)

The evacuation in an emergency, including the conditions that will prompt withdrawal when there is an imminent risk of harm: You should determine what responses are necessary to ensure all people escape safely and when evacuation is necessary. Evacuation may include first response, self-escape, aided escape or aided rescue. For example a person in a confined space may be able to self-escape or may require aided rescue.

Prompt withdrawal, for example, may include when oxygen levels alarms are triggered, where smoke alarms are activated, when ground movement has been detected, or when weather warnings are issued. You should also determine the hazards produced as a result of the emergency that workers self-escaping and self-rescuing may face and what responses are necessary to affect their escape or rescue.

Appropriate transportation from the site: You should include in your plan the provision and method for removing all people on site to a suitable, safe haven. This may include visitors and members of the public.

First aid arrangements including first-aid equipment, facilities, services and the workers who are qualified to provide first aid: Measures will be dependent on the type of incident and the availability and response times of emergency services. One way to identify the first aid needs of your site is to complete a Workplace First Aid Needs Assessment. The WorkSafe New Zealand *First Aid for Workplaces, A Good Practice Guide* has a sample assessment you could use.

Provision for all aspects of firefighting, including adequate compatible firefighting

equipment, procedures for firefighting and training workers in firefighting: Firefighting equipment should be strategically positioned and be of a suitable type for the potential fires that could occur. For example a fire extinguisher capable of fighting fuel fires should be positioned in all vehicles.

Principal Hazard Management Plans (PHMP) are required to include a description of the emergency preparedness for the principal hazard. It is recommended all relevant information is recorded in the emergency management control plan, with a reference in the PHMP, to ensure only the most up to date information is followed in the event of an emergency.

Communications 17.3.3

Good communications are of paramount importance in an emergency, particularly in remote areas and for lone workers. Suitable communication equipment might range from alarms to more sophisticated public address or closed-circuit television systems. Radios or telephones can enable rapid communication if they are carefully positioned. They may, for example, be fitted to mobile plant or backup service vehicles, or issued to appropriate individuals.

Electrical systems, radios or mobile telephones may be unsuitable where explosives are in use or where there is a risk of an explosive atmosphere and the equipment may cause ignition or initiate the explosion.

In most mines and quarries liaison with the emergency services is helpful and strongly recommended. In particular, it is advisable to inform them in advance of any dangers that might affect their operations, for example the presence of explosives, LPG storage, unstable ground and burning tyres which may explode.
For mining operations you must consult fire, police and ambulance emergency services that have responsibility for the area in which the mining operation is located, and, in the case of a coal mining operation, the Mines Rescue Trust.

Suitable access and egress for emergency services 17.3.4

Well-constructed and maintained roadways allow emergency vehicles easier access. These vehicles are generally made for road use and are not suited to difficult terrain. In an emergency, it can be helpful to have a person waiting at the site entrance to direct the emergency services.

In remote areas it may be faster for emergency services to respond with a helicopter. In these situations pre-emptively knowing the GPS co-ordinates and other landmarks near the site will ensure the location is easier to find.

You must provide means of leaving the place of work in an emergency[66].

[66] HSE Regulation 4 (2) (c)
[67] HSE Act 12 (1) (a)
[68] HSE (Mining and Quarrying) Regulation 106 (1) (a)
[69] HSE (Mining and Quarrying) Regulation 106 (1) (b)
[70] HSE (Mining and Quarrying) Regulation 126 (1)

Means of escape 17.3.5

Means of escape should be taken into account when designing both fixed and mobile workplaces. An alternative exit should always be provided in mobile equipment. These can be purpose built hatches or windows that can be easily removed or broken with a special tool.

Large scale emergency planning 17.3.6

Notwithstanding your obligations under the *HSE Act* and *HSE (Mining and Quarrying) Regulations*, the NZ Governments *The New Zealand Coordinated Incident Management System (CIMS)* is a useful guide to planning for large scale emergencies. Large scale emergencies may include:

- Tailings dam failures
- Tip failures
- Pipeline failure
- Subsidence
- Fires and explosions
- Spills of chemicals
- Contaminated water release

Training in emergency procedures 17.3.7

Most people only need to be able to leave their workplace and go to a designated place of safety in the event of an emergency. You must inform workers on what to do if an emergency arises[67].

The SSE must, and quarrying and alluvial mine operators should, ensure emergency management control plans are regularly tested using practice drills and involving relevant emergency services (e.g. Fire Service, St John's, Mines Rescue Trust and company rescue services)[68]. Regular testing should be at least every twelve months. More regular testing may be identified through the risk and emergency assessment process.

Practice drills are essential so everyone knows what to do in an emergency. This includes contractors employed at the site. In the case of contractors employed on short contracts, visitor training may be more appropriate. Such contractors should be accompanied at all times by a person who has appropriate emergency training.

Where rescue equipment is provided enough people should be trained to use it without endangering themselves or others. Training in rescue equipment should be specific to the type of emergency e.g. confined space rescue, heights rescue, use of a fire extinguisher etc.

The SSE must, and quarry and alluvial mine operators should, ensure workers are provided with training in the emergency management control plan and that the provision of this training is recorded[69].

Mine operators must, and quarry and alluvial mine operators should, ensure there are enough trained workers to administer first aid[70]. For remote operations a higher level of first aid training may be required (for example pre-hospital care). For more detailed information on first aid training refer to the WorkSafe New Zealand *First Aid for Workplaces, A Good Practice Guide*

17.4 Response

Emergency response and evacuation plans 17.4.1

Emergency response and evacuation plans are normally designed as a "grab and go" procedure detailing specific actions to be taken in emergency scenarios. Emergency response and evacuation plans may also include signage placed in appropriate areas, such as doorways.

For larger operations the use of Trigger Action Response Plans (TARPs) may be appropriate. For smaller operations an emergency response plan flipchart (a set of simple forms that can help you identify and manage your emergency procedures) is available from the Environmental Protection Agency (EPA). Phone 0800 376 234 or email hsinfo@epa.govt.nz to order a free copy or download a pdf version from www.business.govt.nz/worksafe/information-guidance/all-guidance-items/emergency-procedures.

Locating and accounting for people 17.4.2

Mine operators must, and quarry and alluvial mine operators should, have a system in place to accurately account for and locate all workers or visitors in the event of an emergency[71]. Sign in registers, worker tag boards or radio frequency identification (RFID) tags are some of the ways you could locate and account for people.

[71] HSE (Mining and Quarrying) Regulation 105 (1) (h)
[72] HSE (Mining and Quarrying) Regulation 125

A suitable system will depend on the size of the operation or site, the amount of workers, the frequency of visitors, working times and shifts, and the risks that may be present.

Rescue and emergency equipment 17.4.3

The choice of emergency equipment will depend on the risks identified, the complexity of the site, and the distance from emergency services. Examples of the type of rescue and emergency equipment which may be required include:

a) Breathing apparatus (for confined space entry)
b) Ropes
c) Ladders (rigid or rope)
d) Tripods, winches
e) Tools (e.g. pickaxe, crowbar, shovel, cutters)
f) Stretchers and blankets
g) Buoyancy aids e.g. lifejackets, lifebuoys (rings)
h) Rescue boats
i) Chemical spill kit
j) Fire extinguishers
k) Fire hose reels
l) Bush fire kits
m) First aid supplies

n) Self-rescuers
o) A mobile generator to power emergency lighting
p) Lifting and cutting equipment e.g. hydraulic props, hardwood wedges in various sizes, lifting bags and cylinders, pneumatic pick
q) Resuscitation equipment

Mine operators must ensure there are adequate and appropriate means available at the site to deal with any crush injuries and to rescue a trapped or injured person[72].

Mine operators must ensure that suitable resuscitation equipment is available and people trained to use the equipment are available at the site at all times. A procedure must be in place for workers to raise the alarm when resuscitation equipment is required[73].

17.5 Recovery

At the conclusion of the emergency event, and prior to any operations recommencing, mine operators must, and quarry and alluvial mine operators should, undertake a full review of any PHMP, PCP (including the emergency management plan) or hazards that have contributed to the emergency and establish controls to prevent a reoccurrence. For example:
- Install monitoring apparatus to enable remote recording (for example monitoring the progress of ground movement)
- Seek to dissipate the energy of the hazard away from the active workings, for example by diverting flood waters into disused workings

ATTACHMENT VII – DETAILED COMMENTS ON DRAFT 2

Page	Section	Paragraph	Comment
11	1.1	1	This is confusing. "The regulations apply to mining operations..." is the problem as there is confusion about this. In the subheading you use the terms opencast mines, alluvial mines and quarry operations so why not use these terms throughout the document. There is also confusion in the document around the terms *must, should, highly recommended* and so on which needs to be resolved by defining these terms in terms of sector coverage for the 2013 regulations.
		2	This is not a certainty so I'd use the term "may". I think that there is now a consensus within industry that splitting quarries/alluvials off in the 2013 regulations has created problems for industry & the regulator. Our collective objective should be to bring them together again so why perpetuate the separation via this wording?
	1.2	1	I think you mean "surface mining operations" otherwise you confuse the reader who has opencast mines in the chapter heading as being separate from alluvial mines and quarries
	1.3.1		This clause would include almost every form of excavation, from drainage, road building, subdivisions, buildings, houses. Add a description of exclusions including all the above and civil construction sites plus borrow pits. This exclusion was included in the 1st draft at 1.4 but has been removed.
13	1.4	1	The first draft had a section that excluded construction work which needs to be retained but amended as suggested in our submission. Otherwise we see the guidance being extended to this work due to problems with the 19M Act definitions. We suggest you amend the original 1.2.4 to read and reinsert this into the guidance: ***1.2.4 Excavations associated with construction work*** *These guidelines ~~are not intended to~~ do not cover excavations made solely for the purpose of carrying out any building,*

Page	Section	Paragraph	Comment
			civil engineering or engineering construction work including where the extracted material is used on the site at which the extraction has taken place except where the extracted material used is rock which is processed into aggregate and is used on the site or exported for use elsewhere ~~(e.g. extracting rock or other material from a face adjacent to a road where the rock is used for embankment stability on that road, or from borrow sites to the road formation).~~
14	2	Introduction	This section contains material which is new. It is confusing due to poor use of language, a lack of clear definitions of the terms being used and indicates a lack of understanding of the subject matter. This section is very important as it sets the scene for the rest of the document.. The key message to get across is that the new regime is risk based. Everything you do in health and safety management needs to be driven by this principal. We suggest you insert some statement here like: *Risk management forms the basis of all health and safety management. The law requires you to keep your workplace safe. It also specifically requires you to use a risk management process to do so.* *There are four basic steps to Risk Management:* ***Risk appraisal** (Identifying the hazards) – involves recognising things which may cause injury or harm to the health of a person, eg flammable material, ignition sources or unguarded machinery and categorising these as principal, significant or general hazards;* ***Assessing the risk** – involves looking at the possibility of injury or harm occurring to a person if exposed to a hazard;* ***Controlling the risk** – by introducing measures, which will remove or reduce the risk of a person being exposed to a hazard; and* ***Monitor the effectiveness of the control measures** – involves the regular review of the control measures to ensure that they are suitable.* *The Regulations require that a risk management process is applied to the workplace overall; a specific job, piece of equipment, machinery, or a particular activity of your operation.*

