# ‘A’

**IN THE CORONERS COURT**
**HELD AT BURNIE**

**IN THE MATTER of the**
**CORONERS ACT 1995**
**-and-**
**IN THE MATTER OF INQUESTS**
**TOUCHING THE DEATHS OF**
**JARROD KEITH JONES,**
**MATTHEW DAVID LISTER and**
**SIDNEY THOMAS PEARCE**

**Cor: D J Jones**

**Wednesday, 21 May 2008**

Prior to delivering my finding in this matter, I wish to publicly acknowledge some of those who have assisted me in reaching my findings.

Firstly, I wish to thank all counsel who have appeared and I thank them for the courtesy extended to the large number of witnesses, who attended during the 4 weeks of the reception of evidence. I also thank them for the well researched submissions that they tendered to assist me in reaching my findings and recommendations.

I also wish to thank all the witnesses whom I know find it difficult and daunting to make themselves available for questioning. Of course their value can never be underestimated, for without their sacrifice the Court would never be able to determine the issues arising.

I also wish to publicly acknowledge the tremendous assistance provided to me by Counsel – Assisting Mr Michael O’Farrell. Michael’s contribution has been exemplary, his professionalism in his research and his presentation has been nothing short of awe-inspiring. Thank you Michael.

I also wish to acknowledge the invaluable assistance provided by way of a very extensive report prepared by Workplace Standards Tasmania

I also thank the support staff of the Coroner's Office for all their assistance both before and during the hearing.

I also wish to express my gratitude to the families of Jarrod Jones, Matthew Lister and Sidney Pearce for supporting me during this lengthy inquest. Their emotional support has encouraged me to be as thorough as I can possibly be, and I thank them for their understanding in what has been a long and difficult inquest, not just for me, but also for them in having to relive the loss of loved ones.

In commencing my findings it is important that I remind myself of my obligations as a Coroner and the role and function I am to perform.

These inquests are held pursuant to a direction by the Chief Magistrate made on 10 March 2004.

The *Coroners Act 1995*, s28 relevantly provides:

> **(1)** A coroner investigating a death must find, if possible –
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> **(a)** the identity of the deceased; and
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> **(b)** how death occurred; and
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> **(c)** the cause of death; and
>
> **(d)** when and where death occurred; and
>
> **(e)** the particulars needed to register the death under the *Births, Deaths and Marriages Registration Act 1999*; and
>
> **(f)** the identity of any person who contributed to the cause of death.
>
> **(2)** A coroner must, whenever appropriate, make recommendations with respect to ways of preventing further deaths and on any other matter that the coroner considers appropriate.
>
> **(3)** A coroner may comment on any matter connected with the death including public health or safety or the administration of justice.
>
> **(4)** A coroner must not include in a finding or comment by statement that a person is or may be guilty of an offence.

It is on this basis that I proceed to make the findings.

## Introduction

1. These inquests concern three tragic deaths at the Renison Bell tin mine ("the mine") near Zeehan in Tasmania.

2. On 6th June 2001 Jarrod Keith Jones and Matthew David Lister met their deaths as a result of a rock fall at the Heemskirk 1670 Level in the mine.

3. On 5th May 2003 Sidney Thomas Pearce was killed by a rock fall at the Huon 1359 Level in the mine.

4. The rock falls resulted from very different causes. They were in different parts of the mine. These inquests have however, pursued an investigation into wider issues relating to the work practices, management and safety issues at the mine, in particular during the relatively short period intervening the lethal rock falls.

5. The issue is whether any of the deaths could have been prevented, not as an instance of blame or liability, but with a view to assisting operators of the mine and the mining industry generally from preventing or minimising the risk of accidents of this nature from recurring.

## Historical environment

6. The Renison mine (as it is known locally) is located on the Lyell Highway, about 160 km South of Burnie and 20 km North of Zeehan. Tin was first discovered in the vicinity of the mine in 1890 by George Renison Bell. In the late 1950s the mine was developed as one of the largest underground tin mines in the world. Historical production from the Renison District from 1890 – 1999 has totalled 180,451 tonnes of recovered tin. For most of the period until April 1998 it was owned and operated by RGC Ltd (formerly Renison Goldfields Ltd) when it was sold to Renison Bell Ltd ("RBL"), which was the owner of the mine during all relevant periods. It is with this owner that this inquest is concerned. RBL was a subsidiary of Murchison United Ltd ("Murchison").

7. In about 1994 RGC commenced the development of the Rendeep ore bodies. These comprise an area in the Northern part of the mine and extend from about the 1680 level, at the top of the Heemskirk ore body to 1334 at the bottom of the Huon ore body. As will become apparent the ground conditions encountered in the Rendeep ore bodies were different than those encountered in the higher parts of the mine that had been previously developed. They required more geotechnical management.

8. In its Annual Report for 1999, Murchison announced that it had undertaken a detailed review of its operations and amongst other things had contracted out its mining and haulage functions.[1] During the period ending 30 June 2001 a firm called Henry Walker Eltin ("HWE") was contracted to operate the mine. This included the installation of ground support.

9. In May 2001 a further restructuring was necessary as a result of the onset of lower tin prices. For the time between July 2000 and 30 June 2001 Skilled Engineering Ltd were contracted by RBL to provide labour and mine services.

10. By June 2001, the incoming operator Barminco Ltd, had already begun to put plant and equipment at the mine while HWE were winding down their operations.

11. At all times after 30th June 2001 until at least May 2003 Barminco Ltd ("Barminco") was the mine operator. Barminco was contracted by RBL for that purpose. For the purposes of this inquest, it is important to understand that the contractual arrangements left the responsibility for mine planning and design to RBL, which would issue plans to Barminco for the execution of the work. This included designs and plans for ground support.

## Jarrod Jones and Matthew Lister

12. Jarrod Jones was a miner who had been employed by Skilled Engineering Ltd since 5th July 2000 and had been a miner since 1995. He was competent to drive light vehicles and had learned to operate plant, including rock breakers, under the instruction and supervision of other miners.[2] This is consistent with the system of training that was commonly used in the mine at the time. In his record of interview, Mr Jones' shift boss, Peter Llewellyn, described Mr Jones as an experienced operator of rock breakers. In evidence he described him as "quite competent" as an operator of rock breakers. He was said to be a competent miner.

13. Matthew Lister was a mine planning engineer. He had been employed by RBL since 13th December 1999. On 23rd March 2001 his status was changed to "Trainee Miner" in order for him to gain practical underground experience, which would eventually allow him to become a qualified Mine Manager. It was in this capacity that he was

1 Murchison Annual Report 1999, DVD File 34-11, p7
2 T-Llewellyn April 2004 p110

working with Jarrod Jones on 6th June 2001, gaining experience in underground mining in all of its facets.

## Heemskirk 1670 level

14. After the accident on 6th June 2001, the then Senior Geologist Christopher Mroczek produced a history of the Heemskirk 1670 level.[3] The document is dated 28th June 2001 and was produced in part to assist Mr Max Lee of Australian Mineral Consultants ("AMC") to investigate the cause of the rock fall. Mr Mroczek was assisted by Jody Altmann (then "Jody Gaylard") to locate the supporting records.[4] Some of the document is based on Mr Mroczek's significant personal knowledge of the mine.[5] He commenced work at the mine on 3rd December 1990 as a geologist. The relevant parts are:

> *"The Heemskirk orebody is located in the northern part of the mine and is the upper most of the Rendeep orebodies. The orebody extends down dip from the 1680rl to 1570rl and in strike from 66600N to 66750N (surface is 2200rl).*
>
> …
>
> *The site of the fatal accident is in the upper part of the ore body at the 1670 level where the orebody passes into barren dolomite. Hanging wall to the No 2 horizon is the Red Rock Member (RRM) a sequence of interbedded volcaniclastic, cherty sediments. The footwall Renison Bell Member (RBM) is a siliciclastic sequence of interbedded siltstones and sandstones. In the vicinity of 1670 the hanging wall contact dips at 30°.*
>
> *The development of the HE 1670 drive commenced in August 1994. The sill drive was the first Rendeep development heading mined. No layout, design or MPA was issued. Period reports at the time make reference to Mining Plan Approval (MPA) 906 but this was never prepared. The only recorded design is a Mine Design memorandum (MDM) 0024 issued by the Chief Mining Engineer at the time on 2/8/94. This MDM shows the proposed development (6m x Srn arched) to the footwall of the Heemskirk orebody. The footwall of the orebody was reached in early October as the first recorded ore production was on the 4/10/94. Up to that point, information from daily plods shows that 20 chemical bolts, 23 split sets and 2 sheets of mesh had been installed in the access.*
>
> *At this time, with the exception of specific areas such as the Envelopes, ground support was decided on at an operational level. Chemical bolt spacing was random based on that marked up by the miners involved in check scaling. Meshing and spilt setting was still the responsibility of the crews but with more input from the co-ordinator.*
>
> *Development of the HE 1670 sill in ore continued. By the 11/11/94 the area of the failure had been mined. The drive would have been heading south at this time and the face would have been at approximately 66665N. Accepted practice at the time was to mine all the ore from footwall to hanging wall as mining progressed. This resulted in an opening'" 20m x I5m in the area of the eventual failure. This method*

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3 P50

4 T- Altman 7/12/07 p1836

5 P50, 1st para

*of mining was accepted practice and had developed over 27 years of mining history in the upper part of the mine. It was not until later that the Rendeep area was considered as a 'new' orebody (eg higher talc, steeper dipping stratigraphy) compared to the upper mine and had to be approached differently ie mining narrow development drives for example which was implemented in late 1998/ early 1999.*

*From the 4/10/94 to 11/11/94 an additional 50 chemical bolts were installed, in and around the failure area. On the 11/11/94 a round of ore was mined, the next ore round was taken on the 21/11/94. In the intervening period 37 cable boltholes were drilled on the 16/11/94 and 17/11/94 in and around the failure area. The holes were drilled with a jumbo, orientation = vertical, hole length = 4.2m and hole diameter = 50mm. Five metre plain, single strand cables were installed and grouted on the 18/11/94. It is not clear from the plods if all the holes drilled were cabled and what pattern was used. The cables were not plated. It was common practice at the time for the scaling crew to mark up an approximate 2m x 2m pattern for cables with input from the co-ordinator. It was then left to the jumbo operator to drill the holes as close to the marked positions as possible. A survey pick up of intact cable bolts on 20/6/2001 identified 18 jumbo cables outside the failure area implying if all cables had been installed 19 cables would have been in the zone of failure. At the time longer cables were not routinely installed if they were it was usually in specific areas and designs were issued by Mine Planning.*

*After cabling, mining of the sill continued south till early March 1995 when the orebody pinched out. A further 43 chemical bolts were recorded as being installed in the area south of the failure.*

*The HE 1670 sill was then used as an access to extract two other ore bodies. Between July 1996 and November 1996 the Blackwood 1670 South sill was mined and the bench to the 1694 level was extracted between April 1997 and June 1997. The plods for this period of time could not be located and it is uncertain whether any additional ground support was carried out in HE 1670 prior to mining the Blackwood other than check scaling.*

*In January 1999 development from the south end of HE 1670 sill was commenced to access the Blackwood South 1670 orebody. Prior to this a campaign of scaling, meshing and cabling was carried out from 8/10/98 to 27/11/98. During this period 71 split sets were installed, 9 sheets of mesh and 35 cable bolts. The split sets and mesh were installed as determined by the scaling crew along the length of the drive; the cables were installed to the south of the failure area. The cables were 7m plain, twin strand, grouted and plated. No designs were issued for these cables. There is still evident on the backs in HE 1670 just south of the failure area a 'scaled to' line dated 3/1 0/98. The plated cables were installed mainly to the south of this line. The assumption is that the area of failure was scaled and assessed as not requiring additional ground support.*

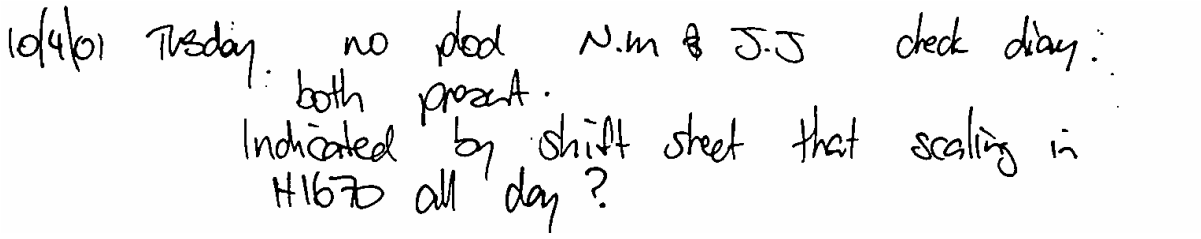
*By the end of 1997, with more and more development drives being mined in Rendeep, and the poorer ground conditions, it was realised that the mine needed a permanent geotechnical presence. Coffey's were approached in early 1998 to conduct a geotechnical audit and make recommendations to improve geotechnical / ground support practice. This process resulted in a geotechnical engineer being employed in November 1998 followed by an engineering geologist in early 1999. An audit report was completed by Coffey's in February 1999 and the geotechnical engineer had by mid 1999 completed a set of comprehensive ground support*

*guidelines for use by the site. All this happened post the installation of all the ground support in the HE 1670 sill.*

*As a consequence of implementing better geotechnical practices, geotechnical mapping of existing voids was commenced. HE 1670 sill was domain mapped by the engineering geologist in May 1999. The ore zone in the area of failure was deemed 'massive and competent' and assigned a Q' of 6.6 and RMR of 54. Principal structures for the ore zone, hanging wall and footwall were also recorded. The engineering geologist noted at the time that the cables where the backs eventually failed were not plated and there was no mesh. On the 22/12/99 the engineering geologist (7) issued a plan requesting that the cables be plated. A comment on the same plan, dated 19/0/00 stated "old cables will make this impossible".*

*No further work was carried out in HE 1670 until June 2001, leading up to the failure."*

15. Mr Mroczek in his report stated that no further work was carried out in Heemskirk 1670 until June 2001, leading up to the failure, but I do note from my investigations there are two references to work being done in the area prior to June. Firstly the plods disclose that on the 9th April 2001, an instruction was issued to check scale Heemskirk 1670 and the instruction was completed by T Honner and F Pfab with the notation "c/scaled rockbusted more scaling to mesh and bolt (see 03:01 Summary of Machine Use and Personnel Movements). In other notes (in Volume 03:03) reference is made to shift sheets which appears to indicate that a NM &JJ ( which I infer refers to N Maine and Jarrod Jones) did undertake scaling in the area prior to June and as early as April 2001 (See inset below).




**Excerpt from Exhibit 03:03**

16. A number of important matters appear from this brief summary.

17. First, it would appear that at the time of the accident on 6th June 2001, RBL had available sufficient records to assist senior staff in determining the ground support that had been installed in a particular part of the mine and when such ground support had been installed and such information was clearly available as it pertained to the Heemskirk 1670 level.

18. Secondly, it would have been known or information was available at the time of the instruction being given to re-enter Heemskirk 1670, that when the area was first developed decisions as to the level of the ground support being installed were made by the crews. (It was indicated by Dr Fuller in his report that the choice available to crews at the time of the installation of ground support in Heemskirk included 2.4m long 46mm diameter Split set friction bolts, 2.4 m long resin anchored solid bar bolts with 22mm nominal diameter, 5m long, 15.2mm diameter single strand cable bolts, fully grouted with cement and mesh. It would appear from the comments of both Mroczek and Dr Fuller there was very little design or planning of ground support.

19. Thirdly, from about 1997 it was known that a permanent geotechnical presence was needed at the mine, particularly for the management of the Rendeep orebodies.

20. Fourthly, the ground support actually installed in the area of the rock fall included 5 metre single strand cable bolts. However, they were only drilled to a length of 4.2 metres. Mr Mroczek estimated that there may have been about 19 cable bolts in the failure area.

21. Fifthly, in 1998 more cable bolts were installed to the South of the failure area. The records show that Mr Llewellyn had assisted in installing these and he confirmed that in evidence. Importantly, these bolts were 7 metre twin strand cables which were plated.

22. Sixthly, the failure area was in an area with a very wide span. This was not uncommon at the mine, but this heading at the 1670 level was the first into the Rendeep bodies. The other wide spans had been cut in higher in more stable parts of the mine. So large was the excavation in the Heemskirk 1670 drive it was consistently described throughout the hearings as “the ballroom”. It would appear from the evidence the area had a roof span of 15-16 metres and a length of 18-20 metres

23. There are other issues dealt with by Mr Mroczek which will become relevant when Dr Fuller’s evidence is considered.

## Purpose of the development

24. The purpose of the rehabilitation work undertaken in 2001 was to gain access to and mine a small bench at the back of the 1660 sill to the floor of the 1670 sill.[6] The depth of the ore was about 5 metres and it was slightly off set from the 1670 level floor. It was intended to drill down holes from the 1670 level in order to extract the ore from the bench.[7]

25. At some stage I infer, a decision was made by RBL management to mine this bench. It is not clear from the evidence when this decision was made. In his evidence, Mr Clive Thompson the mine manager said that before such a decision was made, it would have been discussed at a planning meeting at which all RBL technical staff would have been present. These meetings were regularly held each Tuesday.[8] Their purpose was at least in part, to allow all of the engineers and geologists at the mine to bring their collective experience and knowledge to bear on each aspect of the mine planning process. This included knowledge of the geological structures in the areas to be worked as well as the ground support. However, it did not entail an historical search of records to determine whether and if so, what particular ground support was installed.[9] At this time the technical staff at the mine numbered 15, including geologists and a geotechnical engineer. It would also appear that no records of these meetings were kept, and I assume therefore not disseminated to the underground crews.

26. In the case of the Heemskirk 1670 level, neither Mr Thompson nor Ms Altman could recall such a meeting. However, Ms Altman recalled that she knew that the intention was to "[go] back in there".[10] In her interview with Mr Sears, Ms Altman recalled going past the 1670 access and looking into the crosscut about 2 weeks before the accident. She saw rocks on the ground and decided to return with someone who knew the area. She was not aware of what ground support had been installed in the area.[11] In evidence she did not recall being asked to conduct a geotechnical assessment of the

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6 Transcript – Lee 15/11/07 p361
7 Transcript – Thompson 4/12/07 p1559
8 T – Thompson 5/12/07 pp 1542, 1552-3, 1561, 1668
9 T-Thompson 3/12/07 p1410
10 T-Altman 7/12/07 p1848
11 P189, p7

area.[12] I note that if she had gone past within two weeks of the accident and observed fallen rocks they could only have occurred after the area had been check scaled in early April 2001 (See comment above at page 7).

27. In any event it is clear that Ms Altman did not make an inspection, or geotechnical assessment of the area before 6th June 2001.

## Mr Llewellyn's inspection

28. From Mr Llewellyn's evidence it can be inferred that he and other shift bosses would have been instructed by management to rehabilitate the area. Mr Llewellyn went into the area some days prior to the accident to inspect it. He saw that there was ground support including the tails of cable bolts. He said that he assumed the cable bolts were 7 metres in length. He did not know that they had only been drilled to 4.2 metres. He said that had he known that the cable bolts were only 4.2 metres, he would have checked the area more thoroughly.[13] In previous evidence Mr Llewellyn said that he would not have sent Jarrod Jones and Matthew Lister into the area without having seen the engineers to see why there were not 7 metre cable bolts installed. [14]

29. Had Mr Llewellyn referred the issue to "the engineers" it is likely that Ms Altman would have been consulted. Had she known that the cable bolts were only 4.2 metres long, together with the fact that they had been installed in 1994, she would have treated the ground as if there were no cable bolts in it at all.[15] Basic geotechnical knowledge would have told her that 4 metre cable bolts were insufficient.