Page	Section	Paragraph	Comment
14	2	3	While alluvial mines and quarries are not legally required …. Why not just state: *...should treat the 2013 regulations (whatever the correct title is) as best practice guidelines.*
		4	These (refs in this para & the next) were issued before the 2013 regs came in so need a tweak or two
14	2.1	General	The rest of this section is very confusing and the language is confusing & inconsistent with the subject matter. Needs a rewrite to make it clearer.
		2	This is the first time the issue of quarry/Alluvial mines not being covered by the 2013 regulations occurs & the way this is managed is not clear in the document as it is managed in different ways throughout the document. Often the distinction is not clear. Here the issue is that Quarry/Alluvial do not have an SSE After: *Opencast mine operators must...* Then add: *Quarry and alluvial mine operators "should designate a manager (DM) with responsibility who develops..."* Otherwise is confusing & not all operations "must" as some are not covered by the 2013 regs so need to use the term "should"
15	2.2	Heading	This section needs some definitions. This needs to be about here to then sort out all the confusion from here on. For example this heading - risk appraisal is hazard identification so the title is wrong but then the content doesn't reflect the title anyway. I think this heading needs to be Risk Management. • Risk appraisal (hazard identification) • Risk identification • Risk analysis • Risk evaluation • Risk treatment

Page	Section	Paragraph	Comment
			• Monitoring & review • Communication & consultation This is what NZS/AS 31,000:2009 contains. You can then introduce the PHMP & PCP concepts as part of the risk assessment process - they will throw up the significant/principal hazards. (principal = significant). Then deal with explaining what the regs say about PHMPs & PCPs. **Risk appraisal** - defined by reg 54 as the process of identifying hazards **Risk identification** - defined by NZS/AS 31,000:2009 as determining the risks that are associated with the hazards **Risk analysis** - defined by NZS/AS 31,000:2009 as determining the likelihood and consequences for each risk **Risk evaluation** - defined by NZS/AS 31,000:2009 as determining the risk rankings to determine which need treating and with what priority **Risk assessment** - defined by NZS/AS 31,000:2009 as being risk identification, analysis and evaluation Risk treatment - defined by NZS/AS 31,000:2009 as being the assessment and selection of appropriate risk controls based on the hierarchy of controls
15	2.2	2	Delete (c) and (i) as they are not relevant to surface mines
	2.4		This is in the wrong place. See earlier comment. Explain risk management which introduces PHMPs & PCPs and then explain them.
16	2.5	1	Not sure why you use may here when you use will above
		3	Residual risk has a specific meaning in risk analysis. I know what you are trying to do here but most will not. Also risk experts are now moving away from assessing residual risk as it is too easy for people to manipulate. They prefer applying controls and assessing the controls against the hierarchy of controls. Have you got enough hard controls? I think you need to explain this in the risk section and so cross reference this here. I think you can do this as in the risk management process you define what is called the "mandate" which is the risk ranking that the company finds is acceptable. For items below this you might have controls but these activities would not be examined with quite the same scrutiny the high risk items

Page	Section	Paragraph	Comment
			would be. Why make this comment here about residual but not above with PHMP?
	2.6	1	No this is incorrect. Firstly it's not about assessing hazards it's about assessing risks which arise from hazards. I understand why you used the word hazard as it ties in with the current Act's language but this language does not align with the ASNZS standard referred to below. Risk assessment follows hazard identification (defined as risk appraisal in the regulations) and is composed of • Risk identification • Risk analysis • Risk evaluation It is followed by risk treatment. See ASNZS ISO 31,000:2009 The language is all wrong with hazards and risk being mixed up. You don't manage hazards you manage risks. The hazard is always there. For example you can't really remove gravity which is the hazard but you can remove the risk posed by gravity which is a fall. Replace it with: *To manage the risks arising from hazards effectively, an assessment of how likely a hazard is to cause harm and what the consequences of that harm might be needs to be carried out. This helps prioritise which risks need to be dealt with first.*
		2	Risk appraisal is defined by regulation 54 as being hazard identification so you must be using it with a different meaning here. The standard does not use the term *risk appraisal.* It is risk analysis that is quantitative or qualitative. Risk analysis is part of risk assessment. You don't estimate risk you evaluate risk
		3	This is simply regulation 55 quoted word for word so why the next sentence. Just put a footnote to reg 55.
17	2.6	1 & 2	Why refer to only these 2. reg 76 dealing with inundation & inrush talks about risk, reg 80 dealing with roads talks about

Page	Section	Paragraph	Comment
			risk, reg 105 emergency management planning talks about risk
		Minimisation	This approach is fine as it is what the act states but I think the guidance should go further and adopt the Australian approach which is a lot clearer. At the very least it is useful to explain administrative controls and PPE controls under minimisation *There is a hierarchy of controls or preferred order of control measures, which range from the most effective to the least effective. The hierarchy of control measures is:* *Elimination - removing the hazard or hazardous work practice from the mine. This is the most effective control measure;* *Substitution - replacing a hazard or hazardous work practice with a less hazardous one;* *Isolation - stopping persons from interacting with the hazard eg machine guarding, remote handling;* *Engineering Control - if the hazard cannot be removed, replaced or isolated, an engineering control is the next preferred measure. This may include changes to tools or equipment, providing guarding to machinery or equipment.* *Administrative Control - includes introducing work practices that reduce the risk. This could include limiting the amount of time a person is exposed to a particular hazard; and* *Personal Protective Equipment - should be considered only when other control measures are not suitable or to increase protection.* *If a hazard, significant or otherwise, cannot be eliminated or isolated, you will need to set up controls to minimise the likelihood of harm occurring to workers.* *When selecting controls, you first need to look for controls that will prevent the incident occurring (preventative). Any controls that minimise or otherwise lessen (mitigate) the consequences of the incident are only supplementary to prevention.*
	2.8	3	I think this stuff is important enough to deal with here rather than just a reference
	2.9	1	Surely the Act means quarry/alluvial "must" do this. This is section 7(2) It's the first time you have distinguished between mining operation & quarry/alluvial.

Page	Section	Paragraph	Comment
18	3	1	Not well written. Both *assessment of the deposit* & *the factors that will affect direction of development* are controlled by geology. Geological characteristics are dip, strike, bedding, faulting, folding and others.
		2	Odd statement. No one refers to "planned" ground movement. I don't even know what it is unless you call a blast planned ground movement. Just refer to it as ground instability and failure as after all that's what the section is about. In the list add: damage to neighbour's infrastructure and neighbouring housing damage to public infrastructure (roads, powerlines, water supplies) Also, infrastructure isn't environmental. Damage to surrounding geology is a silly expression. What does it mean? An eco-system is a natural habitat. Why not just state: *Disruption to natural drainage, discharge of contaminants to streams, damage to natural habitats and discharge of contaminants to air.*
	3.1	1	Batter is not defined the way you suggest in Fig 1. Drawing is incorrectly labelled where vertical component is shown as the batter. The batter is the slope between the catch benches, which has been labelled "face". The face is a more generic term and can apply from the crest to the pit floor. Note that the batter angle is correctly shown.
		2	Why bother to try and explain this as it made little sense to me as written - just refer to the figure.
19	3.2	2	This paragraph uses the term appraisal where in other areas the word assessment is used. Appraisal is used earlier in connection with risk. The language is confusing. The regulations state that ground movement may be a principal hazard. To determine if it is you need to complete a risk assessment. If the risk assessment shows potential for it to be a principal hazard by way of the definition then you need a principal hazard management plan. Why can't you just say that?
		3	You now go on to state a new set of criteria for establishing if ground or strata instability is a principal hazard. This doesn't

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			work. Which part of this do you want us to implement? You can't have both. I think what you mean is do a geotechnical assessment to determine if there is a principal hazard when these criteria are met. What is the geotechnical basis for the height criteria stated (15m, 8.5m & 30m)? There is little point in have a risk based system if you then cut across it with arbitrary statements like this. This whole approach is both confusing to the reader and at odds with what the regulations are suggesting: • First step is complete an initial geotechnical assessment of the operation. This should be able to be completed by a person with basic geotechnical skills like a mining engineer, a geologist or an experienced practical supervisor (might be the CoC holder) • This needs to include a basic risk assessment process to determine if slope stability needs to be addressed in more detail before controls can be developed. It might decide that because of the depth of the excavation, the known ability of the ground to stand at some depth/slope due to existing nearby excavations that no further investigations is necessary & a stable slope design can be completed • This initial assessment may lead on to the need to do a more thorough assessment using geotechnical specialists involving a more detailed risk assessment. The way this is currently written will sometimes lead you to a detailed geotechnical assessment when this is not required. The additional criteria do not make geotechnical sense if you treat weak rock exactly the same as strong rock as stated in item (a). There are examples of strong rock where existing faces in the same material show that stable heights are possible at greater than 15m. There is no sound basis for treating the grouping of *weak rock to strong rock* the way you have. The NZ Geotechnical Society Incorporated *Field description of soil analysis guideline (Dec 2005)* Table 3.5 Rock Strength classifications that you have grouped together cover a range from *Extremely strong to weak* as can be seen from the table below. Geotechnically, there can be no justification for treating these materials in the same manner form a slope design perspective. You are grouping a very strong granite with weakly cemented gravel.

Page	Section	Paragraph	Comment

Term	Field identification of specimen	Unconfined uniaxial compressive strength q_u (MPa)	Point load strength $I_{s(50)}$ (MPa)
Extremely strong	Can only be chipped with geological hammer	>250	>10
Very strong	Requires many blows of geological hammer to break it	100 – 250	5- 10
Strong	Requires more than one blow of geological hammer to fracture it	50 - 100	2 - 5
Moderately strong	Cannot be scraped or peeled with a pocket knife. Can be fractured with single firm blow of geological hammer	20 – 50	1 - 2
Weak	Can be peeled by a pocket knife with difficulty. Shallow indentations made by firm blow with point of geological hammer	5 -20	<1
Note: No correlation is implied between q_u and $I_{s(50)}$			

The conditions where ground stability "should" be treated as a principal hazard are excessive. Just because an overall face angle (read slope as follows) is more than 45 degrees or an excavation is more than 30 metres deep doesn't create inherent risk. A face of 45 degrees in granite that is 10 metres deep is hardly a principal hazard. A pit that is 50 metres deep but with an overall face angle of 37 degrees is also not a principal hazard.

The example a) iii) should refer to the overall slope angle.

In b) ii) the use of 27 degrees as a constraining angle is nonsense. This angle appears to be related to the use of dozers as referred to in the second paragraph of 3.6.1 on page 26. It has no scientific basis, and for most free-draining materials, the natural angle of repose is 37 degrees. Again, it should refer to the overall slope angle as shown in figure 2 for consistency.

3.2 a) ii should read "adequately benched slope". You can't have a benched face. Refer Figure 1 – a face is not benched, it

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			is between benches 3.2 a) iii should read "overall slope angle". Refer figs 1 and 2 - no such thing as an overall face angle
		(d)	This is meaningless. What is a significant hazard? How could geology, *irrespective of...* give rise to a significant hazard? I think what you mean is that there is something on the edge of the slope (tip, building, road, stream...) that might make it a principal hazard. But even this is poor drafting as what I suspect you want here is that if there is any of this stuff above a slope then regardless of the slope/face height (which do you mean?) angle and so on you should do a risk assessment to determine if you have a principal hazard (not a significant hazard)
20	3.2	Fig 3	The 30m dimension seems meaningless. I suspect it's meant to extend to the crest point but then adds nothing to the figure. It's completely out of proportion to the depth of 30m shown. It is also not clear why the "h > 30m" is shown where it is. It should be shown against the vertical distance illustrated by the line with arrows at each end as "h (> 30 m)" Same issue with Fig 4. What is it supposed to show?
	3.3	1	There seems to be quite a bit of overlap with these bullet points. Rock type & planar orientation are characteristics & geological features as are rock properties, drainage patterns and so on. Keep it simple is a good idea. Delete pillar dimensions as we are dealing with surface mines here
21	3.3	1	The code will not be issued when this guidance is issued. Similar issue with other codes referred to.
	3.4	1	You need to do an investigation in order to do an appraisal or assessment so why mention it? You use the term "appraisal" often and in different ways so suggest it needs to be defined. Problem here will be it's defined in the regulations. Surely its size and scale of the excavation.
		2	Unless you define these they would all seem to overlap. The risk appraisal - if this is a broad brush risk assessment to identify hazards that might be principal or significant then you do this before you event think about a ground/strata instability PHMP. It shouldn't be in the list. Having arrived at a list of hazards which includes a hazard associated with ground failure you would then do a risk assessment that would involve

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			both operational people and geotech people. For this you might only do a desk top geotech study. This risk assessment would then tell you if you had a principal hazard and needed to complete a PHMP. The controls would require you do a higher level geotech assessment followed by design of ground control system. A geotech assessment surely includes site investigation. This is all very confusing here and more so when you look at the rest of the section.
	3.4.1	1	I'm not sure you need to have all this stuff in here as a full geotech assessment/design can only be completed by a competent person experienced in this stuff. Just say this and get rid of all this technical stuff because most who read this guidance will not understand it and will not be using it
		2(i)	Get rid of tectonic evolution as I can't see it having much to do with geotech design. You are giving the impression to the reader that all geotech assessments that have any site investigation need to go through this complete list. They don't. Including tectonic evolution in the site investigation is over the top. Any issues related should be identified under geomorphology, physical geology and geologic structure without needing this separate heading. Surely they are progressive? Basic assessment may lead to a more in depth assessment. See earlier comments.
	3.4.1.2	1	The list is fine but then it is followed by far too much technical detail
22	3.4.2	3	I thin k you have already covered quite a few of the items in the list already
23	3.4.3		This material needs to right at the start of the section
24	3.5		There is far too much technical detail included here
	3.5.1	4	The statement in the 4th paragraph that "Techniques are… well known" and reference to text books is pointless. The sentence should read that "Intact rock properties can be readily determined through field and laboratory testing by specialists" or something along those lines. Best practice is for a geological model to be developed by a geologist who understands the local geology and knows how to prepare a geological model. This could be any geologist or mine geologist. Using an engineering geologist or geotechnical engineer is not best practice if they don't have this knowledge.

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			It is a geological model being discussed here, not a geotechnical model
	3.5.2		Best practice is for a structural model to be developed by a person (any geologist or engineer) who understands the local structural geology and who knows how to prepare the structural model with reference to the geological model . "structural geologist" is too specific, and a structural geologist may not have sufficient knowledge of the local geology and geologic structure, or know how to interface the structural model with the geology model developed by the mine Secondly it is unclear whether a structural geologist includes a geotechnical engineer and/or an engineering geologist
	3.5.4	1	Best practice is for a hydrogeological model to be developed by a person (any geologist or engineer) who understands the local hydrogeology and who knows how to prepare the hydrogeological model with reference to the geological and structural models. An “expert” may not have sufficient knowledge of the local geology and hydrogeology, or know how to interface the hydrogeological model with the geological and structural model(s) developed by the mine Secondly it is unclear who qualifies as an “expert” and whether this includes an experienced geotechnical engineer.
26	3.6	1	Starts with *At mines or quarries.* Inconsistent language with other sections.
	3.6.1	1 & 2	This is operational stuff not slope stability so not sure why it is here. Also who decided 27° was the magic number. Better to state this as a ratio and its 1V:2H. In the second paragraph, the reference to where the original slope being greater than 27 degrees would cause difficulties is not correct. Most free drain materials will stand up at 37 degrees or more, and the purpose of a mine or quarry excavation is normally to use the material properties to advantage at an angle as steep as reasonably practical to either maximise recovery of a resource or to minimise the amount of unnecessary material removed. Once the steepest safe and practical batter angle is determined, it is common practice to remove loose material using an excavator. A dozer is rarely used in this type of application unless used for preliminary stripping of topsoil and subsoil, or dozing down a slope of blasted rock to place it at a more convenient place for loading out. At the top of the page, the purpose of the statement about a survey plan having to reflect the types of benches used is not clear. If fact, it would be better to delete the sentence to avoid confusion. As a general comment, observation of existing highwalls or faces in the same rock types should be used as a guide to assist

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			in determining appropriate design parameters. Geotechnical studies have been known to produce results that are not consistent with "real world" experience. Geotechnical properties of material can only be estimated and assumptions have to be made about materials, faults, weaknesses, etc. Geotechnical studies are only as good as the data and the validity or otherwise of assumptions used. The real world produces the best and most reliable data.
27	3.6.2		You need to introduce working faces and final faces before you get into this discussion. Working faces are usually cut steeper than final faces and with lower bench height - often with an excavator as low as 5m so slope stability is not a major issue. The statement in the second paragraph that benches should also allow long-term access to instrumentation is highly dangerous. The catch benches are designed to catch falling rocks and prevent them from reaching the lowest working levels. They are not and should not be designed for pedestrian access, and any access would have to ensure that a person is protected from falling or otherwise will not fall, and a full risk assessment may need to be undertaken. The prudent approach is that, in general terms, no personnel should access a catch bench, so it should not be implied that this access is acceptable practice, when it is generally not.
	3.6.2.1		A batter is commonly used to denote a single slope. A highwall is the total pit slope. Need to sort out terminology. Looks like multiple sources from different countries have been used here. Sometimes you use slope and sometimes you use batter. Last bullet point: (such as windrows or ditches) of sufficient size to capture any potentially hazardous rockfalls
	3.6.2.1	Bullet 4	should say "excavating the batter face in lifts from top to bottom to allow for ….". A batter does not have benches in it – refer fig 1
		2	Reference to batter angle being determined by blasting type. No its not. The angle of the working face is a function of the machine used to excavate it and any stability issues. Usually these faces are low and matched to machine reach. The angle of a batter in a highwall (which essentially means a final slope) is a function of geotech design (rock hardness & strength,) and operating parameters like the excavation method (machine), blasting method (controlled/cushion blasting). Sometimes the rock is soft enough for faces to be cut to an angle and sometimes the overall slope is controlled by benching with very steep individual faces.

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	3.6.2.2	3	The reference to 15m width is completely arbitrary. The safe bench interval is a matter for risk assessment involving geotech design if it is a final wall bench or operating considerations if it is a working bench. Reference to bench spacings of 15 metres and access to loaders and excavators to clean the exposed face is misleading. Loaders do not clean faces that are 15 metres high, nor do excavators. An excavator will normally be used to clean down a face as it is excavated, whereas the finished height is likely to be greater than the reach of the excavator. Once fully established, there is no practical means to maintain a 15 metre high face with normal machinery, so the batter angle needs and face height need to be suitable, with the face prepared (scaled) as the pit or quarry floor is dug down past it. The term *sloughing* is used. Not used in NZ
28		1	No mention here of rock fences, bunds although there is later
	3.6.2.3	3	You need to make sure the reader knows you are only talking about final wall faces here. The reference to *hazard control* is wrong – it should be *risk control.*
		3	The statement: *It is recommended no more than 20% of benches should be less than the selected design width.* Where does this come from? Arbitrary parameter that has no place no a risk based system. All benches should be constructed to design width. Some become less due to localised failures but that should not be a material issue. The sentence should be deleted. Under "Second", reference to bench width accommodating equipment for "cleaning benches" and long-term access to any monitoring stations is inappropriate without stringent risk management controls. Access to catch benches by and large should be discouraged. There is no inherently safe way to clean a catch bench.
	3.6.3		Inter-ramp slope design - I don't know why you single out this section of the highwall. It's no different to the rest of the wall in terms of how you treat it. You say that it is but I'd contest this. It's just a slope like any other.
	3.6.4		What is a floor width? Do you mean working bench width? This is a function of: • road width to access face • working room required around the excavating tool which is different for a loader & excavator top or bottom

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			loading • working room required for positioning the truck correctly • room for a shot to be drilled on the bench for mining the bench immediately below What does safe "staging" of trucks mean? Not a term used in NZ. I think I know what you mean but use NZ terminology
	3.6.5	1	Last sentence. Doesn't sound right to me. It doesn't reduce the stress. It reduces the effective friction angle through lubrication of defects & so reduces the overall rock mass strength.
29	3.6.5	2	*Surface drainage design should take into account a minimum of 1 in 100 year 72 hour rainfall or flood events.* Where does this come from? Again completely arbitrary statement & in my experience over a range of operations, this is not a standard by any means. In fact District Councils use a 1 on 50 year event for storm water design for subdivisions. This is a matter for resource consents and not this type of guidance. The statement that surface drainage design should take into account a minimum of 1 in 100 year 72 hour rainfall or flood events exceeds most criteria used in existing operations by a very large margin. Many operations have either short lives where the risk is not material or can manage the risk of flooding without incurring unnecessary up-front construction costs. The sentence needs to be modified to say that: "Surface drainage design should take into account relevant rainfall or flood return event probability, the effects of damage including downstream environmental effects caused by such an event, and risk of injury to people, damage to property, recovery costs or other business impacts. Design conditions may be imposed in resource consents." Or words to similar effect. The last paragraph is correct but the one I refer to contradicts this hence it needs to be removed. 4.1 b) I the “or” should be replaced with “and”. If the volume of water exceeds10,000m3 but is not above the level of any land then it should not be a principal hazard eg. in wet periods there may be >10,000 m3 of water in pit bottom.
	3.6.6		This section is good material but would be more useful earlier in the section
30	3.6.6.1		An example of the right level of detail. Belongs earlier in the section. A way to decide on detail is to give them what they need to have a basic understanding so they can manage a consultant doing the work. That’s what this material does. Just enough understanding to manage a tech expert.
	3.6.6.2		Some of this is too detailed. Figs 5 to 9 are good and are enough to tell the story without the words on p30.