## Scaling the drive

30. At the start of their shift on the morning of 6th June 2001 Jarrod Jones and Matthew Lister were directed by Mr Llewellyn to do two jobs. The first was to rock bust and scale the Heemskirk 1670 drive and the second was to check scale the Zeehan 1500/1480 rise and prepare and fire the Zeehan 1500 bench.[16]

31. The 1670 scaling job was not a priority. It was a secondary job that was to be done when there was nothing else pressing for the men to do. The job had probably been

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12 T-Altman 7/12/07 p1848
13 T- Llewellyn 12/11/07 p8
14 T-Llewellyn April 2004 p119
15 T-Altman 7/12/07 p1853
16 C3 p16

ongoing for sometime, as far back as April 2001. There had been another crew apart from Messrs Jones and Lister performing the work.[17]

32. The object of the scaling was to remove any loose rock from the backs and sides of the drive so that it could be safely accessed for production. A miner performing the scaling always works from scaled ground, which is safe to unscaled ground, which is not known to be safe. In manual scaling using a scaling bar, the work is always performed in front of the person doing the work; the obvious purpose being to stop any rocks that are brought free from falling on them. The same is the case for mechanical scaling using a rock breaker.

33. Scaling the Zeehan 1500/1480 rise was completed by about 11:00am. Mr Llewellyn saw Messrs Jones and Lister at Zeehan 1500 and instructed them to complete the scaling of the Heemskirk 1670 drive. At some stage during the day they had told Mr Llewellyn that they would need a mechanical scaler (or rock breaker; colloquially "rock buster") to complete the job. Mr Llewellyn had told them that they could collect the scaler from the surface.

## The ME112

34. The mechanical scaler to be used was the ME112. This consisted of a scaling mechanism mounted on a vehicle. The scaling mechanism consisted of a pneumatic hammer mounted on a boom which extended from the top part of the front of the vehicle. In its normal operation as designed, the boom could move both horizontally and vertically through an arc of about 50 degrees from a pivot on the vehicle.[18] The hammer was also articulated with the boom, so it could be moved further through a vertical plane central to the end of the boom.

35. The boom was also designed to extend for some 1800 mm.

36. The vehicle had a cabin in which the operator could drive or "tram" the vehicle to the site of the scaling. This was usually done with the boom down and fully retracted to allow it to be manoeuvred in the drives in the mine. Once stationary at the site the vehicle could be fixed in position by 4 legs mounted at its sides. It could be operated by fixing only two of the legs but this was not the preferred way of using it. It was more stable if all four legs were down. The operator could sit in the cabin to operate

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17 T-Llewellyn April 2004 p17; 12/11/07 p29

18 T-Howard April 2004 p285

the scaler, although it would seem that this was not always the preferred method of operation. Sometimes the operator would stand on the back part of the vehicle with the controls of the boom to allow better vision of the scaling operations.

37. The higher the boom was raised from the top of the vehicle, the closer the hammer to the front of the vehicle bringing the operator closer to the rocks being scaled. Of course, when the boom was extended the operations would take place further from the operator.

38. There was some evidence that rocks would sometimes roll down the boom towards the cabin, particularly when the boom was raised to its highest point. However, this was relatively inconclusive and does not assist the resolution of any particular issue in these inquests.

## Tags and the No Go Bay

39. There is evidence that there were three types of tags used at the mine for the purpose of marking machinery as defective.

    (a) Danger tag: a red and white or red and black tag that signified the machinery could not be operated. It had to be repaired where it was. Only the person who placed the tag on the machine, the mine manager, or other senior manager could remove it.

    (b) Information tag: orange or green tag to inform the person operating the machinery of a defect. This also appears to be described as a caution tag.

    (c) Out of service tag: yellow and black tag to signify that the machinery was out of service until it had been fixed. The person fixing the defect could remove the tag.[19]

40. There was some confusion about the place from which Messrs Jones and Lister picked up the ME112. Some witnesses said that it was in the "No Go Bay". This was a place theoretically reserved for plant and equipment to be left when in need of repairs. If the machine was left there, it should not have been taken because it was still required for repairs by the fitters.

41. The original no go bay was at the north side of the workshop yard near the fitters shop. The go area was on the south side. It will be recalled that in June 2001 there

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[19] C37 p5

had been a restructuring. HWE was leaving and Barminco had been appointed the incoming contractor. Barminco had already brought some of its plant to the site, taking up the south side. This meant that RBL machinery was left on the North side. The go area became the west side of that part of the yard with the no go bay in the east. Mr Llewellyn did not give unqualified agreement to this. However, he said that there was always an overflow of machinery in the yard and sometimes the go and no go machinery would become mixed.

## Defective mechanism

42. It is evident that for some time prior to 6th June 2001, the remote mechanism used to operate the rock breaker on ME112 was defective. A micro switch that operated the boom extension did not function.

43. Thomas Honner gave evidence that he had discovered the problem with the boom, taken the rock breaker to the surface and reported it to Scott Noonan, a fitter, who identified that the problem was caused by the faulty micro switch.[20] It is not clear when this happened. It may have been as early as 13th March 2001, or as late as 9th April 2001. The evidence is inconclusive.[21]

44. When the matter was first reported to Mr Noonan he said that he went underground to fix it.[22] He took the remote mechanism back to the workshop, pulled it apart and identified the problem. He then went to his shift boss Mr Llewellyn and told him about it.[23] Mr Llewellyn and the Underground Superintendent Brenton Stead asked Mr Noonan if there was anything else wrong with the rock breaker, apart from the inability to extend the boom. Mr Noonan told them there was not. They then instructed Mr Noonan to put the controls back together so that the rock breaker could be used. Mr Noonan asked them whether the boom should be extended or retracted. They told him to leave it retracted.

45. A work order[24] made by Mr Noonan suggests that the problem was notified to him on 20th April 2001. This was a week after Mr Honner had previously operated the machine. It seems that Mr Noonan may have requested the new part on 23rd April 2001.

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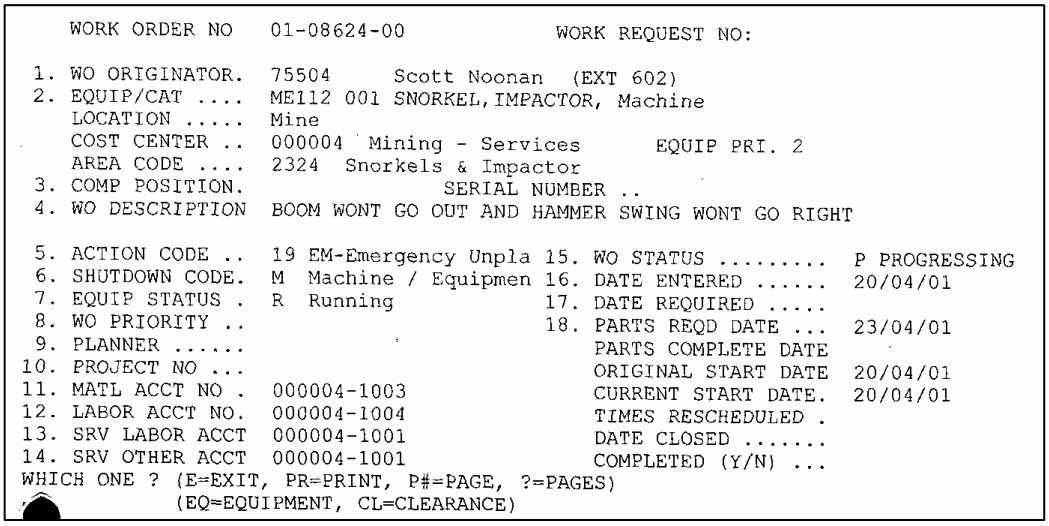
20 T- Honner April 2004 p349ff
21 C11
22 T-Noonan April 2004 p388
23 T-Noonan April 2004 p389
24 C38



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    WORK ORDER NO   01-08624-00            WORK REQUEST NO:

 1. WO ORIGINATOR.  75504     Scott Noonan  (EXT 602)
 2. EQUIP/CAT ....  ME112 001 SNORKEL,IMPACTOR, Machine
    LOCATION .....  Mine
    COST CENTER ..  000004 Mining - Services      EQUIP PRI. 2
    AREA CODE ....  2324  Snorkels & Impactor
 3. COMP POSITION.                SERIAL NUMBER ..
 4. WO DESCRIPTION  BOOM WONT GO OUT AND HAMMER SWING WONT GO RIGHT

 5. ACTION CODE ..  19 EM-Emergency Unpla 15. WO STATUS .........  P PROGRESSING
 6. SHUTDOWN CODE.  M  Machine / Equipmen 16. DATE ENTERED ......  20/04/01
 7. EQUIP STATUS .  R  Running            17. DATE REQUIRED .....
 8. WO PRIORITY ..                        18. PARTS REQD DATE ...  23/04/01
 9. PLANNER ......                            PARTS COMPLETE DATE
10. PROJECT NO ...                            ORIGINAL START DATE  20/04/01
11. MATL ACCT NO .  000004-1003               CURRENT START DATE.  20/04/01
12. LABOR ACCT NO.  000004-1004               TIMES RESCHEDULED .
13. SRV LABOR ACCT  000004-1001               DATE CLOSED .......
14. SRV OTHER ACCT  000004-1001               COMPLETED (Y/N) ...
WHICH ONE ? (E=EXIT, PR=PRINT, P#=PAGE, ?=PAGES)
            (EQ=EQUIPMENT, CL=CLEARANCE)
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**Extract of Work Order**

46. I note from this work order that it discloses not just a problem with the boom extension, but also with the inability of the hammer to swing to the right. There is no other reference to this particular problem and I am unaware as to whether this was corrected or not, or whether it may have played any part in relation to the accident. Of course, it may have been corrected and the only item to be fixed was the micro switch. It would seem from the evidence of Noonan, when it was first reported to him by Honner there was no problem with the boom, save and except the ability to extend, so it may be that the machine was used after this and suffered some damage or mechanical failure which led to it being rejected later by Howard.

47. It is likely that the conversation between Mr Noonan and Messrs Stead and Llewellyn occurred between 20th and 23rd April 2001.

48. Grant Howard gave evidence that on 25th April 2001 he was to use the rock breaker with Matthew Lister for the purpose of scaling the hanging wall in Bruny 1550. He discovered that the boom was not working properly; it would not retract or extend. He had a discussion with Mr Lister to the effect that he thought that the rock breaker was unsafe to use and should be returned to the surface. Mr Lister told him that the rock breaker had suffered from this defect for some time, but that others were still using it.[25]

49. Mr Howard said he contacted Brendon Morrison, a fitter, who found that there was a part missing.[26] This is consistent with Mr Noonan's account that the micro switch

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25 T-Howard April 2004 p220f

26 T- Howard April 2004 p221

was removed. Mr Howard then says he contacted his shift boss, Mark Smith. He told him that he did not want to operate the machine in its defective state. Mr Howard said he then took ME112 to the surface and parked it in an old fuel bay. He put a "Danger – Do not operate" tag on the machine.[27] Mr Noonan seemed to think it was an out of service tag.

50. Brendan Morrison gave evidence. He confirmed that Mr Howard had reported the matter to him and that he had found there was a part missing.[28] However, he thought that the tag that was placed on the machine was an out of service tag.

51. Mark Smith, an underground miner gave evidence.[29] He said that he was aware that the rock breaker was out of service because the boom arm would not extend and that it was in the no go bay. In his interview with Mr Sears and Mr Las he said that he thought that the rock breaker had an information tag on it and that Mr Llewellyn had authorised Messrs Lister and Jones to use it.[30]

52. Messrs Howard, Noonan and Morrison were made redundant in May 2001. Mr Howard seems to have become disaffected with Murchison. Messrs Howard, Noonan and Morrison gave evidence that they last saw the rock breaker on site in the no go bay. However, this was some time before 6th June 2001.

## Events leading up to the rock fall

53. It is clear from the evidence that between 11:00am and 12:00 on 6th June 2001, Jarrod Jones and Matthew Lister collected the rock breaker from the surface and trammed it to the Heemskirk 1670 access. They were seen at crib time, about 1300 hours by their work mates.[31]

54. At about 1400 hours Mr Llewellyn saw Messrs Jones and Lister operating the rock breaker in the 1670 access. He had taken some firing plans to them to enable them to complete the preparations to fire Zeehan 1500. Mr Llewellyn thought the rock breaker was operating safely. There was nothing to cause him concern.[32] Mr Llewellyn thought that they would return to the surface after they attended to the job at Zeehan 1500. He did not know they had returned to the 1670 level.

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27 C17
28 T- Morrison April 2004 p396
29 T-Smith April 2004 p385
30 C36
31 T- Smith April 2004 p385
32 C3 p20

55. At about 1630 hours Messrs Jones and Lister were observed to be travelling back to the 1670 level by Mark Smith, Thomas Honner and Frank Pfab. They were in a utility at the intersection of the North Renison decline and the Blackwood incline. They asked whether Messrs Smith, Honner and Pfab would plug in the firing that they had loaded at Zeehan 1500. Mr Smith said that he, Honner and Pfab agreed to do this, as they were about to plug in a firing they had loaded.[33] That would appear to be the last time that Messrs Jones and Lister were seen alive.

56. It can be inferred that they returned to Heemskirk 1670 to continue mechanical scaling on ME112. They had previously been seen operating the rock breaker, with Jarrod Jones sitting in the cab and Matthew Lister standing on the back, probably shining a light on the backs to help Mr Jones see what he was doing. Their positions when they were found suggest that this is how they were operating the machine at the time of the rock fall.

57. At about 1750 hours Peter Llewellyn noticed that Messrs Jones' and Lister's tags were still on the tag board and had not been removed to the Out board.[34] Between about 1800 hours and 18:05 he asked Jozef Phillips from Maxfield Drilling to go to Heemskirk 1670 to see if he could find them. Mr Phillips did so and found the rock breaker with a heap of rocks on it. He went to the right side of the rock breaker and discovered an arm under the rocks. He ran to other side calling out, but more rocks fell out of the backs, so he left the area and called Peter Llewellyn on his radio.

58. There is no doubt that Jarrod Jones and Matthew Lister died as a result of a rock fall that occurred sometime between 16:30 and 18:00. It is likely it occurred before 17:30, because that is when they are likely to have commenced their journey back to the surface at the end of their shift.

## Mechanism of the Rock fall

59. The report of Dr Peter Fuller[35] a highly qualified geotechnical engineer, deals with the mechanism of the rock fall in detail. The conclusion in the report is as follows:

> *"From the facts presented in this report, the ground fall has been caused by the intersection of structures in the back that has allowed the block to release with only minimal rock fracture. The majority of the fall was from a wedge of ore left in the*

33 T-Smith April 2004 p 385
34 T- Llewellyn April 2004 p80
35 C40

*back of the Heemskirk 1670 access and it was bounded on the east and south-east side by the hangingwall, the north side by a steep joint or ore-dolomite contact, the north west side by the ore-dolomite contact and on the south west side by a joint. A major structure not exposed and/or identified in previous geotechnical mapping with a dip of about 10° towards about 290° has formed the top of the failure at its thickest zone.*

*There is evidence to suggest that the block did not fall vertically but rotated around the lower hanging wall where the failure zone was thinnest. In this area the rock bolts functioned more efficiently than in the centre of the zone where they were not long enough to be properly anchored above the upper failure surface.*

*From the detailed survey of the fall conducted by the Renison surveyors, the volume of the fall was 117±10m3. Its weight was between 396 and 470 tonnes and based on an average density of 3.7 tonnes/m3 for Heemskirk ore.*

*Of the estimated 40 rock bolts installed through the failure zone, only a few through the thinner part of the failure block appear to have offered any significant resistance to the fall. This meant that a substantial portion of the weight of the block was applied to the estimated 19 single strand cable bolts distributed through the fall area on a nominal 2m square pattern. The installed cable bolts were long enough to be anchored well above the bounding structure but the majority of these had suffered such severe local corrosion where they intersected the upper failure surface that their tensile strength was reduced to only a small percentage of their rated 25 tonne capacity.*

*As a result. once the block started to rotate and move downwards there was insufficient strength capacity in the installed cables to resist the downward motion and the cables failed. It is likely that the cables would have failed progressively due to the differential loading caused by the block rotation and variable cable strength depending on the extent of the corrosion that had occurred.*

*Overall, the geometry and likely mechanism of the fall is consistent with their being a low lateral stress acting across the back of the access."*

60. Much of the factual basis for Dr Fuller's report is found in the history prepared by Mr Mroczek set out above. This was all the information that was available to RBL before making a decision to rehabilitate Heemskirk 1670.

61. Attached to the report (amongst other things) are a number of geological plans and sections prepared by Dr Fuller from plans and sections that were supplied by RBL after the accident. These plans were either in existence, or certainly the information necessary to compile them was in existence prior to the rock fall on 6th June 2001.

62. Importantly, figure 5 in the report showed geological mapping of geological structures in the area of the rock fall. In rudimentary terms, structures are either faults on which prior movement has occurred, or simply joints or breaks in the rock. Joints or breaks could be mining induced, however at the 1670 level Dr Fuller did not think that there would be significant fracturing as a result of the relaxation in the rock as a result of mining.

63. Dr Fuller also relied on structural mapping that had been undertaken by an engineering geologist, John Slade in May 1999. Mr Slade had found and described 3 joint sets in the ore body and the hanging wall, together with one random structure.

64. It was a combination of this information that led Dr Fuller to find that the rocks in the backs of Heemskirk 1670 were certainly not massive and that wedge structures were likely to have formed. This is a conclusion to which he could have come to before the rock fall on the information that was then available to RBL.

65. It should be noted here that Mr Slade had found that there was an absence of groundwater in the area. Dr Fuller referred to a survey plan of 9th April 1999 in which Fault A was noted as an old watercourse. There was considerable cross examination of a number of witnesses about this aspect of the Heemskirk failure. The specific questions put to Dr Fuller directed his attention to the hypothetical assessment of the ground water problem as it may have been apparent before the failure. There was evidence from Mr Llewellyn that when he inspected the area before the scaling works commenced he did not observe groundwater. He said it may have been wet in the past, but there was no evidence of that on his inspection. Dr Fuller also found that the stress levels in the Heemskirk 1670 level were likely to have been very low as a result of the mining of the nearby Blackwood orebody at the 1670 level. He said in his report:

> *"From this measurement [vertical stress component of 26.6 MPa], the major principal stress direction is along the Heemskirk orebody and the minor principal stress would be approximately normal to the hangingwall and footwall. These conditions would have existed during the initial development of the Heemskirk 1670 access but subsequent mining in Blackwood 1670 in the hangingwall of the Heemskirk orebody (Fig. 6) would have largely shielded the back at the fall site from the compressive intermediate and minor principal stress. As a result, stress levels in the back of Heemskirk 1670 at the time of the ground fall are likely to have been very low." (Dr Fuller's Report – p5)*

66. In this context, “low” stresses indicate a lack of compression that tends to hold rocks firmly together, despite the structures in them. Lack of compression means that the rocks are able to move more freely. Dr Fuller’s conclusions about stress were based on pre-mining stress data that had been collected at the mine. It was available to RBL before the accident.