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31	3.7	2	*The measures are generally aimed at preventing instability.* What else would they be aimed at? you don't need to say this
32-33	3.7.2		Just the right amount of detail here
35	4.1	1	Regulation 66 (c) states: a mining operation must have a principal hazard management plan for tips, ponds, and voids if a tip at the mining operation is— (i) located on a slope; and (ii) is greater than 15 metres in height; and (iii) is greater than 100 000 cubic metres in volume. This states *a tip or pond…* 2nd sentence includes a mis-quote of the definition of a principal hazard (which occurs repeatedly through the guidance). The definition should be the same as in the regulations.
		3	This list of conditions is not contained in the regulations. The approach is wrong as these are arbitrary parameters not contained in the regulations. A risk assessment is required to determine if things outside the regulations might constitute principal hazards. Regulation 66(c)is quoted in para 1 so why have you added these and where do they come from? (b) (ii) contradicts reg 66 as it states 10,000m^3 when reg 66 states 100,000m^3. This section is giving a definition of when a tip or a pond is a principal hazard that isn't included in the legislation. For example, it includes a relationship with the area or footprint of either, which isn't covered by legislation. It also talks about a tip being a principal hazard irrespective of its size where "a collapse is possible". Of course a collapse is "possible", but that doesn't necessarily relate to it causing multiple fatalities or single recurring fatalities. I have a problem with this, as the legislation requires the SSE to undertake an appraisal to determine what is a principal hazard. This is a different approach. The height of the pond above a working area would be a concern. Many silt ponds are places partially up cuts to minimise treatment areas. These would not have large water volumes and not high. They would not constitute principal hazards which goes back to an earlier comment – this material needs to be clearly identified as apply to principal hazard category

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			tips, ponds & voids.
37	4.3		Poorly structured and missing much that is required. We did all this last year. Why don't you just use the material that industry developed last year? It was developed by a team of people with various skills & experience covering a range of operations. We needed 8 pages to properly address design issues including risk assessment. This guidance has only 1 page.
		2	2nd paragraph list of considerations starts with the geology of the area. There is no context around this consideration so it is not clear what the guidance is trying to achieve by mentioning it. More clarity over context is required. Add foundation properties to the list The list of considerations doesn't mention geomorphology/landform; rainfall; hydrogeology (are there any springs that may be an issue, or creeks to divert, or general under-drainage requirements?); or foundation strength issues. The footnote referencing regulation 26 should clearly say that it is referring to the HSE Regulations 1995.
		4	The guidance should tell the reader when each of these tipping methods should be used. We went through all of this in the End Tipping Guidance developed last year.
38	4.5	1	This section is just ponds/dams so why the references to tips?
		2	These are tipping parameters or do you mean them to be dam construction parameters? Confusing to try and deal with ponds with dams. If the pond is formed by a dam it needs to be dealt with differently compared with a pond formed by a hole in the ground. The hazards and associated risks are different and dams are controlled by legislation & other guidelines ANCOLD.
		last	These parameters apply to tips not ponds or dams
39	4.6		*A competent person should certify the construction meets design specifications and tolerances, and prepares a report that*: This is un-necessary for most ponds & dams many of which are temporary & will not constitute principal hazards. Need to make it clear what category of tips/ponds/dams needs to be certified. If a tip or pond is a dam the requirements are covered in sections 4.6.1 and 4.6.2.

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39	4.6.1	1	The reference to *under constant pressure.* Confusing as this brings in pressure vessels. Section 7 of the reference says more than this so would help if you made this clearer
40	4.6.2	3	Why not assist the reader by telling them that a small dam is one less than 4m height & less than 20,000 cubic metres of fluid
41	4.7		Please clarify what records are to be kept
42	5		In the list of unwanted events, interaction with pedestrians is not mentioned, and this is certainly an unwanted event with relatively high probability so needs to be added. Include in the list of unwanted events: -Vehicles running over pedestrians
	5.1		2nd paragraph misquotes the definition of principal hazard (again). Should say "or a series of recurring accidents that result in single fatalities".
43	5.3	2	It is not always possible to achieve this during maintenance and for supervision so a comment to this effect and what this means in terms of other controls would be useful.
44	5.3.3	1	The speed limit set should be related to risk. *Have adequate rockfall protection measures which may include a catch ditch, although risk from rockfall should be eliminated by considering alternative routes* On its own this is silly as all pits will have a rock fall risk. It's how you manage it that counts.
		2	Avoiding these things is a risk assessment issue especially underground workings. It depends on how deep they are. Need to use *where ever possible*
		Fig 16	Figure 16 may be far from safest best practice (it may in fact be very hazardous) and should only be included if it the safest thing to do with consideration to intersections and HV and LV traffic flows. It won't eliminate interactions at intersections and it may increase interactions. In general there are many intersections in mines and quarries. How does this work in practice at intersections? This segregation may introduce much greater hazards approaching intersections or at intersections eg. crossing HV and LV traffic (eg. HV travels left at intersection across path of LV who is going straight or

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			turning right), merging HV and LV traffic approaching intersections, poor line of sight/visibility for LV's etc. Need to make some comment about this issue.
		Fig 12 & 13	They don't add anything & there replacement will not either at such a small scale
44	5.3.4	last	The widths are considered excessive in some situations. Cat recommendation is: *One-way straights and corners* • *A minimum of 2 – 2.5 widths is recommended* *Two-way traffic* • *In straights, a minimum of 3 – 3.5 truck widths* • *In corners, a minimum of 3.5 – 4 truck widths* This is limiting if the largest item of plant seldom travels the road. Should be usual plant and special traffic management of a bigger item travels the road occasionally.
45		1	*Where it is not practicable to have two lane roads, adequate passing bays and turning points should be provided (one lane roads and turning points are not recommended on haul roads).* This statement makes much more sense but it contradicts the last para on p44 which uses the word *should.* This is an example of many where the words that you define are used carelessly We'd like to see mention of other controls to keep light vehicles safe - maybe they are somewhere else? Width isn't the only control available.
		Fig 16	Make consistent with Fig 14. Dimension light vehicle road
46	5.3.5.1	2	Doesn't make sense as some words are missing.
		Table 3	Is the 1:375 meant to be 1:37.5?
		Table 4	Are the units %? Same issue last paragraph with the units not stated in the formula.

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48	5.3.6	General	(2nd Paragraph), Consideration should be given to the height of the driver in different vehicles, and the possible restriction in vision from edge protection bunding Good diagrams for mining trucks in: http://www.rexminerals.com.au/-/rex/Lib/Docs/Appendix-2_Air_Quality-Caterpillar_Haul_Road_Design_and_Management.pdf
		Fig 18	There is no reference to this so what is it meant to show?
	5.3.6.1		Needs some statement about the need for the PHMP Roads etc to address weather conditions and decisions about stopping haulage. A general comment here is that very little of the commentary stuff is linked back to the PHMP requirements
	5.3.8	1	Reference in the first paragraph to imported materials and the discussion about road pavement in the last paragraph need to be reviewed. In some cases, importing gravel is not cost-effective, and an operation will be shut down by rain and this is accepted by the affected businesses. The last statement about implementing a policy when a road "becomes a prohibited zone" and to regulation 80 (1) (h) is somewhat confusing. It would be better to say: "Alternatively, if all-weather pavements are not practical or cost-effective and roads become untrafficable due to weather and under-foot conditions, you should have suitable risk-based procedures as to when operations cease and under what conditions they may re-start."
51	5.3.9	1	Also required to protect structures off the road and areas where people may be working. Need to address confusion between mounds for road edge delineation, protection from vehicle going over the edge of a road & same for end tipping. They are not the same thing as they have a different purpose.
52	5.3.9.2	1	Where does the 1.5m minimum come from? If this is purely arbitrary then why have a risk approach? I know it is included in the UK guidelines but an arbitrary height has no place, unless qualified, in a risk management based guideline. What is a heavy vehicle? This will give rise to un-necessarily high windrows in some situations. Also inconsistency with 1.5 times wheel height here & Fig 15 with 50 - 66% of wheel height.
		2	The comment about 85 tonne trucks is new. Where does this come from? For a Caterpillar 777 truck with 3.2 m wheel

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			height, this would be a windrow 6.4 metres high and with a base width of more than 17 metres. This is not practical in any surface mine or quarry. Nothing even remotely comparable is required on public roads, which often have no edge protection at all. The whole paragraph discussing this should be deleted. Almost all the literature available on the internet refers to ½ the wheel height. The windrow height needs to be determined by a risk assessment & not an arbitrary height. If your comment about the 85 tonne truck is correct then why set an arbitrary height of 1.5m? It depends on what the particular road geometry is and what other controls are available for a run-way truck. 1.5m minimum height may create visibility issues at intersections and is neither necessary nor practical for roads where only small vehicles operate (eg light vehicles or scrapers).
	5.3.9.3	1	If a portion of a windrow extends *over the hillside* then I suggest it will slump down the hill well before any truck hits it. Needs to state the windrow should be made from suitable material
53	5.3.9.3	4	The inspection requirement is from a UK regulation so the reference needs to be *should* and not *must.* Be useful here to discuss what excavated material is suitable for windrow construction. For example sand is not.
54	5.3.10		No mention that these run-away controls can replace edge protection
	5.3.11		Include Reverse Parking in the list. Reverse parking does introduce a reversing hazard.
55		Fig 30	Use metric only
56	5.3.12	1	You use the words "tip" and "stockpile" which is confusing. Settle on one. Tip = dump, stockpile=live dump that is used as temp storage. I am not sure that section 4 and 9.7 address roads at the tip. Nothing from the 2013 NZ draft guidance on road design seems to have got into here Fourth control listed of managing stockpile size so that it does not restrict vision of operators appears to mean that the operator of any vehicle should be able to see over it to another vehicle approaching around the side. This is in almost

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			every case an impractical control. Other controls should be used.
	5.3.13		A diagram of road access into a workshop area would be useful
	5.3.14.1		Some of this material is repeated in the geotech section. Where roads are adjacent to any highwalls, or stockpiled material containing large rocks which could cause harm if dislodged.
57	5.3.14.2	1	Is this an engineered fill or simply a waste dump? Compaction and layering issues are not the same. Compaction of fills is stated but method is not. This is normally undertaken by virtue of loaded trucks tipping to a maximum height off the end of a dump face and the circulating traffic creating the compaction. Perhaps there needs to be some words added to create clarity about what is good practice. Although it refers to cutting benches when dumping on a "slope", it doesn't indicate at what slope angle this is required, but says that it "should" be done. On a 10 degree slope, this wouldn't be necessary. On a 20 degree slope, it probably isn't. There needs to be more detail in the guidance to ensure that the context is appropriate. This system does not apply to material placed as tailings in slurry form. There may be other areas where fill is placed as a slurry that are also problematic.
	5.3.15	3	Placing traffic management plan matters in a code on survey seems an odd place to put it. It's a road design issue and ought to go here. The survey code should not be dealing with design issues. This says that traffic management plans are "visual in nature". This may be OK for a site that changes little, but it won't work or won't be practical for a mine site where haul roads are constantly changing.
	5.3.16	1	Needs to refer to standards on temporary signage as well - CoPTTM Reference to line marking when most mines and quarries have gravel/dirt roads should be deleted. We use NZTA standard traffic signage, and marker pegs to delineate roads, not line markings. 2nd paragraph, 2nd sentence "Maintaining signs should be part of the road maintenance program
	5.3.17	1	Spelling error in that the word needs to be "operate" the vehicle

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58	5.3.18	2	There is no need to have lighting within pits at all intersections just those where there may be pedestrians. This would require power reticulation around large pits where roads change frequently for little added benefit. Other controls are available – speed restrictions, good vehicle lights, sign distance… Reference to lighting at intersections and on pedestrian routes needs to clarify that this applies to high traffic areas close to existing infrastructure, but lighting at intersections is not practical at isolated and frequently locations around mine and quarry sites.
59	6	Introduction	Shouldn't first aid be a basic facility or is this covered elsewhere? Should reference the Guidelines for the Provision of Facilities and General Health ... Commercial & Industrial Facilities as it contains all the relevant information
	6.2		With the availability of portable toilets there is absolutely no need for anyone to use anything else *natural screens* regardless. Where did this come from/ It's bizarre.
	6.3	1	The correct term is *potable water.* Wholesome water has no meaning in NZ but potable does as there are potable drinking standards.
	6.4	1	The use of the word "must" in the first sentence needs to be amended as there is no regulation requiring this and as the rest of the sentence states there are options available.
63	8	General	General comments: • Too much detail • Insufficient material on transport & storage • Should also cover drilling • Confusing terminology • Does not address the currently commonly used initiation systems (non-electric) • Some material is dated – not many operations use safety-cord

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			Suggest go to this site for Qld guidance which is simple, easy to understand & covers all areas in the right amount of detail Section 8 needs to support the requirements of the regulations with respect to the PHMP for Explosives. The PHMP is mentioned in 8.1 but that is as far as it goes. Needs a section on commonly used explosives and initiating systems. No mention of site mixing of ANFO which is common Needs a section on drilling. Drilling needs to deal with drillers logs as an aid to blast design/control (voids, clays, jointing) Detonator storage & transport not really covered Sleeping of loaded shots. The blast design is very vague and would have expected it to contain at a very minimum detail of:- • Plan of the blast area to a recognised scale • Layout of the blast hole collars • Illustrate the initiation sequence of the holes • Illustrates and states the loading sequence of each hole for explosives, decking and stemming • Position of sentries and other measures to secure the danger area • Danger area created by a particular blast • The result of any blast hole alignment and or face survey We sought comments from Orica and have added these throughout the detail (in blue) that follows. They made a general comment as follows: If Section 8 is intended to be used as a "Best Practice Guideline" in the use of explosives at opencast mines, alluvial mines and quarries it has completely missed the point and needs to be re-written entirely to achieve this objective/outcome. For

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			example, there are little or no references as to how explosives are to be stored or to be transported on these sites. It is also very brief in indicating and detailing what must be regarded as 'industry best practice' in using explosives on these sites. Security of explosives is not covered. The linkage between this document and the PHMP is unclear. The PHMP seems to be the overriding document with actual procedures in how explosives are to be managed on a site. Thus, the purpose of Section 8 is uncertain. The need or otherwise for a PHMP covering explosives and blasting should be emphasized and the broad requirements of the PHMP detailed. References are made throughout this section to other NZ regulations (eg "… in accordance with ….'; "… must comply with…"). If the requirements referenced are critical then they should be detailed in the Guideline. No mention is made in Section 8 on the handling of site mixed explosives (mainly ANFO) by site operators.
63		Introduction	*To keep explosives below the thresholds in these areas is the principle of safe use of explosives.* Clumsy wording. What thresholds? 3rd para: Needs to be rewritten as this paragraph doesn't make sense and has concepts confused. For example, where does 'heat, pressure, etc' fit into the 'life cycle' of an explosive?
	8.2	1	It is important enough to state what these are rather than just the reference. There is nothing specific in sub-part 2 on explosives. I think you mean reg 123
		Duties	You can't "ensure" adequate experience. Also if the person has an approved handler certificate isn't this evidence? I agree that in my case I'd want to make sure they had the skills & knowledge as well as the certificate but legally not sure about this. Manager might argue they are entitled to rely on the certificate. Not all these are hazards - some are controls. Knowledge requirements - Is this not covered by the CoC and so no need to state this? Not familiar with the HSE (Mining and Quarrying) Regulations but suggest that this section needs to reflect the

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			responsibilities of those involved with explosives within an organization from the most senior executive down to the shot firer (approved handler?) and finally to those actually handling explosives in the work place. The current list of accountabilities is confusing and many overlap. The roles of others who may be handling explosives (eg bench hands, MMU operators, pit coordinators, magazine keepers, etc) are not covered. Shouldn't the Site Manager and the Blasting Contractor both have knowledge of HSNO?
		last	This is rubbish. You can't have a category "contractors". All this stuff applies to everyone using explosive regardless of employment status. It's not only contractors who are approved handlers. Don't know why you say they must do hazard ID as this activity requires a PHMP and that is part of that process.
	8.3		On a typical mine or quarry there will always be a need to transport 'loose' explosives not in their original packaging. Guidance as to how this should be done needs to be given. Guidance is required for what constitutes a suitable container if explosives are not in original packaging. Is there a need in NZ for those who have unsupervised access to explosives (and chemicals of security concern) to undergo a national security assessment? If so these requirements need to be highlighted.
	8.4		Use of second-person personal pronoun should be discouraged. No mention is made of recording 'use'. The guideline should list and perhaps standardize the process for recording the movement of explosives. On large sites appointed and authorised magazine keepers may need to get involved in this task.
	8.5		Do vehicles operating on a site and on private roads need to conform to NZS5433:1999 as stated? Strongly recommend the adoption of the most stringent transport requirements for explosives as there could be a requirement for mine vehicles to travel outside the site's perimeter on public roads. Can detonators and explosives be transported on the same vehicle? If so, what precautions need to be taken when carried together within the site's perimeter?
	8.6		Again use of second-person personal pronoun needs to be removed. How is shot firing equipment to be 'made safe'? What is the recommendation in doing so?

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	8.6.3		**There is no need to earth MMUs during charging. It is never done.**
	8.7		Meaning of 5th bullet point isn't clear. What is a face check? Best outcome would be to delete it from the list as it doesn't appear to add value. Visible blast warning signs in the 8th bullet point are not used at any mine site that I know o and probably not used at quarries? Unless you mean the standard blast today type sign sometimes erected at the mine entrance. Best to delete reference to this as people have to be looking for it to be effective. Audible should be enough, either through siren or use of 2 way radios when there are no near neighbours. Use of second-person personal pronoun again! The list seems to be a repeat of all the duties listed in Section 8.2. The list is not comprehensive and needs to include:- • bench preparation, • vehicle movements, other equipment/machinery on bench, • consideration of possible elevated temperature and/or reactive ground, • underground workings or cavities, • vicinity of public roads, rail, flight paths, • security of loaded shots, sleeping loaded shots, etc. • duties and responsibilities of blast controllers, blast guards, • post blast inspection and entry times. How is the weather controlled in NZ?!
66	8.8	1	On the requirement to complete a risk assessment: No. Having a formal risk assessment for each blast when there is an established protocol including a dedicated blast plan and standard blasting procedures should be enough. A separate risk assessment for each blast is excessive. A proper risk assessment process should take about 4 hours and you are not going to do this for every blast. The risk

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			assessment process is for the PHMP. Orica advise that they have completed risk assessments for generic blast types and developed SoP for these various classes of blast. A risk assessment is not required for every blast. Many blasts are routine production blasts. All you need to do is a JSA for each blast as you should be using the SOP that came out of the PHMP development each time you blast.
	8.8	3	No. Who ever wrote this does not understand risk management. These are all the things you take into account when you design a blast. They are not all hazards or risks.
	8.9	1	Using the term *control blasting strategy* here is confusing as "controlled" blasting has a specific meaning in blast design & its not the same meaning as in a risk management context. introduce the concept of the different types of blasts here: • production • final wall • cast and so on and then you can introduce the term "controlled" by saying which ones are considered to be controlled blasts. The principal safety issues in shot firing operations is to ensure that noise, vibration, fume and possibly dust are minimized to an acceptable and/or to set legislative requirements. These factors are basically controlled by blast design (based on ground conditions), on the selection/application of the explosives and on timing/delay sequence. Little mention is made in Section 8 of the latter two controls (ie explosives and timing). For example, loading ANFO into wet holes can have a significant effect on blast results; sleeping shots for long periods of time may also affect blast results. This section contains a lot of theory which is questionable and really should not be included in a Best Practice Guideline. If deemed to be required it should be included in an appendix. Blasting does not always need to achieve 'well fragmented, loose muck piles'. Pre-splitting, for example, does not result in such an outcome.
		2	I'd add surrounding infrastructure, consent conditions relating to blasting, weather as it can effect noise

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		Last bullet	What does "ensure the shape" mean? Nothing.
67	8.9.1.1	1	Again uses the term *controlled blast.* This term is a problem in itself. You are using this I suspect in a risk management sense but the word control has a different meaning in this context. Most blast are std production blast & you are using the term control to cover these which is wrong & confusing. The simple diagram doesn't really do it. There are many more terms you should define so what's wrong with just doing this? Definitions: *Controlled blasting* Blasting patterns and sequences designed to achieve a particular objective. Examples include cast blasting and final wall blasting. Production blasting is different. Try this ref. It's not complete. http://www.iseegoldenwest.org/Back%20to%20Basics.pdf
67		Fig 37	The section and plan view need to be of the same blast – they aren't as one has 5 rows & the other 4.
		last	Is this correct? How does gas pressure bend? It doesn't I suggest.
68	8.10		You now introduce the term *controlled blasting* so should be able to see the issues with the earlier use of the term. The document is becoming too specific. Why concentrate on slope control in this section of the document? Section 8.10.6 and 8.10.7 apply to all slope control measures and should form part of the introduction to this section if to be retained.
	8.11		See earlier comments about explosive selection and blast timing. Is a 'shotfirer' the same as an 'approved handler'? Terms seem to be used interchangeably. The introduction states that explosives must be under the control of an approved handler while on site. Does this also apply when the explosives are secured in a magazine?

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			Who is responsible for appointing and authorizing the "approved handler" for a given mine or quarry? No mention is made of managing misfires associated with signal tubing or electronic detonators. Little mention is made of managing misfires where the initiation system has detonated but the main explosive charge has failed to initiate (eg product recovered in the muck pile during digging).
70	8.11.1	2nd set of bullets	Some of these are for the designer and some the shot-firer What does *profiling* mean?
	8.11.2	First bullet	It's the number of holes fired & not the number of shots fired Add poor detonation sequence. Add bulk explosives misfires, non-electric detonator and electronic detonator misfires.
	8.11.3		Charging blast holes. Talks about checking hole alignment and face surveys. This work should be completed long before charging any hole and the result of any hole alignment and face survey should go into any blast/hole loading plan. Reference to visual warnings again This section is very "light on". It needs to cover charging with packaged explosives, with loose poured explosives (eg ANFO from bags) and bulk explosives from MMUs. The charging techniques and precautions needed to be adopted for each charging method are quite different from each other. For safety reasons mention needs to be made as to how initiating explosives are to be handled on the bench prior to borehole loading. The operation of MMUs, stemming vehicles, etc can have a significant impact on the safety of an overall charging operation. Issues that need to be considered include bench preparation, traffic management plans, location of initiating explosives, blast hole loading sequence, etc. Little mention is made on the importance of stemming in the overall blasting operation.
	8.12		Much of this is a repeat of earlier material

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	8.12.4.2		2nd bullet point has a typo - should read "600 mm" not "mrn". Relieving hole-misfire treatment: This is not an encouraged practice and should only be considered as a last resort. Drilling near loaded holes should be discouraged and the risk of a mishap increases with the depth of hole to be drilled.
	8.12.4.3		The shattered ground option should be re-numbered 8.12.4.2 so that it is clear that you don't drill a relieving hole in shattered ground before discussing when you do drill a relieving hole.
	8.12.4.6		*Once the explosives have been found it should be treated as deteriorated or damaged explosives and the Police contracted (see section 8.14).* Is this absolutely necessary if the mine has proper procedures to dispose of the stuff? I'd say no but understand why you would refer others to the disposal service Loading out a known misfire: Notifying the police of a misfire on a mine or quarry seems a little pointless as they would have no expertise in handling a misfire. What is the intent of involving the police? This requirement seems to be in conflict with Section 8.12.5. The handling of misfired explosives can vary quite significantly based on whether bulk, packaged or initiating explosives are involved. This needs to be highlighted and possibly the control measures for each detailed.
72	8.12	5	What does "control the mechanics" mean? It means nothing to me. Use clear language
	8.12.5		Need to review and outline the misfire reporting protocols so that they are consistent. Mines and quarries should keep a register of all misfires and these records should be reviewed from time to time by relevant/experienced inspectors to ensure safe recovery processes were used.
	8.13		Is burning the most appropriate method of packaging disposal and is this always carried out? Can an authorized disposal or garbage collection service be used? Is burying on site acceptable? There are many ways that packaging can be disposed of safely provide strong control systems are in place.
	8.14		The best way to avoid deteriorated explosives is to have good stock rotation. The guidance should say that
		last	Misfire blasting - Same issues as before. This could be a JSA not a full risk assessment. What is Aussie std for this?