67. The information concerning the ground support that had been installed is more particularly set out in Mr Mroczek’s history. Dr Fuller also estimated that in addition to the cable bolts a total of 40 rock bolts may have been installed in the failure area.

68. On inspection of the area and from a survey that was conducted of the failure zone after the accident, Dr Fuller concluded that there was another structure that had not been identified by previous mapping that was relatively flat (ie, horizontal to the backs) and unlikely to have been observed by a trained eye.

69. Thus the following elements were operating on the failure:

(a) Geological elements:

the structures in the rock and the lack of stress.

(b) Hydraulic elements:

water and acidic elements in it.

(c) Sufficiency of ground support.

70. Important features of each of these elements were not visible.

71. In relation to the geological elements, both Dr Fuller and Mr Lee were of the view that they may not have seen the previously unidentified structure in the rocks.

72. In relation to the water, the evidence is that the area was not wet. Apart from a note on the survey that there was an old watercourse, an engineering geologist had assessed it to be dry and an experienced mine shift boss had not observed any water on inspection.

73. As to the sufficiency of ground support, on inspection an assumption was made that 7 metre twin strand cable bolts were installed.

74. The issue becomes more complex when the evidence of Dr Fuller and Mr Lee is considered. Neither of them were confident that they would have identified the flat structure in backs had they inspected the area. Mr Lee gave evidence that there was

no precedent at the mine to suggest that fully grouted cable bolts might fail, even with water present. In fact, one of the reasons to fully grout cable bolts is to insulate them from the ingress of water.

75. Both Dr Fuller and Mr Lee postulated that the change in stresses during the mining of Blackwood would have been sufficient to cause movement between the structures in the backs of Heemskirk 1670, which cracked the grout allowing acidic water to corrode the cables.

76. Had this not occurred it was Dr Fuller's view that the 4.2 metre cables ought to have been sufficient to hold the structures in place. Even if 7 metre cables had been installed in 1994, the same conditions would have existed, namely, the mining of Blackwood, the cracked grout and the ingress of acidic water against the cables.

77. In his evidence Mr Clive Thompson, the mine manager, said that he thought the reason for the failure may have been the use of already rusty cable bolts. He based this view on a conversation he had with the logistics superintendent relating to unused cable bolts that had been left sitting in the open on the mine surface that were rusty. Mr Thompson said that he had refused to use them, notwithstanding the expense of throwing them out. That this can be related to the installation of the cable bolts in 1994 is speculation and unsupported by any other evidence. Mr Thompson's evidence on this point should not be accepted.

78. Mr Lee was also of the view that it was not necessarily common practice in mines to cause a geotechnical assessment of areas, which were to be rehabilitated. The fact that Mr Llewellyn had inspected the area and not identified any conditions that he thought should be referred to the engineers did not seem to be out of the ordinary.

79. However, Dr Fuller suggested that a geotechnical engineer who was aware of the structures that had been identified in the backs would have made certain assumptions. Each structure would have been projected upwards until its theoretical intersection with another. As one of the structures dipped at 80 degrees, its projection would have resulted in a very high peak to the theoretical wedge formed. Ground support for the backs would have been designed to accommodate this wedge formation. He agreed that had he been confronted with the information about the ground support, having made these assumptions, it is likely that he would have designed a very different system of ground support to that which was installed.

80. It is clear and I so find that all of the information accessed by Dr Fuller was available to management at the mine and although not readily available it had been collected over a number of years and was available to Management in 2001 had proper records been kept and adequately collated. It is possible that if all the information had been available to Mr Llewellyn he would have adopted a different course before sending Jarrod Jones and Matthew Lister into Heemskirk 1670 on the date of the accident.

81. The ease with which the material could be accessed is not really to the point. As Dr Fuller conceded, the fact that some of it was difficult to find should have raised questions in the mind of a geotechnical engineer and indeed management, about the adequacy of the knowledge of installed support. Mr Lee said he thought that the information was there and available to RBL and that Messrs Ward and Stead knew about it, but perhaps did not pass it on. Ms Altman said that she thought the records were easy to find, but she was not convinced, in the ordinary course of day to day mining that RBL had sufficient resources to undertake the level of historical investigation that was undertaken during the accident investigation.[36] That is, with all of her other duties, she would not have had time.

82. Mr Lee raised a valid point when he pointed out that had someone been alerted to information and designed different support, it still needed to be installed by someone, which meant drilling with a jumbo.[37] This involves considerable speculation as to the safety of the jumbo operator who would have to drill the holes. On the evidence, it is more likely than not, the corrosion in the existing support would not have been identified. Rehabilitation work may have proceeded on the basis that the existing support needed strengthening. As Mr Lee pointed out, Messrs Jones and Lister had proceeded a long way into the ball room area or Heemskirk 1670 before the rock fall occurred.

83. Issues that arise at this time and require findings are as follows:

a) What was the mechanism of the rockfall?

b) Where was the rockbreaker taken from?

c) Use of tagging system?

d) What was the status of the rockbreaker, should it have been used?

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36 T-Altman 7/12/07 p1836-7

37 T-Lee 15/11/07 p393, 422

e) Did RBL or its management undertake or direct adequate safety checks before instructing Jarrod Jones and Matthew Lister to scale Heemskirk 1670?

f) Had the status of the ground support been checked would Jarrod Jones and Matthew Lister been permitted to enter the drive?

g) Could RBL, its manager or any other responsible person or organisation reasonably anticipated the rockfall?

## The Mechanics of the Rockfall

84. As to this, I accept the evidence of Dr Fuller and Mr Max Lee, I found their evidence to be well researched and convincing. It is succinctly stated by Dr Fuller in his report:

> *".....the ground fall has been caused by the intersection of structures in the back that has allowed the block to release with only minimal rock fracture. The majority of the fall was from a wedge of ore left in the back of the Heemskirk 1670 access and it was bounded on the east and south-east side by the hangingwall, the north side by a steep joint or ore-dolomite contact, the north west side by the ore-dolomite contact and on the south west side by a joint. A major structure not exposed and/or identified in previous geotechnical mapping with a dip of about 10° towards about 290° has formed the top of the failure at its thickest zone.*
> *There is evidence to suggest that the block did not fall vertically but rotated around the lower hangingwall where the failure zone was thinnest. In this area the rock bolts functioned more efficiently than in the centre of the zone where they were not long enough to be properly anchored above the upper failure surface."*

85. It is apparent that previous geotechnical mapping had not previously detected a fault, which had a significant contribution to the catastrophic failure that occurred. Neither Dr Fuller nor Mr Lee believed they would have been able to visually detect the fault had they performed a visual inspection to determine the safety issues of re-entry.

86. The fracturing of the grout around the cable bolts, the shortness in length of the cables and their installation, and the ingress of acidic water around the bolts were all contributing factors which led to the failure. A further factor is one, which cannot be identified, but it would seem a keystone must have been dislodged whilst Jones and Lister were working in the area. Whether this was caused by the use of the rockbreaker, or some other source is not known and cannot be determined.

## Where was the rockbreaker?

87. There is clear evidence that for a period of time the rockbreaker was parked in the no go zone. Whilst there is no unequivocal evidence that it was there on the day of the

incident, it is more likely than not that it was. There is evidence that the vehicle had not been used since late April, and from the work sheet (supra) it would appear that the defect was reported on or about the 20th April 2001, and again on the 25th April, when it was tagged by Howard. According to Mr Llewellyn he saw Jarrod and Matthew going outside to get the rockbuster so it can be assumed it was parked either in the no go zone or the go zone on the day of the incident. On the evidence I am satisfied that from the time that Mr Howard placed the tag on the machine it was not used and was parked in the no-go zone and remained there awaiting replacement parts until taken by Jarrod Jones on the 6th June 2001.

## What was the tag used?

88. According to Mr Howard, he had placed a danger tag on the machine when he refused to use it on the 25th April 2001. On the evidence it seems highly probable that an information or caution tag had been attached to it prior to this when Mr Honner raised the defect with Mr Noonan . In his evidence Mr Howard made no mention of any tag on the machine when he reported the fault. Mr Howard made two statements, his first was an affidavit sworn on the 13th June 2001 in this document he said:

> *"Management have a system in place whereby employees can put tags on items of machinery which is faulty, dangerous and in need of repair. There are two types of tags, a caution tag and a danger tag. The Caution tags are, from memory, yellow with black writing. They display the word 'Caution' and there is a space where you write in the reason the item is faulty and why caution needs to be taken in operating it. These details should be completed by the person applying the tag.*
>
> *The 'Danger' tags are black and yellow and have the words "Danger' and something like 'Do not Operate' written on them however I'm not entirely sure of the wording. As with the caution tag, the person applying the tag would then write on it the reason the item was dangerous to use.*
> .....
> *I recall putting a 'Danger Do Not Operate' tag on the steering wheel. I signed the tag putting my name on it. I also wrote something like "No Boom Extension" on the tag to indicate exactly what the problem was."*

89. From this it could be inferred that he placed a black and yellow tag on the machine, however in his second statement made on the 28th June 2001, his evidence is not consistent and in an exchange of questions and answers he made the following responses:

> *"Sears: On the table I've placed a danger tag and an out of service tag.*
> *Howard: Yep.*
> *Sears: Is there another type of tag I, I think....*
> *Howard: I think there's a caution one.*
> *Sears: Yeah.*

| | |
|---|---|
| *Howard:* | *Sometimes these are used for um if its only a minor problem, um and you can still operate the machine, they might just put a...* |
| *Sears:* | *Which one are you referring to?* |
| *Howard :* | *Ah, out of service, oh. no, are they the only two tags are they?* |
| *Sears:* | *No, there's another one.* |
| *Howard:* | *What, what colour is the other one?* |
| *Sears:* | *Green.* |
| *Howard:* | *I think yeah, I think there is a caution tag with a, yeah with the, saying you can still operate the machine its just letting the operator know that there is, that there waiting on parts, yeah.* |
| *Sears:* | *So, was it definitely a danger tag?* |
| *Howard:* | *It was definitely a danger tag do not operate.* |
| *Sears:* | *A red one?* |
| *Howard:* | *Yep, a red one!* |

90. This is inconsistent with his earlier statement and later after proof reading his document he said he could recall, not long before he was made redundant putting an out of service tag on a bogger that wasn't working properly.

91. He obviously does not have a clear memory of which particular tag he placed on the machine.

92. Mr Morrison in his evidence referred to the tag as being a yellow and black tag which he described as an out-of-service tag. He was the diesel mechanic who worked on the rockbreaker, and therefore would have personal knowledge as to the tag on the machine.

93. I am satisfied that the tag that was placed on the machine was an out of service tag and not a danger tag, and I accept the evidence of Mr Morrison on this point.

## Status of Rockbreaker

94. The question of whether the rock breaker should have been operated at all on the 6th June 2001 with the faulty control is difficult. On one level, perhaps an utopian view, imperfect machinery should never be operated in a mine. This, however, ignores the commercial reality that machinery with minor defects may safely be operated and operational decisions are routinely made as to the use of defective equipment or machinery. The information tag, as referred to by some of the witnesses was intended to be used in this type of circumstance.

95. The issue of whether a defect is substantial enough to warrant a danger tag, or information tag is also clearly a matter of judgment. This is highlighted by the differing opinions of the miners who operated the rockbreaker during the period April to June 2001. Matthew Lister was quite correct when he told Mr Howard that it had

been operated by others in its defective state. Both Messrs Stead and Llewellyn were also of the view that it was able to be operated with the boom retracted. Mr Howard was of the view that the machine was too dangerous to operate safely. It is clearly subjective and as such one about which reasonable minds may differ?

96. Further, if a miner expresses a view that machinery is too dangerous to operate, should the expression of that view be final? This would certainly seem to be the purpose of the danger tag system, where subject to an important exception, only the person who certified the danger by affixing the tag is able to take it off. But, as said by one of the witnesses, an acceptance of that proposition would mean that a miner who was unreasonably sensitive to safety issues could prevent the use of machinery that was safe and usable, albeit defective. The exception I referred to above is, management intervention.

97. Messrs Llewellyn and Stead decided at some time prior to 25th April 2001 that the rock breaker could be used in its defective state. Mr Howard formed a different view on 25th April 2001. However, the defect had not changed, subject to the notation in the Work Order as to the inability of the hammer to swing right (See Work Order on Page 16 hereof). The micro switch was still missing at all times up until 6th June 2001. In those circumstances was Mr Llewellyn entitled to maintain the view he had taken prior to 25th April 2001 when authorising the use of the rock breaker on 6th June 2001? It can be assumed that prior to using the rockbreaker Jarrod and Matthew would have made a conscious decision to use the machinery. Matthew was present when Howard declared it to be too dangerous to use, so I can infer he was aware of the process of checking the machinery before using it, and importantly, the ability to refuse to use the machine. I have no doubt Jarrod would have possessed the same knowledge and would follow a similar procedure of checking the machine, and having checked the machinery determined it was not unsafe to use.

98. It is relevant to consider at this point as to whether it could be found that either Jarrod Jones, or Matthew Lister or both are likely to have escaped the rock fall had the boom arm been extended to its full length during the operations, in other words, did the defective contribute to the death of Jarrod and Matthew. That issue is further complicated by evidence from competent operators that even if the boom arm had been operating, it would not necessarily have been fully extended at the time of the

rock fall. Indeed, it might have been fully retracted, for example, if the machine was about to be moved.

99. In any event, the rock fall was massive. There is simply insufficient evidence to find that if the boom was fully extended at the time of the rock fall, the tragedy would not have occurred to one or both men. There is no conclusive evidence that at the time of the rockfall the boom was actually being used to scale. I am unable to determine how or what dislodged the keystone, and any attempt to do so would be speculative and unhelpful.

100. It is not open to find that in its defective state the rock breaker could not have been operated safely. It is not open to find that had it been fully operational, the tragic accident would not have occurred.

## Did RBL or it management undertake or direct adequate safety checks?

101. It can be inferred that re entry to the Heemskirk 1670 access drive was discussed at a planning meeting of the RBL technical staff. However, it can also be inferred that none of the recorded information then in the possession of RBL was produced, or analysed, or for that matter even referred to, for the purpose of planning re-entry.

102. Accessing Heemskirk 1670 was not a priority for RBL. However, it must be inferred that it was on the list of work that was available to Mr Llewellyn to deploy his crew. From this it must be inferred that Mr Llewellyn was informed by management that access to Heemskirk 1670 would be required at some time in the future albeit not immediately. It can also be inferred that Ms Altman was aware of this decision, because it was on her list of things to be attended to. However, because it was not urgent she had merely identified where the access was, and decided to return to inspect it with someone who knew the area.

103. What check was carried out prior to Jones and Lister entering on the day of the incident? From the records of the company it would seem that on the 9th April 2001, Honner and Pfab had used ME112 in Heemskirk 1670 for the purposes of check scaling and rockbusting. There is no indication of any geotechnical investigation being carried out prior to this and in fact, when considering the evidence of Altman, she certainly had not done so and she was the only geotechnical staff member there at that time. Further, in her evidence she said that a couple of weeks prior to the rockfall

she had gone past the area and noted a pile of rocks. It could be inferred that those rocks must have fallen after Honner and Pfab had been in the drive check scaling.

104. It seems apparent that despite seeing the pile of rocks Altman made no written note of this nor did she inform others of her observation. In fairness to her, I should add that she would have been unaware of Honner and Pfab having been in the drive at the time of her sighting.

105. This meant that the only check done by RBL before 6th June 2001, according to the evidence as presented, was the inspection by Peter Llewellyn. This inspection was a visual inspection, and I assume as he was about to send men in to scale the area he believed it appropriate from a safety point of view to do so. He observed the ground support. It is clear on the evidence that he made a wrong assumption that the cable bolts were 7 metres and had twin strands. He found no evidence of water. At that time there had been no other incidence in the mine where there had been corrosion of fully grouted cable bolts. From the Evidence of Dr. Fuller & Lee, he would not have been able to identify the flat structure deep in the backs.

106. It could not be said that Mr Llewellyn was not entitled to come to the conclusions he did. However, the question remains whether a more thorough check could have been undertaken, so that a more informed decision could be made. The answer to this question must be affirmative.

107. In considering these issues, the history compiled by Mr Mroczek reveals that in 1997 it was realised that a permanent geotechnical presence was required at the mine. Despite a geotechnical audit and a comprehensive set of ground support guidelines being prepared for the site, there appears to have been no system of review for the re-entry of older areas to determine whether they were consistent with the new guidelines.

108. Added to that is the fact that, in 1999, the engineering geologist at the mine, Mr Slade, mapped the very area of the rock fall and issued plan requesting that the cables be replated. This was not done, because *"old cables [would] make this impossible"*.

109. Four conclusions may be drawn.

(a) There was a lack of coordination of action in relation to checking areas to be re entered;

(b) There were no formalised systems for areas marked for re entry:

(i) to have them assessed by the site geotechnical engineer; or

(ii) to bring them into line with the new ground support guidelines.;

(c) The record keeping system and the available human resources were unlikely to have facilitated access to important records relating to installed ground support, for the purpose of making informed decisions about re entry; and

(d) A general lack of communication.

## Would Jarrod Jones and Matthew Lister have been authorised to enter the area had it been realised that the cable bolting was of 5 metre single strand cables drilled to 4.2 metres?

110. The answer to this issue depends on two important factors. As it did occur, Mr Llewellyn inspected the area and decided that it should be scaled. He said had he known about the length of the ground support he would not have allowed his crew back in. There is a significant element of hindsight in this view. Mr Llewellyn was under considerable pressure when he found out about the ground support, because he authorised the re entry. He was under similar pressure in these proceedings. It cannot be absolutely certain that he would have referred the matter to an engineer, having inspected the area.

111. Secondly, if he had referred the matter, it is highly likely that Messrs Jones and Lister would not have been in the area until further ground support had been designed and installed. The evidence of Dr Fuller and Ms Altman makes this almost unequivocal. Provided that Ms Altman had projected the known structures up into the backs, new, *uncorroded,* 7 metre cable bolts are likely to have been installed.

112. There was a systemic failure in RBL's procedures to ensure that decisions about re-entering previously developed areas in the mine were rationally made, using all of the available information. Had such a system been in place:

(a) Mr Llewellyn may have inspected the area, but would not have been authorised to re enter without a considered and deliberate direction from management.

(b) Ms Altman should have been given sufficient resources and time to check all of the records relating to the area and determine if the installed ground support was sufficient.

(c) New ground support would have been installed.

113. The unfortunate consequence is that it could not be certain that the person drilling the backs for the purpose of installing the ground support would be sufficiently protected from the massive rock fall that occurred. However, had the campaign of reinstallation been successful, it is unlikely that the rock fall would have occurred.