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76	9	Heading	The heading should be changed to read “Controlling ground stability in excavations”. The negative term is inconsistent with how the guidelines should be put across. We need to demonstrate what we want, not what we don’t want.
76	9.2	4	Don't agree. In hard rock you would normally need an excavator to trim the final batter unless you rip with large dozer. Depends on the rock strength. Usually in hard rock the final wall slope is created by benching, not by sloping the cut face. 4th paragraph is wrong. Large mobile plant is what is best used for trimming batters/scaling faces. Excavators are commonly used. The first sentence should be deleted. The "how" should be subject to a risk assessment as and when required.
78	9.3	General	A risk assessment would determine what monitoring was required and how monitoring was to be carried out. This reads as though all operations will need to have lots of monitoring but many will not due to low risk - likelihood and/or consequence. If there is no consequence then why spend lots of money on monitoring? There is too much technical detail in here.
81	9.3.1.7.1		Now you have got way to detailed. Readers of this guidance do not need to know this level of detail
85	9.5	General	This is totally inadequate for what is becoming a common activity. Stated this in review of the first draft. The section suggests that remedial measures are the safest thing to do, whereas it may be safer not to remedy. It should be reworded so that it doesn’t suggest that bridging or filling is best practice for all workings or the only best practice. Having safe systems to mine through and remove the underground workings may be safer than bridging or filling operations depending on the dimensions of the workings. Bridging and filling are additional and different operations and require additional and different plant and materials. They therefore introduce additional and new H&S risks.
87	9.6	Fig 39	This should make clear the stockpiles are not placed in the escape. Be useful to make a comment to the affect that control of the face angle is possible if the digger arm is not retracted further than 90°.
89	10	General	Needs a section to tie together a clear statement of responsibilities as we did in the draft industry guidance
89	10.2.1	1	Tip-head needs to slope away from the tip edge - water management & slight uphill slope makes it easier & safety to back

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			& just touch the windrow
90	10.2.3	1	Delete word "usually". Clearly if we are end tipping over a tip edge you must back up to the tip edge
	10.2.4	1	Not practical as you need drainage along the tip edge. Slope away from the edge and then allow a slope along the tip edge. The water has to go somewhere. 3rd paragraph is wrong or mis-leading. The best way to compact a dump (tip) is to have loaded trucks circulate close to the edge and tip off to maximise compaction and to avoid soft dump edges, which are hazardous. The paragraph should be re-written and say: "Compaction of tip edges is important to provide maximum short and long term compaction and stability. This is best achieved by having loaded trucks circulate close to the tip edge. When materials are too soft, and in some other cases, this may not be appropriate. Where it is not appropriate to tip over the edge, tipping one truck length or more back from the edge is recommended. Procedures should be established for all tiphead traffic movements to minimise risk of unwanted interaction between vehicles." The discussion about tracked versus rubber-tyred dozers is mis-leading. Compaction is very important and higher ground pressure equipment is an important element of this. When a truck cannot tip over an edge, a rubber-tyred dozer might be the preferred method of pushing off in order to maximise compaction, or because they are quicker to get around a site. It would be better to delete the rest of the paragraph.
		3	In one paragraph you have contradicted all the earlier material on end tipping as now it is *best practice* to tip short. You can't have it both ways. After 9 months developing a safe guideline with WorkSafe input and another 9 months on this document we are back where we started in April 2013.
	10.2.5		*Drainage systems must be maintained*. I would think you would want to do this although the word "must" suggests regulation and I can't find one so suspect it's just inconsistent use of the word. "Drainage systems should be designed by a suitably competent engineer or hydrologist" is a wide ranging statement. This may apply to "internal drainage", within the same paragraph, or near a "watercourse", but shouldn't apply to general / low risk situations.
91	10.2.6	3	They aren't just typical rules of thumb as I understand they have been tested in the field & not just by routine use. I'd like to see these geotech calculations that are referred to as not supporting the half wheel height guideline. 3rd paragraph is fundamentally wrong. Windrows are not a *safety extra*. They are a safety essential. Otherwise it implies

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			that a windrow is technically not a control and that a tip would be as safe without a windrow as it is with a windrow. That is totally incorrect. Windrows not only provide control as a physical barrier, they also keep the wheels of trucks and other vehicles at least 2.7 metres per metre of height away from the crest of the tip face. This has the effect of placing the truck wheels in a position which is at less than the natural angle of repose from the base of the tip face. This is a point that is not normally discussed and is not well understood, but can be illustrated diagrammatically. The existing paragraph should be deleted and be replaced with "Windrows act as a physical barrier to limit and control vehicle movement to keep vehicles away from the tip face. They also keep trucks and other vehicles at a position below the natural angle of repose from the base of the tip face. The base width of a windrow will normally be about 2.7 times its height, and this serves to keep trucks and other vehicles away from the top of the tip face." Or words to that effect.
91	10.2.7		Is there a guideline on the height of the stop-block?
	10.3	4	Same issue as above with a statement that effectively means no end tipping. Make up you mind. Above you say ok where risk assessment says ok. Industry draft guidance was accepted last year - at least informally but now this says quite clearly that you can't do it. It will always be practical to end tip and push over or paddock dump. The description of end tipping which says that it requires regular maintenance and re-building of windrows is misleading and the extra words imply that there are higher risks. The other tipping methods also require regular maintenance and re-building of windrows and there are known examples of dozers over-shooting and sliding down tip-heads, sometimes with fatal consequences. The words should be removed from the description of end tipping and applied to all methods.
		last	I agree where you are tipping directly into water but lets clarify that this does not preclude the situation where you tip onto a bench just above the water. This is common practice in alluvial operations where the coarse rejects from the floating plant forms a bench for the rest of the material to be tipped on to
92	10.4.2		Refers to spotters on foot – doesn't say anything about spotters in a machine e.g. dozer
92	10.4.3	1	Delete "should" and replace with "may". There are other controls available so should be optional
92	10.4.5	General	You need to separate out stockpiles which are live & are dumped on & reclaimed from & tips which are not reclaimed from & used to dump overburden in. Otherwise some of this stuff is confusing.

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			As an example – 10.4.5 makes sense for tipping of material containing large rocks but are all the measures specified needed for gravel and processed stocks (ie relatively small sizes). In this latter case it would need to be a prohibited zone for pedestrians but would you really put barriers at the base of an AP40 stockpile face.
	10.4.6		This sub-section has been written as if it is about dig areas, not about tip areas. The words as used are in the wrong place. Section 10 is about tips. When digging coal or minerals, it may be a requirement to have a dig control spotter on foot observing and communicating with the excavator operator. But that should go elsewhere. 10.4.6 should be re-written to have controls related to foot traffic at tip areas due to the high traffic density. In some cases, a spotter on foot is used at a tiphead, in which case, truck movements do not stop at all. Controls are put in place regarding where the spotter may stand, and how closely a vehicle may approach them, the use of high visibility clothing and carrying a hand-held 2 way radio.
93	10.4.8	2	Some operations use a front end loader which is preferable as it does compact the tip head area but so long as it is not used parallel to and close to the tip edge. Dozers do not compact the edge zone. 2nd paragraph should have limitation of use of dozer only removed. A rubber-tyred dozer may do this work, or an excavator. It is not important what machine does it, so long as it can be done safely, and within the specifications and capability of the machine. Remove the words "by a tracked dozer". 3rd paragraph should be deleted. Repeated end tipping can occur if the material being tipped rills way smoothly. The guideline should make it clear that it is ok for rear tyres to make contact with a windrow, but not to mount the windrow.
		Fig 45	Useful to have a diagram showing how fig 45 works in terms of tipped loads sliding down and stopping at the base then above the next load & so on until the last load essentially remains just at the windrow edge which is when you need to move the tip head along. Needs a cross-section & another plan view. Also the loads don't require you to move along for each truck load as, depending on the lift height several truck loads can be tipped at the same point before that part of the tiphead is full. Diagram is incorrect for left hand cab vehicles, which is typical of all large off-road rear dump trucks. This was also pointed out in the May submission. Last load tipped should always be on the driver's side. The drawing appears to show a right

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			hand drive vehicle but the context of the drawing is not explained and other illustrations are for left hand cab vehicles.
		4	Wording is clumsy. Also need to mention the role of the truck driver when doing this - to check that the windrow is there, right height/width & no cracking visible in the tip head floor
94	10.4.9		1st paragraph refers to applying the park brake. Apparently, some trucks have a tipping brake? Need to confirm and have appropriate words. Needs mention of other truck drivers/operators looking at loads & notifying the truck driver if theirs is off centre/has a large rock in it or anything that might destabilise the truck when the tray is lifted. See Industry draft words below: *Unusual Loads* A system needs to be established for the Loading Operator to inform the Truck Operator any unusual load. Such loads might be wet material or contain large rocks that might compromise safety when the tray hoist is raised, or overhanging material such as when vegetation is being moved. A separate location should be established where required to allow these loads to be dumped without compromising the safety of the active tip-head where end tipping would normally occur.
	10.4.10		The illustration does not show how a tipping truck and tipping trailer work when each is raised for tipping, so it could be misleading. The drawing should show what each type of truck does in practice.
95	10.5	3	The PHMP should have in it an inspection and monitoring schedule detailing who, when & how often as per the draft industry guidance. Another example of confusion regarding tips versus live stockpiles – does 10.5 apply to all tips & stockpiles or just overburden tips? Last a) on page: it would be expected that all affected people would be notified of significant defects at a tiphead because if they are significant, the tiphead should have been shutdown immediately using traffic cones, or with a windrow pulled up across the access. The site safety representative should be informed by the same mechanism as everyone else.
96	10.5.1	1	Some words missing here - doesn't make sense. "slope material is *unable* to support its own weight…" perhaps? Good ref for photos: http://www.msha.gov/TECHSUPP/techexchange/dumppoint/dumppointsafety.pdf

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		3	*Cracked areas should either be clearly marked so the area is not used, or the condition should be immediately corrected by flattening that area of the tip. This can be done by tipping material at the base, and carefully pushing material down from the top using a track-dozer.* It is not clear to me what you mean by this & it doesn't make sense. Perhaps it needs a diagram. I am assuming you mean you drop loads at the bottom as a buttress & then push the top edge of the tip-head off against the buttress to remove the cracked area?
	10.5.2	2	Needs an action to go with this. Helpful if you mentioned the use of TARPs here for the actions
	10.5.3	2 & 4	*…check for soft areas using suitable ground penetration tests.* This is a geotech test & is not practical on an hour to hour basis. Best indicator of soft ground is a visual inspection - rutting, cracking and also visual inspection when a truck backs and tips - ground deformation. Also if you sit in a truck you can feel it so truck drivers need to be taught this & report it. 2nd paragraph has not been written by an operator. Soft areas are invariably detected by equipment being driven over them, creating a rut or depression, not by ground penetration tests. Such tests are usually used to demonstrate that compaction has been achieved, such as when building a dam to certain compaction specifications, not by when it hasn't been achieved, due to material properties. The first sentence of the paragraph should be deleted. 4th paragraph: in dealing with weak materials that need to be dumped, normal practice is to constrain them in a separate, constrained area of the dump (tip) where they can be controlled in a "cell" and carefully capped rather than tipping them at the main tiphead. This practice should be actively encouraged. 4th paragraph: last sentence again refers to pushing using only a tracked dozer, which is too limiting. Refer to comments in relation to page 90, 10.2.4.
97	10.5.5	2	As should loading out from an area where tipping is occurring
	10.6	3	This comment belongs in the design section on access/roads at tips
	10.6.1	2	Unless it's a bob-cat I can't think of any mobile plant that would fit down a draw-point. The draw-points themselves are not that large. The real issue here is machines sliding down into the cone that forms above the draw-point and you talk