## Could the rock fall have been reasonably anticipated by RBL?

114. The answer to this question is probably not. The most that can be said for the reasons already given is that new ground support might have been designed and installed. This might have prevented the rock fall, but RBL is unlikely to have anticipated it because, as Mr Lee said, the king pin was the unidentified structure deep in the backs. Even a trained and highly experienced geotechnical engineer may well have missed the existence of this structure. Of course, if the mine had adopted a more stringent approach to issues of safety, there could have been regular geotechnical assessments carried out, and certainly one should have been arranged prior to the issuing of instructions to any miner or miners prior to re-entering the area. Whilst I accept that two experts have said they probably would not have detected the fault, a thorough geotechnical assessment may have done so.

115. It is an acknowledged fact that the risk of rockfalls is always present, and it is important that operators are removed from the area of risk, so far as is practicable. It is an acknowledged fact that the risk of rockfalls is always present, and it is important that operators are removed from the area of risk, so far as is practicable. Regular geotechnical assessment properly documented and readily available may confirm whether ground conditions are unfavourable or undergoing change, and becoming conducive to the formation and exposure of large unstable wedges. A readily accessible database would record the conditions and the actual ground support installed. If this had been available in this instance, the length of the cable support would have been known. A comparison between the last geotechnical assessment and one immediately prior to sending in miners may, and I do not put it any higher than

that, have detected the changing circumstances and may have brought to light some movement of the large wedge.

## Response by Workplace Standards Tasmania

116. A further matter for consideration is the response by Workplace Standards Tasmania to the rockfall.

117. Mr Sears and Mr Las of Workplace Standards Tasmania investigated the accident. They arrived at the site on 7th June 2001. The recovery of the deceaseds' bodies is not an issue in this investigation.

118. On 15th June 2001 Mr Sears made an entry in the Mine Record Book.[38] It was issued as a notice under the Workplace Standards Act 1995, s38. It relevantly stated:

> *"You are directed by me to initiate the following forthwith:*
>
> *(1) For working areas of the mine where there are large intersections or openings, undertake a review of the ground support installed in relation to the ground conditions and the size of the opening,*
>
> *(2) Review all current ground support standards including that for large openings,*
>
> *(3) Review ground support design standards to determine maximum allowable opening sizes without altering the support pattern or type.*
>
> *An audit of progress of all three items above will be conducted on or near 31st August and again on or near 31st October 2001. Documentation is to be supplied at the time of audit."*

119. On 27th June 2001 Messrs Sears and Las made an entry in the record book,[39] which was countersigned by Clive Thompson. It relevantly stated:

> *"As a result of our observations the Renison Mine is hereby directed to:*
>
> *1) Identify all large working or travelway (sic) areas that have been developed for 6 years or more.*
>
> *2) Prioritise those areas identified with regard to age, groundwater, cable bolts and other support, presence of talc, age of cable bolts installed and geotechnical considerations.*
>
> *3) Develop a program for the installation of additional ground support where required.*
>
> *4) Develop safe work procedures for the installation of rehabilitation support.*
>
> *5) Ensure that the procedures developed in (4) are implemented."*

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38 P41

39 P41

120. This response was produced within 3 weeks of the accident. It identifies that RBL needed to pay attention to wide span excavations and the installation of ground support, including the installation of additional ground support where required.

121. It is common ground that neither audit foreshadowed to take place in August 2001 nor October 2001 was conducted by WST.

122. The next visit from the WST inspectorate was on 9th, 10th and 11th July 2001 for the purpose of investigating the accident and taking records of interview. No attempt was made to audit progress of the record book requirements at that time. There was, however, a meeting between Messrs Sears and Las and RBL management and staff, after which Mr Las made the following entry in the record book:[40]

> *"In relation to our Record Book Entry of 15 June 2001 and 26 June 2001 (Structural Assessment), a meeting was held today with Gavin Ward, Jody Gaylard, Clive Thompson, Chris Mroczek, Fred Sears and myself addressing the issues raised. To date substantial and satisfying progress had been made towards addressing/completing the directions given in that Record Book Entry."*

123. What progress had been made by then?

124. On 15th June 2001 Mr Mroczek had written to Mr Lee at AMC with a request by RBL to engage AMC as a geotechnical expert to investigate the double fatality.[41] The investigation was to take three parts. First, to investigate the cause. Secondly, to identify any other areas of the mine that needed attention to ground support and, thirdly, to review the current geotechnical guidelines. Mr Mroczek emphasised the urgency of the first two parts. In the events which happened, the urgency became forgotten mainly due to lack of finances at the mine. This will be discussed further later.

125. AMC acted quickly and efficiently. Mr Lee visited the site from 18th to 20th June 2001 and held discussions with RBL management. By 27th June 2001 Dr Medhurst and Mr Lee had drafted proposals for their geotechnical investigation and audit.[42] It has already been seen that Mr Lee had commissioned historical work to be done by

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40 P41; T-Sears 6/12/07 p1775 & seq.

41 P36

42 P38

Chris Mroczek and Jody Altman, which had been completed by 28th June 2001.[43] Substantial work had also been done to define the scope of AMC's brief.

126. Accordingly, Mr Las' comment about substantial and satisfying progress is understandable.

127. Some further light is shed on the meeting by a letter 19th July 2001 from Ken Patterson, the operations manager of RBL, to Mr Lee.[44] It relevantly stated:

> *"During a meeting with Fred Sears and John Las (Senior Inspector of Mines) on 11 July 2001, the following proposal was put forward to the Inspectors, who expressed their satisfaction with the proposal and the initial work conducted by Jody Gaylard at Renison Bell.*
>
> *In relation to the 15 June 2001 Entry 1, which the inspectors indicated also covers points one and two of the 27 June 2001 entry, Renison Bell has developed a matrix showing all production locations scheduled from the mine over the next two years or so. When complete, the matrix will contain the following information:*
>
> *• Stope name and reduced level*
>
> *• Date development commenced and concluded*
>
> *• Development design (Mine Planning Authority) reference number*
>
> *• Type of primary support and the date it was installed*
>
> *• Type of secondary support and the date it was installed*
>
> *• A broad description of the rock types encountered*
>
> *• An estimate of the talc content present*
>
> *• An indication of the amount of water encountered*
>
> *• Maximum width of the excavation.*
>
> *The matrix will be used to:*
>
> *• Identify large working areas, which are greater than six (6) years of age*
>
> *• Prioritise these areas on the basis of when they are due into production .*
>
> *• Identify the likely geotechnical risks in .each of these areas*
>
> *• Indicate the remedial measures to be put in place to address these issues.*
>
> *It is anticipated at this stage that persons other than AMC will complete the matrix and possibly make recommendations in relation to addressing the 'high priority areas' mentioned directly above. Renison Bell would like AMC to examine/audit the matrix, once it is nearing completion and to either recommend*

43 P50
44 P40

*ways to address the high priority areas or audit the recommendations made by other personnel. A report would be required describing the entire process that has been conducted, highlighting the problem areas encountered and the methods of addressing the issues in those areas.*

*The next issue relates to 15 June 2001·entries 2 and 3. During the meeting mentioned above, it was suggested that the existing Renison Bell Ground Support Guidelines, which were examined and (informally) commended by the inspectors prior to the June 6 accident, contained sufficient information in an appropriate format to address the requirements of Entries 2 and 3. However, it was pointed out during the ensuing discussion that the Guidelines require:*

> *• Updating, in light of new or changed ground support practices at Renison Bell. The last update was conducted in approximately June 1999.*
>
> *• The addition of a new section that defines a procedure for reviewing the installed ground support in the event of changing sizes of existing/planned development. For example, through planned development stripping.*

*In response, should you wish to carry out this work, could you please advise the length of time you anticipate it will take to complete it. Renison Bell would be eager to finish all the work (including submission of final reports) in time for the first Department of Infrastructure, Energy and Resources audit, due to take place on or near 31 August 2001."*

128. Dr Medhurst replied to this letter on 23rd July 2001[45] in the following terms:

"The following provides a response to the scope of work outlined in your letter of 19 July 2001. This involves addressing the Record Book Entries made by Fred Sears (Chief Inspector of Mines) on 15 June 2001 (word processed) and 27 June 2001 (hand written).

***"1 Examine/Audit "The Matrix"***

*In relation to the 15 June 2001 Entry 1, Renison Bell has developed a matrix showing all planned production locations and "relevant" mining and geotechnical data. It is understood that the matrix will form the basis of a process to identify and delineate hazards that present a potential safety and/or production risk.*

*The primary aim of the audit will be to highlight factors that will make the matrix technically useful and practically relevant to ongoing operation of the mine. As suggested, this would involve recommendations on how high priority areas might be addressed or to audit recommendations made by others.*

*Each area identified in the matrix will need to be inspected by AMC. This will allow review of the style and nature of information contained in the matrix and will provide the basis for recommendations regarding the need or otherwise of additional/fewer items. The ground condition data will also need to be compared against Renison's ground support standards in relation to the proposed remedial measures for each area.*

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45 P42

*Exposure or the time that men work in an area is also an important 'consideration when deciding what should be attended to first or receive the most attention. This is especially true for areas where ground conditions can change. The matrix will therefore be examined in how such issues are covered and may require recommendations for additional data collection.· Such recommendations would require further work and might include:*

*- Monitoring and testing programs such as rock mass loosening above critical openings, groundwater quality testing and pull-testing of bolts. These may be required mainly as a quality control measure, but will also to help determine the rate at which key support elements loose their capacity due to corrosion.*

*-Ground behaviour modelling around stopes. These analyses might be needed to examine stress effects/influences as part of stope sequencing, the development of support loading and its relationship to rock failure mechanisms.*

*-Specific risk assessments in "target" areas and the possible requirement for hazard*

*"trigger" levels to be established.*

## *2 Existing Ground Support Guidelines*

*Existing ground support guidelines require updating, in light of new or changed ground support practices at Renison Bell. The update will require a new section that defines a procedure for reviewing the installed ground support in the event of changing sizes of existing/planned development. In particular, the new section will need to address areas where conditions have changed, for example:*

*- Wider excavations (through planned development stripping)*

*- Sheared or dilated rock mass conditions (due to nearby mining)*

*- Corroded ground support (due to age)*

*The last update was conducted in approximately June 1999. AMC will undertake the update to ensure that responsibilities and procedures are defined for:*

*- The collection and reporting of ground conditions, for proposed stoping areas and new openings.*

*- Designing, recommending and approving appropriate ground control practices and support / reinforcement designs.*

*- Ensuring that support / reinforcement is installed as per recommendations and standards, and recorded in the Matrix/Ground Control Database.*

*- Initiation of ground control reviews, eg of old areas before they are mined or as dictated by "tags" in the database, and updating the schedule of support and reinforcement.*

*- Procedures for recommending appropriate support / reinforcement (eg scaling, re bolting or cable dowelling) and ensuring that it is safely and properly installed, arid recorded in the Ground Control Database.*

*Designs must be practical for the mine's equipment and management must ratify standards before they are used. Training of all managers, professionals and the workforce in the art of identifying "rock-fall" hazards is an inherent part of any Ground Control Plan. The update will need to take into account training requirements.*

***3 Work Program and Cost Estimate***

*The work is assumed to require two site visits. The initial work to carry out Tasks I and 2 (as above) will be undertaken by Terry Medhurst. The site visit is expected to take two weeks*

…

*Max Lee will also on-site for one week as part of his work regarding "the Cause" (AMC Letter dated 2 July 2001). This will help to coordinate activities in "overlapping" areas such as data processing and inspections. .....…"*

129. This correspondence represents a refinement of the response to the record book entries by WST. It represents a commitment to the investigation of both the causes of the accident and the audit of existing ground support and guidelines.

130. Dr Medhurst attended the mine for the purpose of his audit in August 2001. At the completion of his visit on 9th August 2001, he held a meeting with members of management and staff at the mine. For the purpose of the meeting he prepared a set of hand written notes.[46] At page 4 of the notes there was a sheet entitled "How will the matrix be used?" It contained a schematic diagram of the factors to be taken into account for the purposes of designing ground support in the mine. In evidence, Dr Medhurst described the matrix as the "record" of the ground support that was installed and the diagram was for the purposes of identifying the issues to be taken into account to design ground support. The document assumes some importance in this inquest, because Dr Medhurst's intention was to encourage the mine to consider the design of the ground support for each area of the mine, rather than use only one generic design.

131. On 16th August 2001 Dr Medhurst wrote a letter[47] to the mine in the following terms:

***"RE: Update on Ground Support Audit at Renison Bell***

*In response to addressing the Record Book Entries made by Fred Sears (Chief Inspector of Mines) on 15 June 2001 (word processed) and 27 June 2001 (hand*

46 P109
47 P108

*written), Australian Mining Consultants Pty Ltd (AMC) has commenced an audit of ground support practices at Renison Bell Mine.*

*In relation to the 15 June 2001 Entry 1, Renison has developed a matrix showing planned production locations and some related mining and geotechnical data.*

*The primary aim of the audit is to highlight factors that will make the matrix technically useful and practically relevant to ongoing operation of the mine. Mr Brenton Stead of Renison and Dr Terry Medhurst of AMC in the period 2 - 8 August 200 I inspected all areas listed in the matrix. As a result of these activities entries in the matrix are near complete.*

*A meeting was held between Renison Senior Technical and Operations staff and AMC on Thursday 9 August 2001 to discuss outcomes from the inspection. A series of handwritten notes were distributed during the meeting. Three criteria were identified/defined in relation to designing/managing ground support activities at Renison:*

- *The influence of mining induced stress changes*
- *The presence of talcose and/or weak rock zones*
- *Age and corrosivity of ground support*

*Areas were identified or targeted as a result of the inspection and discussed in the meeting with regard to Renison's ground support standards and proposed remedial measures; Brenton Stead (Underground Superintendent) has a record of these areas.*

*A review of current ground support standards is currently underway. Partly, as a result suggestions made by Renison staff and the work carried out to date by AMC the following has been identified:*

- *As a minimum, the ground support standards requires a new section that defines a procedure for reviewing the installed ground support in the event of changing sizes of existing/planned development. Also, the ground support guidelines need to show how the matrix is to be used.*
- *Ground support guidelines need to be updated to reflect current work practices.*
- *Designs must be practical for the mine's equipment and management must ratify*

*standards before they are used.*

…"

132. On the same day, Clive Thompson wrote to Mr Sears by way of the following entry in the mine record book:[48]

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48 P82

> *"This Record Book Entry is made pursuant to your entries dated 15th & 27th June 2001. The management team of the mining contractor, Henry Walker Eltin, carried out a review of all working areas of the Mine on 8th June 2001.*
>
> *Both our geotechnical engineer and Australian Mining Consultants have since carried out a more detailed review of the ground support installed in relation to ground conditions and size of openings, in all working areas. Since this review no further work has been done in the Blackwood 1765 area or the Heemskirk 1660 area. No other working areas of the mine are thought to have inappropriate or inadequate ground support in relation to size of openings and ground conditions.*
>
> *It is unlikely that the Heemskirk 1660 will be worked in the future. This area, although less than one year old, has ground water present and is known to have a high talc content. There is evidence of stress induced movement in the ground.*
>
> *It is intended to work the Blackwood 1765 area in the future. This area has some talc in the footwall. It is considered a wide excavation and there is evidence of ground movement. A remedial ground support strategy for this location is to be developed before this area can be progressed further.*
>
> *In response to items 2 & 3 of the 15th June entry AMC have developed a document known as the Ground Support Risk Matrix. A copy of AMC's correspondence, dated 16.8.01 has been appended to this entry."*

133. WST treated this record book entry as a sufficient response to their record book entries of 15th and 27th June 2001 and, for that reason did not conduct an audit on or near 31st August 2001.

134. Had WST conducted an audit on that day it would have found things much to the effect recorded in the letters of 16th June 2001 from AMC to Renison and Renison to WST.

135. WST had also said that it would also conduct an audit on or near 31st October 2001. This was not done. What would have been found had that audit been conducted?

136. First, WST might have found a significant depletion in technical staff at the mine, including the loss of Ms Altman in July 2001.

137. Secondly, WST might have found that in September 2001 AMC had delivered a draft "Audit of Ground Procedures" Report to RBL for comment.

138. Thirdly, WST might have found that Coffey Engineering had undertaken significant structural mapping of the mine, including mapping of the Huon area which was then being developed.

139. Fourthly, WST might have found the Ground Support Risk Matrix that had been updated by Brenton Stead in September 2001.

140. Accordingly, apart from the depletion in technical staff, had WST undertaken an audit on or near 31st October 2001, it is likely to have found that there was ongoing work being undertaken in response to the June 2001 record book entries. As to the loss of Ms Altman and other technical staff, at least until September 2001 the mine had been obtaining significant input from geotechnical consultants, AMC and Coffeys.

141. In the circumstances until 31st October 2001, it is unlikely that the response from WST would have produced any different result in relation to the rock fall in May 2003.

142. Nevertheless, it is perplexing that in relation to an incident as serious as the rock fall in June 2001, the regulatory body did not follow up on its recommendations and keep track of what the mine was, in fact, doing. It is clear that the letter 16th August 2001 from AMC to RBL related to work that had not been completed. By October 2001 some further developments might have been expected. It is not really to the point that there were developments, or that they were satisfactory. The issue is whether the regulatory authority remained vigilant.

143. As a general observation, if a regulatory body indicates that it will audit progress in relation to a specific requirement it has made, there are sound reasons why it should do so. The immediate one is to satisfy itself that satisfactory progress is being made. But there are other reasons, including the industry perception of whether the inspectorate will turn up when it says it will. Lackadaisical conduct by the inspectorate could be expected to produce a similar response from industry. It is in the public interest that the inspectorate monitors the progress of its recommendations. Presumably, the recommendations are not made lightly and, in this particular case, they were in response to a most serious mining accident.

144. There may be reasons for the lack of response. I will refer to this further in my findings.

## AMC's Audit – September 2001

145. As a consequence of the deaths of Jarrod Jones and Matthew Lister, and the Record Book entries made by Fred Sears, the audit was undertaken by AMC and in September 2001, a draft audit document was presented to the company. It is obvious in my view, this was not intended to be the final draft, but was delivered for comment.

Notwithstanding this, RBL appears to have relied upon the document for its continued development.[49]

The following are some extracts from the document.