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			about this issue rather than dropping into the draw-point itself.
	10.6.1	4	Why the reference to fire-fighting here?
		Table 6	Selection of the right sized loading tool is another control. This section needs to be reviewed for adequacy for loading from an operating face as it looks like it is intended to deal with stockpiles
98	10.7	1	What's wrong with some bullet points on managing this in stockpiles
	10.8	1	You should have addressed the issues around tip design in the earlier section
99	11	1	You should mention neighbours especially if close to a residential area
		2	This is about water or tailings so why mention tips here? Again you will need a section on responsibilities as for tips. I'd be inspecting the controls every shift & suggest that the regs require this especially if they are deemed a principal hazard. A windrow can disappear in a few minutes with a grader or dozer
	11.1		Needs reference to a TARP. In some cases these signs would require immediate action & not waiting on a geotech assessment
100	11.1.4	1	You also need to regularly inspect and measure seepage from the seepage system for increases/decreases in flow and the clarity of the water. Indicators of blocked seepage system or breach of the filter cloth system around drainage material ANCOLD guidelines might be a useful place for some simple guidance material.
	11.3	1	Some information on design should go in here. Reclaim problems are often because the designer doesn't think about how to remove sediment when designing the pond. Must be a requirement of the design.
101			Replace lagoon with pond. Obviously this stuff cam e from UK
		Fig 49	I'd want to be loading out to the ADT instead of dumping on the ground. Given the ADT is located outside the high risk failure zone why do it this way? Seems to me the dumping of water laden silt as shown just creates another hazard. I think you should be designing the pond so you can clean it from original ground if the pond is formed by a dam but clearly not all will be like this. Fig 49 It is worth stating that the distance specified may be reduced where the ground the excavator is sited upon is

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			competent ie rock or consolidated gravel. In this instance a design to be prepared. Its about risk management
102	12	Introduction	Surely you are not serious in calling visitors & contractors risks? Visitors & contractors really are just the risks above I think we must stop distinguishing between contractors and employees as the 2013 regs makes contractors staff just workers - all get treated as workers
	12.2		This is difficult for quarries who may deal with 500 to 600 visiting trucks a day and the quarry operator will not know if the driver of each truck has been inducted.
102	12.3		*Add the use of horn signals. These signals warn nearby pedestrians and operators that the equipment is either starting, moving forward or reversing*
		2 bullet points	Haven't we covered this under the design section? Yes at 5.3.2 so why go over it again? Might be better though to include the design components with the operating sections rather than having it all under a design section.
103	12.4	1	*electricity can arc through a surprising distance depending on the voltage and conditions.* Not a helpful phrase as we stated in the 1st review. What is a *surprising* distance? Include comment on the need for isolation of rubber tyred vehicles for 24 hours following accidental contact with high voltage powerlines to manage potential risk of tyre explosion from internal fire (refer to 16.4.2.4)
		3	We offered good advice on first review. You must surely do this as its the basis of the safety mgt system *If the line cannot be diverted, then a risk assessment and control system needs to be implemented, such as a work permit system, with the use of remote controlled equipment, spotters, and other effective controls.*
		5	I don't think the sign alone is enough
104	12.6		Where has dust suppression gone? Where has fuelling vehicles gone?
105	12.6	1	This is silly and we advised you of this in the first review. This will just discourage operators from installing this gear. If it is not mandatory and you can rely on mirrors then when the devices are not operating you should be able to use mirrors.

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			If you define a mirror as a reversing aid then this is ok but add mirror to the eg to make this clear.
	12.7		This puts the spotter in harms way and should be discouraged - not the best solution
106	12.8	1	Why not give the reader a list of issues to include in vehicle rules for following
	12.8.1		Last paragraph: reference to providing additional spotlights on vehicles is likely to be not WOF-compliant. It would be better to delete this paragraph.
106	12.9	4	Does this mean that all operations need to do stopping distance calculations? Most are using experience to decide on speed restrictions so they are a bit arbitrary. If we are maintaining our brakes and ensuring gradients aren't too steep this seems excessive. This section doesn't really provide any guidance. How do you decide what is excessive and therefore what speed limit to enforce?
	12.10		Same comment for parking. Needs to address managing turbo-charge run-down Needs to address pedestrians at shift end in parking area Needs mention of move forward and reverse horn warning system.
		2	We covered this in our first review. Never take the key out as then you cannot move the equipment for an emergency, they get lost at shift change, or cause delays when a new operator takes over and the person with the key has gone elsewhere. Most mines practice this.
	12.11		Do a risk assessment to establish the safe exclusion zone
107	12.11.2	1	I think this is "prohibit" and not "where reasonably...". I can't think of any reason why anyone would need to be within the exclusion zone while a loading unit was loading. The second paragraph should be deleted as best practice should be to prohibit access during loading, and to cease loading if pedestrian or vehicle access is required within the restricted areas shown in figure 54.

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	12.11.3	1	This is way too vague. What does "as possible" mean? There must be manufacturer's guidelines on this that are all pretty std so lest just say don't load on a slope exceeding ?? along the truck and ?? across the truck.
	12.11.3.1-3		Operators say that these loading rules are not correct so I need to know what ought to go in here "spread loads as evenly as possible during loading" and fig 55, do not work in practice. Trucks and heavy trailers will, in nearly all cases, not be loaded legally on axles for public roads, with an "even" load. Even with a 4 axle trailer (which in theory can be loaded evenly), the load will be to the rear for tipping stability, and less load on the front trailer set, to comply with the "bridge formula" for the truck drive axles and trailer front set. The second bullet point contradicts by "rest loads as close as possible to bulkheads". 1st bullet point Unbalanced loads can make vehicle or trailer unstable and more prone to tipping over during unloading
108	12.13	1	I'd say this is a principal hazard through the recurring event condition. Every time one of these falls on a worker it will kill them. Safest way to transport is not to stack them – Parkside take them one slap high but the slab is about 750mm thick. They use a flat deck truck and load with a front end loader and unload with a large forklift. They stack 6 blocks high.
	12.16		May not be able to lock sidings as these are owned by KiwiRail. Is this safety or security related or both? It should say "Where practicable, have a means…"
109	12.17.1	1	Would be helpful to include an example of internal licensing material
110	12.18.1		This is clearly for heavy vehicles and should say this in the text.
111	12.8.2	Figs 57 - 61	These would be easier to understand if the plan outline view of the plant item was superimposed onto the graph. They are not easy to understand as they are.
	12.18.2.3	1 & 2	1st paragraph: infrared illuminators may work in complete darkness rather than only when it is getting dark as stated. Words should be changed. 2nd paragraph: thermal imaging has been tried in fog at Stockton and did not work. It would be best to delete this paragraph until there is proven technology.

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	12.18.2.4		Often have had to turn off alarms for night use, due to complaints from neighbours. Other options are red flashing light (vs orange) on rear at night and there are other audible warning systems that don't cause noise complaints. The other control is pedestrian exclusion. Low frequency "squawker" alarms can be used in environmentally sensitive conditions.
	12.18.3		Many mine vehicles operate on public roads so a reference to compliance with NZTA Land Transport Rule Vehicle Lighting 2004 Rule 32005 Section 9 Retroreflectors and retroflective material would save a lot of illegal mine vehicles on public roads.
	12.18.3		The last bullet point in the list is inappropriately worded and a more generic statement made that "A system should be developed allowing 2-way radio communication from heavy vehicles to reach a specific light vehicle, either through a clearly visible numbering system or an alternative form of positive identification."
115	12.18.5	4th bullet para 1	*You should install a fire suppression system on all mobile plant and consider fitting to other vehicles as appropriate.* This is a new requirement & is excessive. The issue here is entrapment by fire & for some vehicles this is unlikely & can be controlled with less than full fire suppression on all plant including utes, cars, road trucks… Where did this come from? It might make sense for a large mining excavator or haul truck where getting out of the cab & off the truck is not easy. This is a risk assessment issue. Do a risk assessment!
	12.19.2		2nd paragraph: a water tanker is usually least stable when it is partially full rather than when it is full, due to water movement between baffle plates, assuming that they are fitted as is best practice. Words should be altered to clarify this. 3rd para "it is recommended water tankers are fitted with *pulsed infusion*… What is this? Courtesy of Google; Definition of Pulsed Infusion - A variation of water infusion that has been effective in reducing both explosives consumption and airborne dust concentrations during mining. Water is introduced under pressure into long holes containing explosive charges and forced into the coal seam by detonation of the charges. http://www.mindat.org/glossary/pulsed_infusion Surely you don't want us to do this?

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116	13	General	There does not appear to be a direct reference in this section to the best practice use of Isolation or Lock out Systems. This is covered in 16.2, but suggest there should be a reference to it here also.
116	13.1		Can we please also point the guidance material to the stds 4024 and 1755 for conveyors and guarding
118	13.6		Needs more on ladders, design of egress or is this somewhere else? The requirement for smooth, reachable and graspable handrails to assist with movement along a stair or ladder is questioned. Given that plant operators may be wearing gloves, smooth handrails can become slippery in wet/dirty conditions, and in some locations it may be preferable to specify non-slip surfaces to ladder handrails. D1 is applicable to a "Building" as defined by sections 8 & 9 of the Building Act 2004. It is understood that if a building is required to have a building consent then it will be required to comply with the building code, and be inspected and issued with code of compliance by the local council. Fixed plant and equipment, e.g. Conveyor walkways, screen & crusher platforms do not by definition form a 'Building'. AS/NZ1657:1992's scope better captures the requirements of the types of plant access required to 'operate, inspect, maintain and service' the 'plant'. While the document points the reader to AS/NZ1657:1992 in section '16.1.1 Falls from height' the first paragraph of section '13.6 Access routes' would have the reader believe that the Building code applies: *"Machinery, including mobile crushers, often has areas where access at height is required to carry out routine operations, undertake maintenance or access control rooms."* Recommended that more clarity and examples be provided to what D1 Access Routes applies to, and provide a greater emphasis on AS/NZ1657:1992 for permanent access routes on conveyors, support structures and similar
119	13.7		Also need to mention the need to deal with spillage accumulation within the guard. In the introduction, there should be a reference to AS1755, which is to be replaced by AS/NZS 4024.3610, but has excellent information on Conveyor and other guarding. There are various references to "mesh of a sufficient size to prevent the accumulation of spillage within the guard". The mesh opening size is "regulated" depending on the distance from the Guard to the Hazard, according to Appendix C of AS