> *"Three critical criteria were identified in relation to designing/managing ground support activities at Renison:*
>
> *• The influence of mining induced stress changes*
>
> *• .The presence of talcose and/or weak rock zones*
>
> *• Age and corrosivity of ground support*
>
> *In each case, these conditions were observed to have a detrimental impact on mining operations at Renison, which to date, have* ***not*** *been considered as part of design assessments. The impact of these factors on the mining operation is as follows:*
>
> ***Support Practice***
>
> *• Stress related ground failures are becoming more prevalent due to the increasing depth of mining and the apparent weakening of the rock mass, particularly in talcose areas.* ***More detailed geotechnical assessments for critical areas are needed and a greater emphasis on structural mapping is required****.*
>
> *• Groundwater sampling in the Rendeeps area indicates a highly aggressive corrosive environment. Several areas in the mine where the support is greater than 12 months old showed* ***signs of severe corrosion****. This raises the issue as to the useful life of ground support in highly corrosive areas.*
>
> *• The current Ground Support Guidelines provide an overly complex choice of ground support patterns for the range of specified conditions. In particular, intersections and "wide" spans have* ***not*** *been adequately addressed in the current Guidelines.*
>
> *• The Ground Control Matrix shows 133 "active" locations of which 73 are associated with spans greater than or equal to 6m. These "wide" span sites provided the main focus of the ground control inspection.*
>
> *• Grouting of friction bolts has been undertaken on only a* ***limited basis*** *(7%). The Guidelines specify that all but two ground support categories should have grouted bolts installed.*
>
> …
>
> *The management of stress related ground control issues needs specific planning and design awareness. To effectively "design out" such problems, a good understanding of rock stresses and rock strengths is required. Input is also needed from underground observations and associated skills to predict and validate stress related cracking/failures. Greater attention to stress versus strength issues needs to be developed at Renison.*

[49] P180 p484 Audit point 1.1

…

*Minimum ground support requirements for "wide" spans in Renison's main rock types are provided. A wide span should be treated as any sill, drive, intersection or permanent area that is greater than 5m wide.*

…

- *No 2 host ore bodies are generally comprised of poor quality, sheared blocky rocks in zones adjacent to No 1 host orebodies. The Red Rock Member (RRM) in these zones often exhibits poor hanging wall (No2) and pillar stability conditions.*
- *Talc content often noticeably increases at the extremities of the Rendeep stratabound orebodies. Noted examples include lower Huon and upper Blackwood/Dundas zones.*
- *No 2 host orebodies have the greatest variability in ground conditions ranging from good to very poor.*
- *Unmineralised dolomite zones are generally of large (0.5 to 1m blocks) which may contain large wedges. These zones are often located in wide intersections and accesses.*

…

*Stress related ground failures **are active** at Renison…*

…

*Stress changes need to be quantified to a level of accuracy that can be used as input to support design calculations. This may range from a simple assessment of a stress concentration around an isolated orebody, or **may require a detailed numerical modelling assessment**. Such effects can only be assessed on a case-by-case basis."*

The highlights are mine. These few points clearly demonstrate the need for considerably more investigative work to be undertaken to ensure the safety of workers and a safe working environment. It would not be unfair to say that the audit criticised many facets of the mining operation.

## The Ground Support Risk Matrix

146. Dr Medhurst clearly had it in mind to "make the matrix technically useful and practically relevant to ongoing operation of the mine." To achieve this it had to be accurate. It would also be necessary to constantly update it as ground support was installed.[50]

147. The need for constant updating was specifically recognised by Gavin Ward,[51] and was known by RBL management. In evidence there were two emails from Mr Ward to Mr Patterson dated 27th December 2001 and 31st May 2002, each referring to the matrix

50 T – Medhurst 22/11/01 p885
51 P129 and P130

and the need for it to be complete and updated. The first email prompted a response from Mr Patterson on 25th February 2002,[52] after a ground support meeting on 21st February 2002. Mr Patterson's email 25th February was addressed to Messrs Thompson, Stead and Ward. It said, in part:

> *"The matrix compiled by Brenton and Terry to be displayed on the planning department wall. (by 22/02/02)*
>
> *Gavin to brief the planning department on use and updating the matrix. This briefing to be formalised, records taken. (by 28/02/02)*
>
> *Ground Support model to be drawn electronically and displayed in the planning department and briefed with matrix. (by 23/02/02)*
>
> *Checklist to be developed/updated to show evidence of how the matrix and model were used. (by 28/02/02)*
>
> *There is a need to re-examine older intersection cables within existing areas of the matrix (probably a reason that we did not identify the potential problem with respect to Bruny 1500)…*
>
> …
>
> *Follow up meeting Tuesday 26/02/02 prior to Mines Inspector visit to the discuss the above points."*

148. The reference to Bruny 1500 was a rock fall.

149. Mr Patterson said that some of his directions were complied with, but others were not. He said that he relied on his technical staff; Messrs Thompson, Ward and Stead, to undertake these tasks.[53] There was certainly a visit by WST on 26th February 2002. This was for the purpose of conducting a "desk top audit" of the mine's operations.

150. It is clear, that as at May 2002, neither the matrix nor the inspections of the intersections had been undertaken. This is evidenced by the email of Mr Ward's dated the 31st May 2002 forwarded to Mr Patterson. In that email it was recorded that "neither the Matrix Update, nor the intersection inspections have occurred yet." Mr Ward said further:

> *"As the Risk Assessment Matrix has not been updated I would question whether it is being used. Brenton has designed a Ground Support Assessment Work Sheet for assessing ground support design situations, based on the "Ground Support Assessment Process" developed for us by AMC. I think his Work Sheets are very good and that one should be produced to accompany every ground support design he does. (He may all ready be doing this – but I haven't seen them.)"*

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52 P134

53 T – Patterson 27/11/07 p1089

151. In evidence, Mr Patterson recalled Mr Ward having concerns about the implementations of AMC's recommendations.[54] Like much of Mr Patterson's evidence, I found his answers about these aspects of the matter to be evasive and unsatisfactory. Mr Patterson did not seem concerned that his directions to his technical staff had not been obeyed, despite the fact that he relied on them. It might be concluded that the urgency for the matters raised in the email of 25th February 2002 were specifically to address the issues that might arise at the WST audit the next day and that once that had successfully been negotiated, it was "business as usual" for Mr Patterson.

152. Mr Stead said in evidence that he was instructed to generate the matrix, but it was not part of his job to update it. He agreed however, that it would be a "desirable outcome" for it to be updated.[55] The evidence of Mr Stead on this point is inconsistent with other evidence, including the documentary evidence in 2001 and 2002. It is more likely that RBL management, including Mr Stead, were aware of the requirement to update the matrix, but due to lack of resources failed to do so.

153. It seems clear from the evidence that the matrix should have been updated and the evidence of Dr Medhurst corroborates that this was his intention and recommendation. The document was to be a living document being developed as the mine developed and recording the changing circumstances as the mine became deeper. This recommendation was not followed as it was not updated regularly.

154. In October 2002, Mr Stead was transferred from mining duties to the mill operations. From the available evidence, it would seem that no further development of the matrix was done after February 2002 despite the recommendation of Dr Medhurst, and the obvious need for this to be done to ensure a safe workplace and the safety of miners generally.

## Ground support plans for Huon 1359

155. The following (amongst others) ground support plans were tendered in evidence:

(a) 193 – 8th March 2000;

(b) 328 – 5th February 2001;

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54 T-Patterson 27/11/07 p1088

55 T- Stead 30/11/07 p1335

(c) 333 – 23th February 2001;

(d) 334 – 28th February 2001;

(e) 408 – 25th February 2002;

(f) 425 – 8th March 2002.[56]

156. Relevantly, 333 and 334 were drawn by Ms Altman before the audit undertaken by AMC in September 2001. 408 and 425 were drawn by Mr Stead after the audit. This will be further considered when the Coffey reports are discussed.

## Geotechnical assistance after August 2001

157. The evidence clearly establishes that in 1998 there was a realisation that the mine site required a permanent geotechnical presence. A geotechnical engineer (Alex Brady) was employed between October 1998 and November 1999, and an engineering geologist (John Slade) was employed between April 1999 and October 2000.

158. Between October and December 2000 Coffey Geosciences provided geotechnical coverage at the mine for two days each week.

159. In December 2000 a geotechnical engineer (Jody Altman (nee Gaylard) ) was employed by the mine. There was a handover visit by Coffeys on 17th January 2001. Jody Altman remained at the mine until 19th July 2001.

160. Between 24th July and 13th August 2001 Coffey Geosciences provided weekly visits to the mine. Between 6th and 8th September Coffey attended the site to undertake structural mapping of the Huon 1359, 1384 and 1414 levels. This work was completed with the report of 17th September 2001.

161. In addition to this support, there was the involvement of AMC following the tragic deaths of Jarrod Jones and Matthew Lister. This is detailed above.

## Ms Altman's hand over notes

162. On 25th July 2001 Jody Gaylard left some handover notes for Gavin Ward, Stephen Fitch and Sean Thomas of Barminco.[57] These were referred to in evidence, but do not appear to have been tendered. In the notes, Ms Gaylard refers to Huon 1359 level as follows:

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56 P89

57 DVD 02-02 p51-58

"

| | | |
|---|---|---|
| *163. 1359* | *164. Huon* | *165. All 1359 to be reviewed for Mines Department.*<br>*166. This level has been cabled but as with 1384 some wall cables may be required. Intersections, corners and walls have been deteriorating with firings and may need some additional support.* |

…

*Huon*

*Level plans are located on the hooks behind my desk showing where cabling has been installed. There are also sections, to scale showing the installed cabling but I have not had time to update these recently."*

165. I am satisfied that the ground support plans to which Ms Altman was referring to as 1359 related to Huon 1359.

166. At the time she was at the mine Ms Altman was young and inexperienced. She freely admitted this.[58] In fact, one of the reasons why she left the mine is that she did not feel able to address the difficult geotechnical issues it presented to her. In my view, had her notes been appropriately considered, the ground support at Huon 1359 would have been reviewed, and this would have been carried out in accordance with the recommendations made by AMC.

[58] T-Altman 7/12/07 p1835

## Sarah Berg

167. A mine planning report for September 2001 refers to an application for employment received from a person named Sarah Berg for the vacant geotechnical engineer's position.[59] Nothing further is known about Ms Berg. The report goes on to say:

> *"However, because of financial constraints Senior Management has decided not to fill the vacancy for the time being."*

168. Mr Ward said he did not recall a candidate of that name, nor that her application was not considered for financial reasons.[60] Mr Thompson did not recall her application either. He said he was not involved in that side of things.[61] Mr Patterson did not remember the application, but emphatically denied that it was not considered for financial reasons.[62]

169. However, if Ms Berg had simply been unsuitable, why would the report cite financial constraints? The answer is relatively plain. The report is a contemporaneous record of the deliberations of mine management. There was a plethora of evidence to the effect that RBL was severely financially constrained during this period. I find the report is accurate, and the sole reason for not engaging her was because of the financial constraints..

170. This is but one indication of the fact that the commitment to ongoing geotechnical support formed by RBL in 1997 was waning at around this time. I acknowledged that RBL may have found it difficult to obtain qualified geotechnical engineers, but this was not the only reason for lack of geotechnical support. The visits from AMC give an accurate reason.

## Further visits from AMC

171. AMC visited the mine on three occasions after August 2001.

a. 4th – 5th December 2001

b. 27th February – 1st March 2002

c. 25th – 26th November 2002

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59 P132
60 T-Ward 26/11/07 p1032
61 T-Thompson 3/12/07 p1418
62 T-Patterson 27/11/07 p1081

172. A number of other relevant matters occurred during this period.

## AMC visit 4th – 5th December 2001

173. The purpose of Dr Medhurst's visit on this occasion was to consider the ground stability of the Huon and Zeehan areas as a result of the mining of the 883 stope. Stress induced cracking had been observed in the Crown pillar. In a report made by letter 11th December 2001,[63] Dr Medhurst noted the structural mapping that had recently been undertaken at the 1359, 1384 and 1414 levels, *"which highlights the region of weaker, talcose rich zones…"* He said further in conclusions:

> *"Mining of the Huon orebody has now progressed to a point where the effects of mining induced stresses will be more active than previously experienced at Renison. After each blast, careful inspections should be completed on each level for new fractures of excessive blast damage.*
>
> *Ground conditions in the lower 1384m and 1359mLvs are presently considered to be acceptable. Opening of the final primary stope however, may present a key change in the ground response (release of arching stresses?) and will provide an early indicator of ground behaviour for the extraction of the remaining secondary stopes.*
>
> *Monitoring activities should be undertaken with the following in mind; the effects of extraction sequence, and the location of the "weaker" talcose zones. The latter are widespread in the lower levels of the Huon orebody. Additional ground support may be required in the lower levels prior to the extraction of the secondary stopes."*

174. The presence of talc was one of the main criteria that Dr Medhurst had isolated when making previous recommendations about the design and installation of ground support.

## Clive Thompson's email 21st December 2001

175. On 21st December 2001 Clive Thompson wrote the following email to Brenton Stead and Gavin Ward:[64]

> *"Brenton, We should get Terry Medhurst back ASAP. Please can you organise it.*
>
> *Here are some notes I took during Richard Sevilles last visit. His comments are simple and logic [sic]:*
>
> *Huon is the future of this operation. We should manage the risks associated with Huon. We should spend money on these risks. A stitch in time saves 9. Stress is not going to go away, the sub levels are going to get more as time progresses. They must be stiffened now. Terry can advise on what and where and sign off on same. Please read these notes and discuss, but get Terry here as soon as we can.*

63 P92

64 P133

…

*Ken, I have assumed your [sic] OK about all this."*

176. This email is significant, in that it evinces the high importance that RBL placed on the Huon ore body, it was the mine's future. It also shows that RBL was aware of the risks associated with Huon and that there was an urgent need to "spend money" on them to alleviate the risks. It also evidences that Mr Thompson knew of the importance of obtaining geotechnical advice as an adjunct of attending to these issues.

177. In early January 2002 Brenton Stead contacted Terry Medhurst to arrange for a site visit. However, by 11th January 2002 it was apparent that AMC were not prepared to do any further work for RBL due to an outstanding account in the region of $60,000.00 for consultancy fees due to AMC.[65]

178. Despite Dr Medhurst being available to come to the mine in January, he did not attend until 27th February 2002.

## AMC visit 27th February – 1st March 2002

179. On 26th February 2002 Brenton Stead produced a memorandum setting out the scope of work that Dr Medhurst was to undertake for the purpose of the visit.66 Relevantly, the inspection of Huon 1384 and 1359 was noted "for the requirement to install cement dowels in this area."

180. At the conclusion of the visit on 1st March 2002 there was a meeting held in the mine planning office attended by Dr Medhurst, Clive Thompson, Gavin Ward, Stephen Fitch, Dave Brown and Brenton Stead. The memorandum of notes taken by Brenton Stead at that meeting included:

> *"Huon 1359*
>
> *Major structures evident in the backs and walls of the level may continue up through the orebody (can be seen in 1384) and could play a role in the regional stability of the orebody. The orientation of the structures are (sic) favourable to the stress direction and may be associated with the talc in the area. Cables are designed for the draw points of the remaining stopes but these have yet to be installed… Inspection of the level showed signs of deterioration in the North end of the hanging wall sill adjacent to 883 stope and the remaining footwall draw points. The drawpoints and the footwall sill may require some strapping, however the intention is to design and install cemented dowels in this area. This may be able to reduce number of designed cables to install. AMC to establish a dowel pattern to be incorporated into a design on site.*

65 P134, P159

66 P110

…

*It was agreed that the next site visit of Dr T Medhurst should be in a months time on or about the 8 April."*

181. In his report to RBL on 15th March 2002,[67] Dr Medhurst said:

> *"The interpreted stress and fracture orientations in the Huon 1430 sill suggest a propensity for shearing in a NE to SW direction. Mapping carried out in the lower levels of the Huon orebody (1359 & 1384) indicate that pervasive structures, talcose zones and talcose stringers in the hanging wall strike parallel to this direction. This suggests a possible mechanism of movement on structures/weak zones progressively down through the orebody with stope extraction.*
>
> *These structures are most prominent in 1359L and present a strong case for increased levels of ground support for drawpoint access and brow stability. The recommended support pattern for drives and crosscuts is provided in the Appendix. Given the relatively weak nature of the rock mass, brow stability will be particularly sensitive to drive width. In weak rock masses, cable rings should be installed from the brow a distance equal to 3x drive width, ie 15m."*

182. A specific design of cable bolt rings for Huon 1359 level was provided in the appendix to the report.[68] This pattern was used on ground support plan 408 (25th February 2001). This included the 795 drawpoint, but not the 778 cross cut intersection, nor the brow of the fall drive at the 795 stope.

183. Dr Medhurst did not return to the site on 8th April 2002. An attempt was made to bring him to the site in June 2002, but once again due to outstanding payments due by RBL to AMC, it did not come to fruition.

184. Dr Medhurst did not return until November 2002.

## Flooding

185. In September 2002 the water level in the mine increased to the extent that the North Renison Decline to the 1370 level and the South Renison Decline to the 1663 level were flooded. As a result, access to the Huon 1359 level was lost. Because that was the open stope extraction level, the flood had disastrous effects on production.[69]

186. The flooding continued until 1st November 2002, when access was regained to the 1359 level.[70] It is apparent that the flooding was as a result of the failure to maintain the pumps at the mine, a further matter referable to financial constraints.

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67 P93
68 DVD 05-02 p222
69 P146 Monthly Report September 2002, DVD p216
70 P146 Monthly Report November 2002, DVD p186

## CAF

187. In July 2002, extraction of the 813 stope was completed and back filling commenced. In 1999 and 2000, RBL had undertaken considerable work on the best method of back filling the Huon stopes. It had engaged AMC to act in an advisory capacity in this regard to determine the most effective method.

188. Backfilling stopes is an important aspect of mining. As Mr Lee pointed out in evidence that designing back fill for stopes is a complicated process.[71] Usually back fill does not offer anything other than passive resistance to rock failures. Once an area is mined and the stresses in the mine changed, the adding of backfill will not have an effect on the stresses in the changed state.

189. The process engaged in by RBL and AMC resulted in the selection of Cement Aggregate Fill, or CAF, for filling the Huon stopes. RBL entered into a contract with Brambles to conduct the filling operations for the Huon stopes.

190. There was evidence that, up until the filling of the 813 stope the primary Huon stopes had been back filled with CAF, as recommended by AMC. It had been very successful, in that it was found that the secondary stopes could be fired right up to the CAF, which would remain standing. The ability to mine up to the CAF was an advantage to production, because it was not necessary to leave any ore in the sides of the secondary stope to be extracted.[72]

191. In or about July 2002, despite having sought the advice of AMC and the successful utilisation of the CAF, RBL decided to fill the 813 stope with a mixture of CAF and mullock. The question arises as to why this decision was made, when the previous CAF filling had been so successful and the neighbouring 795 stope was yet to be fired.

192. In his interview with WST[73] and again in evidence,[74] Mr Thompson said that the issue of introducing mullock as part of the filling of the Huon stopes was first discussed by RBL's managing director, Paul Atherley and another director, Richard Seville, when the issue of filling the Huon stopes was being considered. Mr Atherley's theory apparently depended on a method that was used in larger stopes at Mt Isa, which

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71 T – Lee 15/11/07 p390
72 T-Thompson 3/12/07 – p1450
73 P163
74 T-Thompson 3/12/07 – pp 1450 & 1664

allowed a cone of mullock to be introduced into an open stope and then CAF poured around it. While the idea of the Mt Isa method had arisen in interviews with WST, it became clear during the hearing such a process was not a practical way of dealing with fill at the mine.

193. During 2002 Murchison was negotiating the sale of the mine to a company called Sirroco, subsequently Renison Consolidated Ltd, the principal of which was Mr Seville. By then Mr Seville was no longer a director of RBL, although there was evidence that he was on site during the last 6 months of 2002. In evidence, Mr Thompson said he thought that one of the reasons why the mullock was introduced was because Mr Atherley did not want to pay for CAF when it was hopeful that Mr Seville's company would purchase the mine. This theory is tenuous. It ignores the contractual arrangements that RBL had with Brambles to pour the CAF and a number of other factors, including the substantial debt that RBL owed Brambles.

194. In July 2002 there was a significant "overbreak" of ore from the 830 stope onto the floor of the 813 stope. The overbroken ore was extracted as part of the 813 stope ore. However, the large amount of the fall added to the amount of CAF that would be required to fill the 813 stope.[75] In his mining comments in the July 2002 monthly report,[76] Mr Thompson reported:

> "813 must be CAFed according to schedule; both to facilitate the remaining development of 795 secondary stope and to reduce the possibility [of] a hanging wall failure.
>
> A strategy had been implemented to expedite the filling of 813. The contractor, Brambles, had agreed to increase the tendered rate of placement by 25%. Further, it is intended to bulk up the CAF with both oversized scats and development waste. This two pronged approach should see 813 filled according to schedule whilst minimising the cost incurred. If the bulking material is tipped at a maximum of 250 tonnes per 24 hour period (and 45 agitator loads of CAF) the fill placed should remain fit for purpose."

195. A number of things can be deduced from this passage. First, it says nothing about the so called Mt Isa method, or forming a cone of CAF. Secondly, it involves an estimate, by Mr Thompson, of the amount of mullock that could be introduced during the pouring of the CAF without affecting its quality. Mr Thompson had been of the view that the CAF that was poured from the 1359 level to the 1384 level in the 813

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75 P146 July 2002 Mining comments.

76 P146

stope was pure. However, he conceded in evidence that there may have been mullock introduced into it.[77]

196. RBL records[78] show that the level of fill required to fill all of the 1384 level was not reached until about 11th October 2002. This is complicated by the fact that the fill level was clearly higher at the footwall of the stope and proceeding at an angle of nearly 45 degrees down to the hanging wall.

197. From the records of Brambles and the Barminco plod sheets, Mr Sears compiled a useful summary in his report[79] showing the ratios of CAF and mullock introduced into the 813 stope for the period of filling between August 2002 and January 2003. In the two months prior to October 2002, the ratio of CAF to fill was 64.7% by volume in August and 48% CAF by volume in September 2000. These ratios fall far short of Mr Thompson's estimates required to keep the fill "fit for purpose."

198. There were other complications. Mr Thompson's theory in relation to the CAF was that he would form two "beaches" of CAF on the northern and southern walls of the stope. The purpose of this was to form a solid wall of CAF against the 795 stope northern wall and the 830 stope southern wall to allow mining against a solid CAF pillar, with the mullock behind. In the centre of the beaches the mullock would be held between the footwall and hanging wall of the 813 stope.

199. There was evidence from Brambles' employees that the majority of the CAF that was poured by Brambles was from the Northern side of the 813 stope, due to a fall of ground in the footwall drive of the 1430 level near the 795 cross cut. This had been barricaded and obstructed their ability to back their vehicles to the edge of southern side of the stope.[80]

200. Mr Thompson suggested that access for the trucks was possible along the 795 cross cut and that CAF was being placed from the northern and southern sides of the stope.[81] He relied on evidence from Ms Burrows who said that she thought that the CAF was poured mostly to the southern side. This is inconsistent with the evidence

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77 T- Thompson 3/12/07 p1465
78 P167, p21
79 P180, p238ff
80 P68 (Barnes) P121 (Lanham)
81 T-Thompson 3/12/1459

of Messrs Barnes and Lanham. Mr Driver gave evidence that to tip CAF he would go to the northern side along the 830 cross cut.[82]

201. It may well have been the intention of RBL that Brambles should pour CAF from both sides of the stope, however, on the evidence it would seem that it was poured mainly from the northern side as the drivers stated in their evidence.

202. In his interview with WST Mr Thompson said that the CAF has run down towards the hanging wall, rather than formed the beaches he anticipated.[83]

203. Due to the inconsistent accounts it cannot be determined with any exactitude, but what can be determined, irrespective from which side or sides it was poured, the mixture of CAF with mullock was not sufficient to withstand mining of 795 stope.

204. Between 20th and 27th September 2002 RBL suspended pouring CAF into the 813 stope as a result of the flooding of the mine.[84]

205. Further problems arose in October. In early October 2002, 2,200 tonnes of ore broke off the 795 stope and fell into the 813 stope. The hanging wall of 813 also had substantial fall offs. To reduce the risks of further loss of ore or further hanging wall failure the filling of the 813 stope was accelerated. However, this was not done by the introduction of more CAF. In the RBL monthly report, Mr Thompson's comments included the following. [85]

> "In early October 2,200 tonnes of ore had fallen off 795 Open Stope's North face into 813 Open Stope. The Hanging Wall of 813 had also had substantial fall offs. To reduce the risk of further ore loss from 795 and possible Hanging Wall failure of 813 it was necessary to accelerate the filling rate of 813 Stope. Barminco had agreed to continue to place dry fill into 813 during the two-week suspension so as to reduce these risks. Unfortunately Brambles elected to reduce their operations to single shift x 5 days per week. Accordingly Brambles placed only 3,530 cubic metres of CAF in October. This amounted to 54% of target.
>
> This low rate of placing CAF was not sufficient to reduce the risk of Hanging Wall failure and possible loss of the Bruny 1500/1516 Block which sits on top of the backfilled Bruny 1447 bench, 14 vertical metres above the backs of 813 Stope.
>
> By the time of the Suspension of Works (18th October) 813 Open Stope was making considerable ground noise and a CMS survey showed that the Hanging Wall had over broken from 1414rl to 1430 rl to a depth of 8 metres. This

82 T-Driver 16/11/07 p441
83 P163 p32
84 P57 line 342ff
85 P146, Mining comments p201

> hanging wall fall off had to be back filled to protect the backs of 813. Dry backfill was placed in 813 at the rate of 1,000 tonnes per day for six days. (Concurrent with the CAF)
>
> The ratio of dry fill to CAF for October was 2.2:1. 16,000 tonnes of dry material (over sized scats and mullock) was place in 813 for the month compared to a CAF total of 7,000 tonnes. By daily observation and management there was a continual beach of CAF placed on both the North and South faces. By week 18 the Hanging Wall had stabilised and dry fill placement was suspended to allow the CAF levels to improve."

206. Brambles had elected to reduce their shifts due to the failure of RBL paying them the sums due under their contract. From Mr Sears' calculations it would appear that during the month of October the CAF placed was 34.6% by volume. Early October was the time that the CAF level was approaching the 1384 level.

207. In November the CAF levels improved to 52.2% by volume. In December there was 80.6% CAF by volume and in January 58.6% CAF by volume.

208. From these figures it can be readily understood why Dr Medhurst formed the view that the fill was unconsolidated when he viewed the CAF in the company of Mr Ward from the 1414 level in November 2002.

209. In his interview with WST, Mr Thompson said he knew that the CAF might fail, but that he was optimistic that it would work.[86] In evidence, he said that his preference was to fill 813 up with waste and not use CAF at all.[87] He said that he had informed Mr Patterson of his preference; however Mr Patterson had wanted to keep Brambles on site. This would appear to be inconsistent with many of his answers recorded in his interview with Mr Sears, but more importantly, with his mining comments in the monthly reports.

210. Whichever is the case, it would seem that Mr Thompson's primary concern was to fill the void with something. This was initially fuelled by the need to prevent the displacement of the hanging wall, but it was heightened in September 2001 with the ore falling out of the 795 stope.

## AMC visit 25th – 26th November 2002

211. Prior to this visit there were two significant factors that intervened in relation to the Huon 1359 level. The first was that the 1359 level had flooded due to the failure of

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86 P163 p40

87 T-Thompson 3/12/07 p1451ff

pumps at the mine. The second was the filling of the empty 813 stope with the mixture of CAF and mullock.

212. In his report dated 5th December 2002,[88] Dr Medhurst noted that the support pattern for the draw points recommended during his last visit had been installed. This was accurate for the draw points to the 795 stope, but that pattern had not been installed for the 778 cross cut, nor the drive between the 795 draw point and the 778 cross cut. In his interview, Dr Medhurst said he did not recall being shown the 778 cross cut in November 2002.[89] It would appear that Mr Ward and Dr Medhust did not visit this area of the 1359 level. This is perhaps explicable because it was not then proposed to mine the 795 stope using the 778 cross cut as a draw point.

213. He also noted that the water levels during the flood had not reached the level of the backs, because there was no evidence of corrosion of the installed ground support.

214. Addressing the issue of the stability of the 795 stope, Dr Medhurst said:

> *"The 795 stope will be extracted by slotting against the 778 CAF with a series of down holes on all lifts. The main question relates to the stability of the waste CAF in 813 stope and its stability…*
>
> *Inspection of the limited waste/CAF exposure at 1384L suggests that it is relatively unconsolidated. It is therefore suggested that an ore skin be left against the 813 fill at least in the bottom lift due to the higher vertical loading anticipated in the bottom sections of the fill. Fill arching effects across the stope are unknown.*
>
> *There is also a strong case to leave a skin in the centre lift to limit rilling effects. Due to the greater hangingwall spans at this level, this skin may ultimately loosen and fall into the stope in any case. It may, however, buy sufficient time to limit dilution. Conversely, the firing plan can be designed to maximise extraction for the upper lift."*

215. Dr Medhurst did not return to the site until after 5th May 2003.

## Depletion of Technical Staff at RBL

216. At the time of the rock fall on 6th June 2001, RBL had 21 technical staff, including surveyors, working on site. This included planning engineers, geologists and a geotechnical engineer, Ms Altman.

217. Ms Altman resigned on 19th July 2001.

218. By 1st August 2001 the technical staff had been reduced to 12. It was common ground that Mr Stead would look after the geotechnical aspects of the mine and, at

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88 P94

89 P35 p15

that stage it was intended that he would be supported by outside consultants when necessary.

219. During 2002 there were 9 to 10 technical staff on site. Brenton Stead was transferred to the mill in October leaving 7. Tracie Burrows, the geology superintendent left on 21st March 2003, leaving 6. Stephen Fitch, planning engineer left on 21st April 2003. He was replaced by Ratiapuseth Nutee.

220. Mr Patterson claimed that he had ongoing geotechnical support from Mr Richard Seville, who was reputed to have geotechnical qualifications. It seems clear that Mr Seville's involvement at the mine ceased on 16th December 2002, when his company's bid to purchase it failed. It also appears from Mr Patterson's interview with WST that Mr Seville resigned as a director of Murchison in about September 2001. While it is clear he still had some input into the mine operations in December 2001,[90] Mr Patterson's claims about the level and frequency of his advice are not supported by the documentation, or Mr Thompson, who said that while Mr Seville paid flying visits, they were not regular.[91]

221. Mr Patterson's understanding of the geotechnical issues in the mine was limited. It has been noted he relied on Messrs Thompson, Ward and Stead to keep him informed. Just what particular assistance Mr Seville could have given Mr Patterson is obscure.

222. Even if Mr Patterson is to be believed about Mr Seville's level of input, the effect of Mr Seville's advice seems to have been that it was necessary for the company to spend money on geotechnical issues in the Huon ore body.[92] This was not done on an ongoing basis. Mr Patterson was, to a significant degree, responsible for this failure, subject, of course to directions from Mr Atherley. This will be discussed further.

223. It seems clear that in the period between September 2001 and December 2001 there was a marked departure from the previous company policy to ensure a permanent geotechnical presence on site. Effectively, there was no one on site to give geotechnical advice to RBL, unless consultants were called in. It has been noted that the last visit of a geotechnical consultant was in November 2002. In evidence Mr

90 P133
91 T-Thompson 4/12/07 1539-40
92 P133

Ward frankly confirmed that this was not sufficient to properly manage the geotechnical issues at the mine.[93] That would seem to be the case.

## Financial Issues

224. There was a considerable amount of evidence about the financial difficulties that RBL was experiencing from 2001 to 2003. This was basically because of the very low price for tin during the period, but also because the hedging arrangements that had been entered into by RBL to secure its position had been unsuccessful. There is little doubt that the lack of funds brought about the foreshortened response by RBL to ensure that it had adequate geotechnical support.

225. In his interview with WST and in evidence, Mr Thompson said that he had concerns about the continued operation of the mine. In the context of obtaining a proper level of geotechnical support Mr Thompson said he had made requests of both Mr Patterson and the acting operations Manager, Henry Laszczyk, to expend money. He was told more than once by Mr Patterson that he would have to wait. In his record of interview he said he told Mr Laszczyk: "…we can't afford to operate."[94] However, Mr Thompson said the decision whether or not to close the mine was not his to make.

226. In evidence Mr Patterson agreed that he and Mr Thompson had discussions about closing the mine. However, he said that when those discussions were held, he and Mr Thompson would refer the issue "up the line".[95]

227. A number of issues arise. First, it seems that both Mr Patterson and Mr Thompson were aware of potential safety issues arising in the absence of geotechnical support. Secondly, it would seem that neither of them had the power to close the mine. Thirdly, the evidence shows that whatever attempts they made to involve people further up the line, who must have been Mr Atherley and the Board, there was a failure to ensure that the mine was put in sufficient funds to obtain ongoing geotechnical support. On this last issue, it might be expected that the weekly and monthly reports provided to Mr Atherley by Mr Patterson would have consistently referred to the need to obtain geotechnical support. They did not do so.

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93 T-Ward 26/11/07 p1039

94 P163 p87-8

95 T-Patterson 27/11/07 p1089 - 1091

## Barminco's knowledge of ground support requirements

228. It was common ground that Barminco was not required to plan or order ground support. Barminco had no geotechnical support at the mine. The responsibility for ground support was squarely on RBL.

229. On the evidence, it seems clear that the AMC and Coffey reports were not circulated to Barminco. The means of knowledge of geotechnical and ground support issues for Barminco were regular planning meetings. There is no dispute that after 1st July 2001 Barminco installed ground support in the mine in accordance with plans provided by RBL. Some of the earlier ground support in Huon had been installed by HWE and were in place before Barminco became the mine operator.

230. Mr Mayes said that Barminco knew from discussions he had with Messrs Patterson and Thompson that RBL could ill afford to attend to duties of shotcreting and ground support.[96] He said that Barminco was aware that there were financial constraints on RBL.[97] He also said that he was aware, from speaking with Delia Sidea from Coffeys that further ground support might be needed in the Huon ore body.[98]

## WST desktop audit

230. Between 28th and 29th November 2002 WST conducted a desktop audit of the mine. The audit was conducted by means of a pro forma sheet sent to RBL sometime earlier setting out questions for RBL to answer in relation to operations at the mine. The audit did not include an underground visit by WST. It was conducted by interviews between Mr Sears and Alan Johnston, on behalf of WST and Mr Ward and Mr Thompson on behalf of RBL.

231. In answer to a question, "Geotechnical mapping is being carried out on a regular basis in stopes and development headings, consistent with the rate of mining advance, where limited or no geotechnical information is available" Mr Ward answered "Usually, not recently". In fact since September 2001 no geotechnical mapping had taken place at the mine. At the time, Mr Johnson was also taking notes on a computer. He recorded,

> *"Yes. G Ward (mining Engineer) reviews geology plan, info and has confirmed his work with T Medhurst AMC this week. Note that capital or operating development has been severely limited for the past 18 months. Critical areas*

96 P83 pp9&14
97 T-Mayes 20/11/07 p706
98 T-Mayes 20/11/07 p708-9

*recognised. Ideal would be for specialist geotech engineer to be on site when development resumes. Verified."*

232. When cross-examined Mr Ward agreed that after September 2001 geotechnical mapping was not done on site[99] as there was no one qualified to do so.

233. In the circumstances the answer to the audit was misleading. A lack of candour is likely to divert a regulatory authority from its task relating to safety. Despite this, in September 2001 Coffey had recognised Huon 1359 as a critical area for geotechnical mapping. Further, that mapping had been referred to by AMC in its approach to mining Huon 1359. It is difficult to make a finding as to the effect of this misleading statement and the subsequent rockfall. It would be speculative to find that, had the truth been known WST would have taken any particular action as a result of the failure to carrying out regular geotechnical mapping in the stopes and development headings. It is, however, another indication of RBL's attitude to continued operations throughout this financially straitened period.

## Events leading up to the rock fall 5 May 2003

## CAF failure

235. On 12th December 2002 firing commenced for the 795 stope slot. The firing took place adjacent to an area previously mapped by Coffey Geosciences and identified as having a talcose zone running through it together with structures in the backs.

231. On 11th January 2003 the bottom lift (1359 to 1384 levels) of the 795 stope was fired.

232. On 5th February 2003 the second slot between the 1384 and 1414 level was fired.

233. On 3rd March 2003 the 795 stope middle lift (1384 to 1414) was fired at 6.20pm at the end of the day shift. At the commencement of the night shift Graeme Lanham entered the mine to check the stopes and disconnect the firing line. He drove to the 1430 level and entered the 830 cross cut and then turned right into the 813 stope area. He stopped his vehicle and got out to find a massive hole in the ground. This was as a result of the failure of the unconsolidated fill at a point above the 1384 level. A massive amount of CAF had poured out into the 795 stope as well as the ore from the middle lift that had been fired that evening.

234. At the 1359 extraction level, the CAF and ore mixture had rilled out into the 795 cross cut and the 1359 sill drive between the 795 and 778 crosscut.[100] In these proceedings

99 T-Ward 26/11/07 p1045

the 1359 sill drive was consistently referred to as "the fall drive" to denote the drive in which the rock fall occurred.

## Bombing

235. Bogging operations commenced to clear the fall drive and crosscut. Work was slow. The ore and the CAF/mullock mixture had to be segregated. The area was the deepest operating part of the mine and the conditions were very wet. The 795 crosscut was cleared as was part of the fall drive, but there was still a rill of dirt ascending to the brow of the 795 stope with an opening of about a metre. Remote bogging continued in the stope from the brow of the cross cut. After some time, due to the heat and water, the ore in the rill in the stope became oxidised and the bogger began to produce an undercut. Some witnesses described the ore as standing straight up. The RBL weekly report for the week ending 30th March 2003 describes the ore as standing vertically.[101] This was an undesirable outcome, because the aim was to produce a rilling effect in the ore pile in the stope so that it will continue to come down as bogging progresses and report to the draw point for extraction.

236. In order to produce a rill, the Barminco workers began to bomb the ore in the stope. Bombing is a relatively common mining operation to overcome problems with oxidised ore.[102] Its purpose is to locate a particular explosive in a suitable place on the oxidised ore and to detonate it.

237. In this case the explosive of choice was anfo, which is used because of its concussive effect. Anfo is essentially fertilizer soaked in diesel (*Ammonium nitrate-fuel oil*) which is then detonated. From the description given, the anfo is packed in bags; it is a heavy item to handle, particularly if it means locating the explosive in an open stope. The invariable rule in all mines is that a miner does not enter an open stope. Miners must remain behind the brow.

238. There were a number of miners engaged in bombing the rill, including Sidney Pearce. A considerable amount of explosive was used to bring the rill down. The RBL weekly report for the week ending 30th March 2003 describes bombing as effective.[103] This would not continue to be the case.