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			1755 or AS/NZS 4024.3610 and Worksafe New Zealand Ergonomics of Machine Guarding Guide.
		Fig 67	Fig 67 refers to 2m above ground for "reach", which should be 2.5m under 1755 or 2.7m under 4024.3610
119	13.7	Fig 73 & 74	This is the first time we have a reference to *must require a tool to open*. What is a suitable tool? Is a key a suitable tool? You need to define this. Figs 73 & 74 - we believe these are overkill. Note what appears to be accumulation in fig 74. The nip points must be guarded, as they should when compared to conveyors, but the main drum, with smooth lagging, is a low risk situation, in comparison to the situations which do need attention. With all material handling, there will inevitably be spillage, at times. These will be at the entry, exit and any RAP collar/conveyor. Due to the width of "drums", there is a significant area behind the proposed panel type guards, which will inevitably require entry for clean up. Most Hotmix drums in NZ are guarded at the nip points only, and I'm not aware of an accident with the greater drum.
122	13.7.1	Fig 77	*Nip-point guards that eliminate the in-running nip-points and the drive pulleys are the best way to guard conveyors (for more detailed information see NZS/AS 4024.3610).* It is called AS/NZS 4024.3610, it may be prudent to mention that this is in draft form at the moment, is it going to replace AS 1755:2000? Needs reference to AS1755 as well
123	13.7.1.2		Be useful to list all the guarding and access dimensions from stds 4024 and 1755. A reference to AS/NZS 4024.1801 table would be help to many trying to determine what constitutes adequate protection from reaching through a guard. The distance from guard end to shaft centre should be stated as minimum of 1m.
	13.7.1.4		"install..at, places where people regularly walk along..", then requires further guarding of the skirt at the belt. "walk along or" should be deleted.
	13.7.1.5		The stance of the Quarry Inspections has been to guard all return rollers within 2.5m of ground or walkway, where someone may reach. Tony Forster has recommended a setup per AS 1755 fig 3.3(a), with a maximum clearance of 4mm,which changes to 5mm in AS/NZS 4024.3610 *Conveyor return rollers do not generally present a trap hazard. However, in the following situations a trap hazard exists:*

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			• *Where the belt cannot freely lift sufficiently it presents a trap point because a structure is positioned above the belt* guidance would be helpful, i.e. 120mm. What about where people pass under the belt with the return rollers overhead. For instance, AS1755:2000- Section 5.8(i) – Guarding idlers accessible from underpasses, crossovers and crawlways. This contradicts section 13.8.2.
126	13.7.2	1 & Fig 86	The other option to 2 handed operation is proper guarding so let's not rule this out. A stone guillotine does not cut right to the base of the stone, it splits the stone. The danger area is the top edge & it is possible to guard access to the top edge. Some guillotines require the operator to hold the slab against the backing plate while it is split so 2 handed operation will not work for these machines but they can be adequately guarded.
128	18.8.2		The bit about the Building Act is a bit misleading as many conveyor systems are not in a building and the Building Act will not apply. People may then interpret that that this requirement does not apply. In AS1755:2000 Section 5.3.2 the clearance is 2.1 metres and similar in AS4024. Also, AS/NZS 4024 is not that simple as it allows for low and high risk at 2.5m and 2.7m respectively.
128	13.8.3	1	Too vague. The wording needs to be more specific. Are we talking of a pre starting warning when a conveyor system starts up or are we talking about a warning before each item starts up ?
129	13.8.4	2	A reclaim tunnel needs to meet the definition of a confined space for this to apply. This is: An enclosed or partially enclosed space that is not intended or designed primarily for human occupancy, within which there is a risk of one or more of the following: (a) an oxygen concentration outside the safe oxygen range. (b) a concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation. (c) a concentration of flammable airborne contaminant that may cause injury from fire or explosion. (d) engulfment in a stored free-flowing solid or a rising level of liquid that may cause suffocation or drowning. I think you are approaching this the wrong way as there is more than a confined space issue here or there may not be a confined space issue at all. There may also be a fire hazard and entrapment issue so you need might a second egress.

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			There is a potential isolation issue as well. Maybe best to state there are a number of potential hazards associated with reclaim tunnels and list them then state that you need to risk assess the operation of the tunnel.
129	13.9	3	Worksafe has been very specific as to the appropriate standard. That is very helpful. Why has Worksafe not been so specific about other sections of AS/NZS 4024? For instance, statement on 2.7 meters "out of reach".
	13.11.1		"fire extinguishers are provided…on every floor of a building or structure." This seems excessive in a crushing plant with multiple "floors" around screens and crushers, most which have very little to burn. This should be based on a risk assessment which you state in the opening para but then make prescriptive statements in the bullet points
131	13.11.2		There is detail on the MinEx website that is useful here Be useful to recommend a fire-drill training period (time between refresher training) as well as regular escape drills or is this under emergency response
131	13.11.3		In the context of flammable dusts, I think that there is an opportunity here to distinguish between the fire and explosion or the fire triangle verses the explosion pentagon. The logic behind this is that control options vary between the two environments considerably. For instance, if you have enclosure you are more likely to reach the LEL but can mitigate the effects with technology like FIKE systems, etc.
132	13.11.3	1	There really needs to be a reference here to the appropriate standards that discuss Zones 0,1,2 and 20,21,22 otherwise this section may be misinterpreted
133	13.12		f) and h) should be "must"
136	13.13.2		Always use the term *dredge or floating plant.* Most in NZ are the latter & not dredges.
137	13.13.3	4	Some guideline on the depth of burial & size of the deadman would be useful
139	14		You need to introduce the need for a worker health control plan here. What is it & what's in it. Should there be a section on the management of Asbestos (In relation to both building materials on site, and contaminated material brought on to clean-fill sites?

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139	14.2		Hand drills are used in mines & tunnels. What are *feathers*? Drills are used extensively in exploration & ground support. Adding water to the airline before the pneumatic drill would be problematic. Dust collection unlikely to be possible with hand-held drills.
140	14.2		Spitting or dressing? Maybe Splitting or dressing
143	14.9		The list of opportunities to manage fatigue includes what appear to be both work and non-work opportunities without identifying which is what. The daily or nightly sleep period, for example, should belong at home, not a work. This needs to be made clearer.
145	14.13	1	Flag this. We need more than this. Minerals West Coast started work on some guidance material but it needs geochem input. Need to deal with the issue of mercury being used (amalgamation) in gold recovery and being naturally present in gold ores and so exposure can occur via smelting.
	14.14		1st paragraph - the first few words are self-evident and the wording is inappropriate.
146	14.15		Section looks very good but needs the addition of guidance on each type of PPE as to where/when it should be used. Eg when do you need to wear a hard-hat?
147	14.16	1	Be useful to quote the source for this statement which is regulation 128 Need to make it clear the must applies to those covered by the 2013 regulations
148	15.1		Needs to address access on and off dozers
151	15.5	1	Should we not give a limitation as to what work is expected from portable ladders. 3rd Paragraph ,change this to: Portable ladders should be used for temporary access only, and should not be used as working platforms or a permanent means of access to any item of plant

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			Should the note also raise EWP's as another method for avoiding working at height and measures to be taken when using EWP's. EWP = elevated working platforms.
151	15.6	1	Who are profilers? The hierarchy of control starts with a windrow "capable of supporting a person's weight". This implies an intention for a person to stand on top of the windrow. Windrows are primarily for preventing vehicles from crossing over a hazardous edge. If a person stands on, or can climb over a windrow, the windrow is not a control of the open pit void hazard. On re-reading this, it appears to be referring only to the alternative barrier and seems to mean a fence that won't full over if a person falls against it, but it doesn't say that. Suggested alternative wording is: "A windrow, a fence, or other similar barrier that a person is required to keep to the safe side of, and will not fall over if a person falls against it." The context of having a harness and running line is not clear. How is such a control intended to be applied and what for? The wording of these "hierarchies" needs to be reviewed.
153	16	Introduction	Refers to *competent person.* Be useful to add in the definition in the regulations: **competent person** means a person who— (a) has the relevant knowledge, experience, and skill to carry out a task required or permitted by these regulations to be carried out by a competent person; and (b) has — (I) a relevant qualification evidencing the person's possession of that knowledge, experience, and skill; or (ii) if the person is an employee, a certificate issued by the person's employer evidencing the person's possession of that knowledge, experience, and skill. The inspection regime needs to be risk based or follow the manufacturer's recommendations
153	16.1.1		16.1.1 refers to AS/NZS 1657 *Fixed platforms, walkways, stairways and ladder design, construction and installation*, which is the better reference, whereas previous sections (13.6) refer to *Building Code Clauses D1 Access Routes and F4 Safety from Falling*
154	16.1.4		As this is our industry guidance note it should refer to items we have in our industry chutes, screens and crushers we do

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			not send many workers into reaction vessels, drains, sewers etc. Shouldn't the guidance recommend us to either not make the space confined by further disassembly of a piece of equipment or ensuring there are no hazardous substances or substances present?
	16.1.5		(cadmium fumes can be fatal within hours)
156	16.2.1		(What are type of energy). Radiation, solar, wind, nuclear and other types of energy have been left out of the first sentence.
158	16.2.3		In the paragraph below fig 107, "it is good practice to have a process that uniquely identifies all parts of a system including switches, cables, piping and valves." This sounds good and the intent is good, but cables and piping requires more guidance, of the frequency of labelling, when you might consider a cable tray some 50m long with several cables, or a single pipe draining oil from a crusher back to the oil tank.
158	16.2.4		3rd paragraph is not correct. Tags are not always used, eg when an operator is undertaking a pre-start check on a piece of mobile plant, only a personal danger lock is used. No tag. The word "always" should be changed to "may be". Specify a requirement for **ALL** people working on a Locked out item of plant needing to apply their own lockouts Include provision for Group Lockout systems
160	16.3.1	2	The list of items that a permit to work is far too broad. Normally this concept is used for high risk type activities. Inclusion of jobs involving 2 or more workers means almost all jobs would fit the criteria. This is onerous and unnecessary for routine tasks.
162	16.4.1.2	3 & 1st bullet	Sometimes you use OEM and others OVM. You also need to define the term.
		2nd bullet	You should include detail on this as some don't know/do
	16.4.1.2.1	DBT	Goughs have supplied a good technical review of DBT which recommends against adopting the practice in favour of other controls
	16.4.2.1.1		"Therefore employees should not use compressed air hoses to dust themselves down at the end of their shift" (should probably be added)

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	16.4.2.2		Cage guards aren't available for large tyres? What constitutes a suitable restraining device? Practical examples would be useful. Final tyre inflation is carried out with the wheel on the vehicle. Is the intention to have a cage/guard for initial inflation (wheel off vehicle) or for final inflation (wheel on vehicle) or both? Currently inflation is *undertaken from a place of safety* as a control.
165	16.4.2.3.2		This may be inappropriate for some earthmoving plant and should be risk assessed to see if they are appropriate for some plant items. This monitoring technology is not currently used on all vehicle tyres and this is making it recommended to install it on all vehicle tyres. Installation of sensors should be on a risk-based approach.
166	16.6	4	Accumulation of material in the "crash box". What's a "crash box"?
	16.6.2.1		Para 5. Include "Crowbars must also not be used due to the risk of them catching and moving violently
169	17		Mines Rescue have supplied an assessment of this section & the comments below are from this assessment which is attached to the MinEx submission. Sending a copy of all current emergency management control plans to the Mines Rescue Trust could be a big overkill – best consult with them as all mines, quarries and alluvial operations would flood them, does this help them or weigh them down with unnecessary paperwork?
183	Weak rock		Needs to include Cemented Gravels.
	General		It would be helpful to list all the footnote references that are in each section at the start of each section – just a list of references not every footnote.
	General		There are various references to things or people being authorised in writing and it might be useful to add an appendix capturing all of these.