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100 P56; P121 (Lanham's ROI)
101 P145
102 T-Speight 14/11/07 p236; Thompson 3/12/07 p1477
103 P145

239. As the ore continued to oxidise the situation became more difficult. A number of witnesses said that bombing was ineffective. A number of things were done between late March and 18th April 2003, namely,

a. a rope with a grappling hook was lowered onto the top of the stope dirt from the 1414 level. Bags of anfo were lowered down on to the rill and then detonated;

b. a bund wall was constructed at the brow of the 795 draw point and bags of anfo were thrown into the rill from the top of the bund;

c. bags of anfo were also thrown from the brow of the fall drive into the stope;

d. on two or three occasions a Shift Supervisor, Mr Greg Bowkett and Mr Graeme Lanham crawled from the fall drive into the open stope to place bags of anfo at a point near the rill where it was most likely to bring it down towards the open stope. This is of course contrary to the most basic of safe mining practices in stopes; and

e. finally, on day shift and night shift of 17th April 2003 4 slash holes were drilled through a point from the 778 cross cut on the eastern side of the intersection of the fall drive into the rill in the stope and explosives pushed through and detonated.

## MDM 0274

240. At some time prior to 11th April it must have been realised by RBL that the oxidisation of the ore was becoming difficult to manage. On that day, Stephen Fitch drew up Mine Design Memorandum ("MDM") 0274[104] showing an extension to the drive of the 778 cross cut to the east and then turning left to the north east to break through into the 795 stope near the hanging wall. MDM 0274 is dated 11th April 2003 and on that day was signed by Stephen Fitch, as planning engineer, Alicia Perkins, as geology superintendent and Gavin Ward as Technical Services Manager. There were also places for it to be signed on behalf of Barminco and by the Mine Manager, but neither signature has been appended.

241. None of those who signed the document had any recollection of doing so.

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104 P71

242. MDM 0274 purports to vary Mine Planning Approval ("MPA") 1138, which was drawn up in October or November 2000. MPA 1138A[105] shows a design for the extension of the 778 cross cut to the hanging wall drive. As the 1359 level was developed the construction of the hanging wall drive through to the 795 stope to the 778 cross cut was abandoned.

243. In its original design, the cross cut extension would have proceeded further East towards the hanging wall, before turning north east and then north at the hanging wall drive. In this design there would have been a pillar bounded by the 795 stope in the north, the hanging wall drive in the east, the 778 crosscut in the south and the fall drive in the west. The pillar would have been about 132m$^2$ and in its east west dimension measured 21 metres. The pillar formed by MDM 0274 would have measured 72m$^2$ and 14.4 metres respectively.

244. There is an issue about whether MDM 0274 was ever issued to Barminco. In this sense, "issue" means the formal act of providing it to Barminco as an instruction or authorisation to proceed with the work.

245. However, MDM 0274 establishes that in April 2003 it was anticipated by RBL that it may be necessary to extend the 778 cross cut in order to extract the residual ore in the stope from the hanging wall end of the stope.

## Authorisation for the extension

246. In his interview with WST[106] Clive Thompson said that there had been discussions in regular Tuesday planning meetings to the effect that it may become necessary to extend the cross cut. He said that on one weekend he had received a phone call from Brett Anderson to say that the ore had oxidised to an extent that it could no longer be extracted. Mr Anderson asked him if Barminco could extend the cross cut to the original design; that is, in accordance with MPA 1138. This is consistent with an assertion Mr Thompson made under cross examination. Later in his interview he was shown MDM 0274. He said that he thought it had probably been drawn up as a contingency if the mining of the cross cut had eventuated.[107] When asked about this in Court he said that about 11th April 2003 Mr Fitch had told him that Mr Anderson

105 P72
106 P163 p101
107 T-Thompson 4/12/07 p1504

had asked him to do a design of the cross cut in case the oxidisation of ore occurred again.

247. In his interview with WST, Mr Thompson said that when Mr Anderson had called him he had indicated that he would "clap it in".[108] In evidence he said that he took this to mean that when Mr Anderson commenced the extension he would align it by a rudimentary estimation with his hands clapped in front of him without a survey.[109]

248. Mr Thompson was cross examined about his discussions with Mr Anderson and what had been agreed. He was clearly confused about the dates. However, he maintained that he had only authorised Mr Anderson to take two cuts on the basis that, on the Monday morning they would sit down with the engineers and discuss it. This is inconsistent with his record of interview, in which he said that when the firing of the second cut brought the rill in the stope down, he was very happy because mining would continue in the stope. It is also generally inconsistent with the notion that in order to extract the ore, it would be necessary to extend the 778 cross cut into the stope. It is also inconsistent with the fact that MDM 0274 was already in existence, although Mr Thompson said that he was not aware of the MDM at the time. But it is clearly inconsistent with the explanation in the interview with WST, in which he said the MDM was drawn as a contingency.

249. In evidence, Mr Anderson said he thought, but was not certain, that he had seen MDM 0274 on the shift bosses' office wall. Under cross examination he said he was struggling to identify it with certainty. In his interview with WST Mr Anderson said this:

> "When we had been trying to get the rill to come down it was designed for, redesigned for the seven, seven – do you know that one…"[110]

250. The notion of a "redesign" is consistent with the MDM. It is inconsistent with Mr Thompson's memory of the arrangement with Anderson that the 778 cross cut would be extended in accordance with its original design. Mr Anderson said further that it may have been the week before that he called Mr Thompson at home to suggest that two cuts would be taken straight forward in the 778 cross cut, the left hand (northern)

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108 P163 p104
109 T-Thompson 3/12/07 p1493
110 P79 p22

wall would be stripped and the ore accessed by a drive into the stope.[111] He said that Mr Thompson did not specifically restrict the work to two cuts.

251. In his evidence, Mr Flack said that he thought MDM 0274 looked like the plan that Barminco used to extend the 778 cross cut. However, he was away when the arrangements between Mr Thompson and Mr Anderson were made to extend the cross cut.

252. In his record of interview, Mr Ward said that he did not communicate MDM 0274 to Barminco. In evidence he said that he did not remember issuing the MDM at all.

253. After the second cut was taken on the night shift on 18th April 2003 the ore in the stope began to rill again and normal bogging operations resumed. There was no need to continue with the extension of the cross cut at that stage.

## Bogger incident 25th April 2003

254. On the nightshift for 24th April 2003, Matthew Brookes was undertaking remote bogger operations in the 795 stope. Between 3.00am and 3.30am on 25th April 2003 Matthew Brookes had sent the bogger LD58 into the stope to extract a bucket of ore. He was attempting to move a rock about half the size of the bogger bucket when he noticed that the rill was coming down. He put the bogger into reverse in order to move it out of the way of the rill dirt, but was unsuccessful. The rill dirt buried the front of the bogger and despite attempts to move it, Mr Brookes found that it was stuck.

255. There were a number of attempts made to move the bogger on that shift. A retrieval hook was fixed to the bucket of bogger LD72, which was sent by remote control into the stope to hook onto the fitting at the rear of LD58. Attempts were made to pull LD58 out using the power of LD72. This was unsuccessful.

256. During the next shift, attempts were made to fill a 769 truck with dirt, hook it to LD72 and then, using both machines, pull out LD58. When that was unsuccessful a bulldozer was hooked on to the truck, another loader, LD83 was connected to the lifting hitch in the centre of LD58 through the fall drive with a chain to apply lateral force to LD58. This last device was the subject of some controversy.

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111 P79 p23

257. In his evidence Mr Capell said that in order to hook the chain from LD83 to the articulation point of LD58 Clive Smith, the shift boss entered the open stope. In his evidence, Mr Smith said that "it may have been" him that connected the chain to the articulation point. He conceded that the easiest way to connect the chain to that point would have been to enter the open stope.[112] Later,[113] Mr Smith said that he had entered an open stope on up to three occasions during his mining career. He said that to enter the stope would have been against all policies and procedures. He did not remember the chain being attached to the articulation point, but he remembered it being attached to the rear of LD58. When asked if this was one of the occasions when he had entered an open stope Mr Smith said:

> "I can not recall entering the stope to do it, but it would have been."[114]

258. I find that Mr Smith did enter the open stope to connect a chain to LD58.

259. Despite these endeavours attempts to move the bogger failed, because there was too much dirt at the back of its bucket. Eventually, the retrieval hook on LD72 broke.

## Further extension of 778 cross cut

260. The 25th April 2003 was a Friday. In his interview[115] with WST Mr Thompson said that he had been "on a couple of days off at this time". He said that on Saturday (26th April) he had phoned Geoff Flack, who had told him that the loader had been buried and that Barminco were going to continue the 778 cross cut works to get into the stope. Mr Thompson said that he told Mr Flack that he would come and have a look. He went on to say that in the morning of 27th April he went to the mine and found that Barminco had extended the cross cut to the stope and had broken through into the stope. On Mr Thompson's account, Mr Flack had said to him words to the effect, "What the bloody hell are you doing here?" to which Mr Thompson had replied, "Well I've come to have a look, cause it's mined off design and I don't feel comfortable about it, so I'll just go and have a look". I find this somewhat incongruous, when considering Thompson's other evidence when he said he had told Mr Flack the day before that he was coming to have a look.

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112 T-Smith 21/11/07 p777-8
113 T-Smith 21/11/07 p805ff
114 T-Smith 21/11/07 p807
115 P163

261. In his evidence Mr Thompson said that it was he who called up Mr Flack on 26th April. He said that Mr Flack told him that Barminco was breaking through into the stope that night. He asked Mr Flack if he had mined off design. Mr Flack told him he had a plan. He said that when he saw Mr Flack on Sunday he asked to see the plan, but it was not shown to him. He said he had gone underground to inspect the work and when he returned to Mr Flack's office to ask for the plan, Mr Flack told him that it was on the jumbo. The plan office was locked because it was a weekend.[116]

262. Mr Thompson said that he never saw the plan. In cross examination by Mr Jackson, for Barminco, he said he did not see it on Monday 29th April. The following exchange occurred:[117]

> ***PJ*** *Did you come back the next day and have a look and check it?*
>
> ***CT*** *I came back on the Monday, we talked about in the mine communication we did.*
>
> ***PJ*** *Who was at that communication meeting on Monday the 28th?*
>
> ***CT*** *I don't even know if Brett Anderson was back on site. It would be either himself or Flack, myself, Gavin Ward, (inaudible)., Alicia.*
>
> ***PJ*** *Yeah, well Gavin Ward certainly knew about MDM0274, was it mentioned at that meeting?*
>
> ***CT*** *In the Monday communication Meeting.*
>
> ***PJ*** *On the 28th?*
>
> ***CT*** *The 28th or 26th?*
>
> ***PJ*** *The 28th?*
>
> ***CT*** *Yes it was.*
>
> ***PJ*** *It was mentioned?*
>
> ***CT*** *That is the Monday morning?*
>
> ***PJ*** *Yeah, following your discovering they had broken into the stope?*

116 T-Thompson 3/12/07 p1479
117 T-Thompson 4/12/07 pp1602-5

***CT*** *Yep.*

***PJ*** *The day the next day – so MDM0274 was mentioned that Monday?*

***CT*** *Not by number, not by name.*

***PJ*** *At the Communication Meeting?*

***CT*** *No, the act of breaking through into the stope was mentioned.*

***PJ*** *Yep, was the existence of a plan mentioned?*

***CT*** *I don't think so. I can't recall it being mentioned.*

***PJ*** *You'd asked Geoff Flack about a plan the day before and he said he couldn't produce it because it was down on the jumbo. The next morning you had a communication meeting about this very thing and you didn't ask for the plan to be produced?*

***CT*** *That's correct.*

***PJ*** *And you can't remember anybody mentioning that there was a plan?*

***CT*** *Flack said there was a plan.*

***PJ*** *Okay. So he said again on the Monday morning there's a plan?*

***CT*** *I don't even know if Flack was there on Monday morning.*

***PJ*** *No Mr. Thompson. You said to us earlier in-. No, I won't, I'll withdraw that. On the 27th of April you went down underground, saw that they'd broken into the stope. You said to Flack 'Have you got a plan?' or he said 'I've got a plan.' You said 'Where is it?' He said 'It's down on the jumbo' so it wasn't produced to you?*

***CT*** *That's correct.*

***PJ*** *You came in the following morning to a communication meeting. Did anybody mention at that meeting that there was a plan?*

***CT*** *I don't think so.*

***PJ*** *You don't think so. Did you ask about it again?*

***CT*** *We had to, we asked, we talked about what had happened, but I don't recall anybody mentioning a plan.*

***PJ*** *Wouldn't you want to be satisfied on that Monday morning that they had in fact mined on design?*

***CT*** *I should have been.*

***PJ*** *Were you?*

***CT*** *I think I was, yes.*

***PJ*** *So why did you not ask 'Where's the plan?'?*

***CT*** *I don't know.*

***PJ*** *'I want to see it'?*

***CT*** *I don't know, right, I can't remember. I didn't. I should have done.*

***PJ*** *And the reality was they had broken into the stope and it was finished.*

***CT*** *I had, fully aware that I'd be looking at the plan at the end of the month doing the contractor claim. And, but I didn't think to look at it on that day. They'd done it. I said-. I think I said 'You've done it now and it's remote. You know, it's not safe Flacky, we can't work in there 'cause it'd have to be a remote one back there.' I didn't, I thought if it was gonna fall in, it probably would have fallen in there and then. It hadn't. And I wasn't pleased with what he'd done. I didn't do a post mortem on it. I should have done. I think I said that yesterday. I should have interrogated Gavin Ward and that plan. And I didn't*

***PJ*** *What was the purpose, what was the purpose of a communication meeting?*

***CT*** *Talk about issues.*

***PJ*** *You had an issue that morning didn't you?*

***CT*** *I had an issue the previous day.*

***PJ*** *Well you brought it along that morning surely? It hadn't disappeared overnight?*

***CT*** *It certainly hadn't.*

***PJ*** *No*

***CT*** *It (inaudible) talked about it.*

***PJ*** *No, it certainly hadn't. And you didn't question anybody that morning? Where is this plan, I want to see it?*

***CT*** *Well, Gavin Ward was there too and he didn't pipe up and say, 'I didn't issue a plan'. It was, you know, I'd been away for four days. I'd been away for Wednesday, Thursday, Friday, Saturday, or Wednesday afternoon, Thursday, Friday, Saturday and I came in Sunday. Like I said yesterday, it's not unusual for an acting mine manager to issue a mine design, it happens all the time. Especially if that acting mine manager is the planning superintendent. (Inaudible).*

***PJ*** *You said Gavin Ward was at the communication meeting on the 28th?*

***CT*** *Me-.*

***PJ*** *You just did.*

***CT*** *I think he was, yes.*

***PJ*** *Who else was there?*

***CT*** *I'm (inaudible) everybody that was-.*

***PJ*** *Stephen Fitch?*

***CT*** *If he was still on site he would have been.*

***PJ*** *If he was still on site?*

***CT*** *Yep.*

***PJ*** *Gavin Ward was? If they'd been discussion about a plan, you would have expected Gavin Ward to say, 'Well there is a plan, it was done on the 11th of April'?*

***CT*** *But I'm trying – it seems unusual because there is a man died here, but because somebody issues a plan when your absent, you don't necessarily say, well look, I've got to go and look at it. You know, I must look at this plan and interrogate it. You said, or somebody said yesterday, oh but you should have done on that occasion because it had broken in to a stope and that's highly unusual. What benefit would I have gained from interrogating the plan with regards to the safety of the breakthrough? I had already declared it a remote area. I should have looked at the plan, I admitthat. I should have looked at that plan. I should have asked to see it. I should have had Gavin Ward explain it to me and I didn't. And now we're sitting here talking about it. That doesn't mean anything other than I didn't ask to look at that plan.*

***PJ*** *What you're at least inferentially saying though, Mr Thompson, is that there was a plan?*

***CT*** *I was told there was a plan, I hadn't seen it.*

***PJ*** *Yeah. And you were satisfied then that as of the 28th of April, you were satisfied that Barminco had mined to a plan?*

***CT*** *I wasn't satisfied but I had seen the brow, which is what I was worried about, the brow. It hadn't fallen in.*

***PJ*** *But you were satisfied that they hadn't just gone off and dug another tunnel in the ground without any plan, weren't you?*

***CT*** *I had no reason to doubt Flack at that time. Flack has quite a record of telling me lies. No, I knew him fairly well. I didn't believe he was lying. He told me he had a plan and I believed him.*

263. In his interview with WST, Mr Flack said that when LD58 had become buried he called Mr Anderson who told him that it was alright to "go around", that is mine the crosscut.[118] Mr Anderson told him to call Mr Thompson. Mr Flack said he called Mr Thompson. He said:

> *"I rang Clive…That was on the Saturday of the weekend. Clive came out on the Saturday, or maybe, yeah, it was the Sunday, and Clive came underground and had a look and give permission to drive around and we commenced to drive around…"*

118 P138 p21

264. The immediate problem with this account is that Barminco commenced to mine the cross cut on Saturday, 26th April. However, in evidence Mr Flack said he had Mr Thompson's permission before he commenced the work. Mr Flack said further that it was he who rang Mr Thompson on the Saturday, not Mr Thompson who rang him. He said that Mr Thompson had come to the mine on the Saturday afternoon, which is at odds with his interview.[119]

265. Mr Flack denied having said to Mr Thompson, "What the bloody hell are you doing here?" He denied Mr Thompson's discussion about not feeling to comfortable about mining off design.

266. Mr Flack further said that he had seen a plan on Mr Anderson's desk and that he had "gone off that." He said that Mr Anderson had said to take three cuts using that plan. Later he said he saw plans on the wall of the muster room. In cross examination, he said that there was definitely a plan to which Barminco was working, whether it was MDM 0274 or some other plan.

267. In evidence Mr Anderson confirmed that he was in Burnie when Mr Flack contacted him and that he directed Mr Flack to seek Mr Thompson's approval for the works.[120]

268. In a statement adopted in evidence,[121] Judson Burke, a former OH&S supervisor for Barminco said:

> *"I remember at one stage after the bogger was buried being at the scene with Geoff Flack. At that time the cross cut had not been extended. We were heading up the decline and Clive Thompson was coming down in his four wheel drive. We stopped and Geoff spoke to him. They were talking about the buried bogger and how Barminco was to get it out. It was stated that they were going to drive around the back through the cross cut so they could free the front of the bogger. I had no doubt that they were going to extend the cross cut. The next time I was at the scene the drive was in."*

269. Mr Thompson cross-examined Mr Burke about this account, but Mr Burke was not materially shaken.

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119 T- 28/11/07 Flack p1158ff
120 T- Anderson 20/11/07 p653
121 P176

270. Mr Smith said that after the bogger had been bogged he had a vague memory of Mr Flack saying that he would go and discuss putting the access drive in with someone, although he didn't say who.[122]

271. Mr Ward said he knew nothing of the 778 cross cut being extended by Barminco. He said that no one had told him about it. He did however remember the bogger being buried. It was recalled that he also signed MDM 0274.

272. I am satisfied there was a plan. Barminco thought they were operating from a plan. If that is the case, it would seem strange that if the original design had been agreed by Mr Anderson, only 2 further cuts would be taken before turning towards the stope. I am satisfied that MDM 0274 was the plan and it had gained currency in the mine, notwithstanding that there was no finally signed document, or evidence that it had formally been issued to Barminco.

273. I have found it difficult to analyse Mr Thompson's evidence. On one level, he was attempting to help the inquest and did to a considerable degree. However, he and Mr Patterson had undergone a prosecution for offences arising out of the May 2003 rock fall. This may have had some effect on their memory of events.

274. Mr Thompson's interview with WST is, in many respects, striking in its candour and ought to be accepted where his later evidence is inconsistent with it and uncorroborated by other reliable evidence. Mr Thompson was specifically asked about MDM0274 in his interview.[123] His answers were consistent with the position that Mr Flack had mined the cross cut "off plan".

275. Whether or not Mr Thompson saw the plan, or was aware of it, does not justify his position. He certainly knew about the works and gave his authority for them to continue, whether before or after they had been commenced. He could have shut down the works immediately when he became aware that Barminco had conducted them without his authority. It would seem unlikely that Mr Flack would take the responsibility of the work on his own shoulders. He had gone as far as seeking Mr Anderson's approval and Mr Anderson had told him to check with Mr Thompson first. It was only a matter of picking up the phone. Finally, the evidence of Mr Burke

122 T-21/11/07 Smith p779
123 P163 p103

tends to confirm that there was no issue between Mr Thompson and Mr Flack concerning the works.

276. Irrespective, once the works were constructed, there was no attempt to ensure that they were safe. Barminco says that this was the responsibility of RBL and while this is true in part, Barminco knew that the person who had looked after geotechnical issues, Mr Stead, had been transferred to the mill in October 2002. It must also have known and I so find, that there was a lack of geotechnical advice available to RBL on site. Mr Mayes went so far as to say that he was aware that RBL could not afford geotechnical assistance.

## The No go zone

277. In cross examination, Mr Thompson gave evidence that on 27th April 2004 he instructed Mr Flack that there was to be a "no go zone" from about the point of the second cut into the 778 extension into the stope. That is, there was a point beyond which no one was to proceed. Mr Flack and Mr Thompson had some discussion about the practicalities of the operating of a remote loader from behind that point, because the vision of the remote loader operator may be obscured as the loader proceeded into the stope.

278. In his record of interview with WST[124] Mr Patterson said he went the 1359 level and the 778 cross cut with Mr Flack after the drive had been put through. He was referring to plan P19 when the following exchange took place:

> *PATTERSON: Umm and there, I walked around there, but that's that was my main area of inspection.*
>
> *SEARS: Ken's pointing to a circle and a dot on this plan which is from memory a place where Peter Diprose had set up on the morning of the accident, or was standing, we'd have to look at the, go back to to Peter's record of interview, it was just at the entrance, if you like, of the fall drive looking north towards the loader and then Ken just mentioned that he walked around the 778 crosscut extension and break through into the hanging wall, is that right, Ken?*
>
> *PATTERSON: Yes, that's right.*

124 P131

279. When asked about this passage in evidence,[125] Mr Patterson became very agitated. He insisted that he had not been to the brow of the stope and that he had stayed behind the stop point that Mr Thompson had established. This, like much of Mr Patterson's evidence, was unconvincing. His answer to Mr Sears had been quite specific. There was no reason for him to give it were it untrue. There was also evidence that Mr Speight and Mr Smith[126] saw him in the area of the brow of the stope at the end of the 778 crosscut.

280. Mr Thompson was cross-examined at length about the no go area. He agreed he would have been astonished had Mr Patterson ventured there, or that the remote bogger operators had been consistently working there, attempting to extract LD 58 with LD72. He said they would have been unable to do so if they did not have line of sight. Mr Thompson said that he would visit the stope every day, mainly to observe the hanging wall. He would do this from the 1384 level. He said he did not see the remote bogger operators operating the machines from the brow of the stope at the end of 778 cross cut extension.

281. In cross examination by Mr Sears, Mr Flack agreed that a no go point had been established. He said that no line was drawn but that it was taken that the point was where the cable bolts ended.[127] Mr Flack implied that he had not seen the bogger operators in the 'no go' zone and said that he had been on days off for much of the time. That is certainly the case from 1st May 2003.

282. There is no question that in the days leading up to 5th May 2003 the remote bogger operators would stand at the brow of the stope at the end of the cross cut. This would allow them to operate LD72 and, on 5 May, LD58 with a line of site.

283. There was also an issue between the remote bogger operator, Mr Speight and his supervisor Mr Smith, as to whether Mr Smith had agreed to have a jumbo brought to the area to put rock bolts into a particular wedge in the hanging wall pillar. This was well into the no go zone. Clearly, Mr Smith was in the no go zone. There was also evidence that Mr Anderson was aware that the operations were continuing within the no go zone.

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125 T-29/11/07 Patterson p1311

126 P86

127 T – Flack 28/11/07 p1217

284. The possibilities seem to be as follows. First, a 'no go' zone was never established between Messrs Thompson and Flack. Secondly, assuming that there was a 'no go' zone established between Mr Thompson and Mr Flack, it seems that the need to observe it was not communicated in any meaningful way to the shift bosses and their crews. Thirdly, notwithstanding that a no go zone was established, it was completely impractical, because it did not allow the bogger operator to bog the ore in the stope, or free the loader. It was, therefore, ignored. Fourthly, a combination of points two and three.

285. The most likely explanation, and I so find, is that the 'no go' zone was discussed between Mr Thompson and Mr Flack, but it was not communicated to any other person, or, if it was, it was quickly discounted as being impractical for the efficient recovery of LD72. If it was communicated in any formal or meaningful way, it would seem unlikely that Mr Patterson would have entered the no go zone, or that it would have escaped Mr Thompson's attention that it was being regularly transgressed.

## Bogger operations between 28th April and 5th May 2003

## Purpose

286. There was an issue whether the main purpose of breaking into the back of the stope through the 778 cross cut was to recover the bogger, or to extract the ore. When the first two cuts were taken on 18th April, the purpose was clear. It was to extract the ore. However, the operations between 18th April and 28th April reduced the remaining ore, so that on Mr Thompson's estimate at the time, there was only 2,000 tonnes of "contaminated" ore to be recovered. As it turned out there was considerably more. He said that he would not have extended the cross cut had Barminco not done so to retrieve the bogger. Mr Anderson was of the view that there was considerably more ore to be recovered. His estimate was 10,000 tonnes.[128] Mr Flack said he thought there was only 2,000 tonnes, but that it was pretty rich tin and they were going after it.[129]

287. Mr Flack also said that he had heard of boggers being buried and left in other mines and that this was not uncommon.

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128 T-20/11/07 Anderson 666

129 T-28/11/07 Flack 1127f

288. However, is the purpose of the operations relevant to the issues in this inquest? There was a considerable amount of time, labour and cost expended on extending the cross cut and then continuing to bog the contaminated ore with the result that the bucket of LD58 would eventually become exposed to the extent that it was thought that it would be recovered in the night shift of 5th May.

289. RBL was continuing to recover ore as a result of these efforts and Barminco was increasing its chances of retrieving LD58. Both RBL and Barminco were responsible for the operations.

## Bogger retrieval procedure

290. There was evidence that Barminco had in place a bogger retrieval procedure.[130] On the evidence, it seems common ground that it was not obtained, nor followed during the recovery operations.

## Operations

291. At some time during the extension of the cross cut two large rocks appeared in the vicinity of the rear right hand corner of LD58. The precise position of the rocks is disputed. Mr Burke suggested that they were in the fall drive and not in the stope and there was a gap between them and the loader.[131] He photographed them. Mr Speight and Mr Nisbett said that the rocks were in the position as shown on a plan of the accident site that had been shown to them in their interviews with WST.[132] However, it is not clear who actually drew the position of the rocks on the plan and the questions put to witnesses about the position of the rocks in their interviews and in the witness box were leading.

292. Mr Patterson said he saw the rocks leaning on the loader. In cross examination it was specifically put to Mr Patterson that the rocks were not leaning against the loader. In the absence of corroboration I am not prepared to accept the evidence of Mr Patterson, and I accept the evidence of Mr Burke as being more accurate.

293. Mr Smith said that the plan showed the approximate position of the rocks. He thought that they had slid down the rill dirt and come to rest next to the loader. He said that if they had fallen, the loader would have been damaged.

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130 DVD 27-01 p115 – "Retrieval of Remote Loader Work Instruction"
131 P176
132 P19

294. Mr Ling said he could see a patch missing in the backs of the fall drive near the brow of the stope, from where he assumed that the rocks had fallen.[133]

295. It is clear that it was thought necessary to remove the rocks to facilitate the recovery of the loader. Mr Speight had been attempting unsuccessfully to move them with LD72. The task specifically assigned to Sid Pearce and Andrew Nisbett was to put an eye bolt into each rock, so they could be towed away. This is consistent with them obstructing the passage of LD58 from the stope into the 795 draw point.

296. It was suggested that the eyebolts could be inserted into the rocks without the need to enter the open stope, however I was not fully convinced as to the accuracy of this suggestion.

297. When the 778 cross cut broke through into the stope, a pile of broken ore was exposed. It was necessary to bog this clear before access could be obtained to the loader. It can be inferred, and I so find, that this took place from the 28th April until 3rd May 2003. On that day, 6 stripping holes were drilled in the northeastern corner of the hanging wall pillar that had been formed by the extended 778 crosscut. The purpose of these holes was to allow bogger LD72 to turn left from the crosscut into the stope. Had the stripping not been done, it would have been necessary to reverse the bogger into the stope and then move it forwards towards LD58.

298. The stripping holes were fired on 4th May 2003. Mr Anderson agreed that it was likely that these works, undertaken by Barminco, were not authorised by RBL.[134] There was certainly no plan authorising the works.

299. When the stripping holes were fired, two slabs appeared on the corner of the pillar. This was of some concern to the bogger operator, Mr Speight. He said the slabs were about 2 to 2.5 metres above the floor of the cross cut. He mentioned it to his shift boss Mr Smith. Mr Speight said that Mr Smith (who inspected the pillar with Mr Patterson) told him that he would arrange for the jumbo to be brought down to bolt and mesh the wedge. He said that when he came down on the next day and saw that this had not been done he mentioned it again at a muster meeting. Mr Smith said that he had simply told Mr Speight to keep it monitored and if it deteriorated to let him

133 T-Ling – 14/11/07 p315
134 T-Anderson 20/11/07 668

know. Eventually, a wedge fell out of the corner.[135] However, it would seem that Mr Speight was still expecting the pillar to be bolted and meshed.[136] It never was. It should however be made clear that this was not the site of the rock fall on 5 May 2003. The evidence goes to the issue of the condition of the pillar and the changed ground conditions.

300. The extent to which a wedge had formed says something about the condition of the hanging wall pillar. However, Mr Anderson and Mr Smith said that they did not notice any major deterioration. Mr Smith, in particular said that, because of the relatively short time over which the pillar had been formed, it did not show signs of deterioration.[137]

301. This is consistent with the views of the miners working in the area. Apart from the slabs on the north east corner of the pillar that unsettled Mr Speight, the miners who gave evidence generally were of the opinion that the area they were working in was safe. The exception to this was Mr Wray-McCann, who accompanied the surveyor, Mr Diprose to the 1359 level on 5th May 2003.

302. Mr Wray-McCann said that he had warned Mr Speight to take great care in the area. He was concerned about the area generally. Mr Speight had already told him about the spalling of the slabs on the pillar. He said the whole 778 cross cut was wet and the area around the brow had not been meshed.

303. However, Mr Wray-McCann was an exception. The rest of the miners expressed few concerns about the area.

304. Finally, on this point, it is notable that despite the concerns expressed by Mr Speight and perhaps Mr Wray-McCann, there was no recognition of the potential that the ground conditions might have adversely changed.

305. It is against this background that the events of 5th May 2003 can be investigated.

## 5th May 2003

306. The following narrative is taken from the interviews of Messrs Speight, Nisbett, Capell and Ling.

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135 P27 p18-20
136 T-Speight 13/11/07 pp195-7
137 T-21/11/07 Smith 811

307. On 5th May 2003 Mr Speight's duties were to continue working to free the dirt from LD58. He was assisted by Mr Capell. He commenced by attempting to remove the two large rocks. He cleaned the floor of the fall drive in preparation for this and, at some time during the morning Brett Anderson arrived. Mr Speight asked Mr Anderson and Mr Capell to take Mr Anderson's four wheel drive vehicle round to the 795 draw point and to flash their lights if Mr Speight's attempts to move the rocks were damaging LD58. They did this for about 20 minutes and then gave up.

308. Mr Smith arrived and told Mr Speight not to worry about removing the rocks, but to go around the other side (ie, through the 778 cross cut extension and remove the dirt from the front of LD58). Mr Speight and Mr Capell continued doing this after crib. They had brought the remote controls of LD58 with them in case they freed it sufficiently to move it.

309. At crib time, Mr Smith instructed Mr Nisbett and Mr Pearce to find some eyebolts to install into the two large rocks. They could not locate any eyebolts in the store on the 1700 level, so they went to the surface. They returned to the area at about 3pm and installed one of the eyebolts into the larger of the two rocks. Meanwhile, Mr Speight had managed to move sufficient dirt from around the bucket of LD58 for it to be seen plainly. It was then possible to operate the bucket of LD58 with the remote control. Mr Pearce and Mr Nisbet joined Mr Speight and Mr Capell to watch the bogger operations.

310. Matthew Ling, an electrician then arrived. He said to Mr Capell that he was required elsewhere and Mr Capell left. He returned a little later. Mr Nisbett and Mr Speight were operating the remote controls for LD58 and LD72 respectively. Mr Pearce and Mr Ling were watching. There were then 5 people in the area. They were walking from time to time between the brow near the hanging wall at the end of the 778 cross cut and the fall drive between operating the remote controls to try to free LD58. This was so they could see how they were progressing from the fall drive.

311. At about 5pm they were all in the fall drive. Mr Speight decided to make one last attempt to move LD58. He left Mr Ling and Mr Pearce in the fall drive and walked with Mr Nisbett and Mr Capell to their position at the brow in the 778 cross cut. Mr Ling and Mr Pearce remained watching the operations from the fall drive. After a short while Mr Ling formed the view that the attempt was not working and he left the

fall drive and walked to the 778 crosscut waving his cap lamp. Mr Pearce stayed in the fall drive. Mr Ling told Mr Speight and Mr Nisbett that they weren't doing any good. They told him that they were simply trying to "loosen it up". It was at this point of time, without warning, the fall drive collapsed.

312. There was dust and confusion in the 778 cross cut. Quite soon the other miners realised that Mr Pearce was no longer with them. The pillar appeared to be shaking and the miners realised that they should get back out to the footwall drive immediately. They ran along the crosscut and over rocks that were now strewn over the intersection of the 778 cross cut with the fall drive. They were calling Sid's name, Andrew Nisbett stopped and caught hold of Ricky Speight's cap lamp. Ricky Speight looked down and saw Sid Pearce's belt among the rubble, he told Mr Nisbett to keep running.

313. Tragically, Mr Pearce had died when a rock struck him at the intersection of the fall drive and the 778 cross cut. He died instantly.

## Mechanism of the fall

314. The fall was investigated by Dr Medhurst of AMC and Mr O'Toole of Coffey Geosciences. Dr Medhurst first visited the site on 9th May 2003. He had limited access to the fall zone. On 12th May 2003 he wrote to Mr Patterson[138] noting that his brief was to:

> "1. Provide an opinion as to the cause of the fall of ground in 1359L
>
> 2. Provide an opinion on the viability of mining the Huon 830 stope and the overlying Bruny 1500-1516 bench stope."

315. He noted that an expression of opinion about the cause of the fall of ground was premature, but went on to say:

> "The nature of the incident; ie, that up to 5m of overbreak in a single 5m drive appears to have been ejected from the drive with some considerable energy (and without warning), is outside our experience, excepting openings that are prone to severe bursting."

316. He further attended the site on 21st May 2003. In a report to Mr Thompson dated 30th May 2003,[139] Dr Medhurst said that he was unable to determine the precise trigger, with confidence. He said the survey data definitely suggested a "structure-bound

138 P118
139 P119

(wedge) fall geometry." He noted that the Huon stoping area was becoming increasingly distressed and that "[m]ovement on structures is now more common as weak rock zones are deteriorating, possibly due to long exposure times." He noted the following contributing factors:

"**Regional factors**

- High abutment stresses to the Huon stopes
- Stress redistribution, eg from yielding of the 795 pillar

**Local factors**

- Orientation of the drive in relation to the existing structures
- Location of the structures with respect to the existing voids
- Formation of "the new pillar" by extending the southern access
- Blasting associated with mining the southern development
- Secondary blasting in the stope
- Talcose rock mass, plus talc infill on structures
- Shallow east dipping (hidden) structure
- Shearing on structures, particularly the shallow east dipping structure
- Insufficient support capacity for the proposed shear/rotational mechanism of failure."

317. As to the issue of support capacity, Dr Medhurst had earlier noted that most of the bolts installed were shorter than the failed block.

318. In his evidence, Mr Lee was asked about the mechanism of failure. Although he had not investigated it in detail, he expressed a view, based on what he had read and discussed with Dr Medhurst. That view was that the formation of the pillar when the extended 778 cross cut finally broke through into the stope was the most significant factor contributing to the event.

319. Mr O'Toole produced three reports:

a. Barminco Huon 1359L Rock fall Investigation, Renison Mine Tasmania, Z13145/1-AB dated 30th July 2003;[140]

b. Workplace Standards Tasmania, Huon 1359L Rock fall Non-linear Numerical Modelling Investigation, Renison Mine Tasmania, Z13153/1-AB, February 1994;[141] and

140 P30

c. Workplace Standards Tasmania, Huon 1359L Rock fall Ground Support Assessment, Renison Mine Tasmania, Z13153/1-AB, February 1994.[142]

320. In his first report Mr O'Toole noted:

a. Fault zones in the Huon footwall are significant for mineralisation grade, but also in contributing to zones of poor geotechnical conditions that may be encountered in the walls, backs and pillars of broad open stopes.

b. During the early planning stage of the Huon open stopes (May 1999 to October 2000) it was recognised that there was potential for mining induced stress concentrations to cause stability problems and issues associated with pillar size and influence of talc zones.

c. The AMC Ground Control audit in September 2001;

d. Coffey's own structural mapping in September 2001 ( also specifically relied on by Dr Medhurst in his report);

e. The AMC report of December 2001, in which Dr Medhurst had commented on slower time dependent fracturing in talcose rich zones after the initial stress distribution event.

f. The AMC February 2002 report noting that the structures in the orebody were most prominent in the 1359 level and present a strong case for draw point access and brow stability.

g. The AMC report, November 2002 noting a mechanism of movement on structures/weak zones progressively down through the ore body with stope extraction is anticipated.

h. AMC had only been used by RBL on an "as required basis" and that day to day geotechnical issues were addressed by RBL engineering, geology and operations staff.

i. The loss of RBL technical staff between November 2002 and May 2003.

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141 P106

142 P101

321. Mr O'Toole observed that two of the three critical criteria, namely stress changes and talc had been identified in the Huon 1359 stoping area. In addition there were strongly dipping pervasive structures in the walls and central drill drive in the vicinity of the 795 and 778 crosscuts, striking north parallel to the fall drive.

322. All of those things mentioned by Mr O'Toole were facts that were known to RBL at the time of the rock fall.

323. Mr O'Toole took the view that the slabbing recognised by Mr Speight on 4th May 2004 was the first sign that the pillar was under high stress. He noted the failure of Clive Smith to recognise it as such and to report it to Mr Anderson or RBL.

324. In his analysis of the Ground Control installed in the area, Mr O'Toole found that had AMC's minimum recommendations been met by RBL it would have resulted in a specific assessment of the ground support requirements, because of the presence of talc and stress. Even without these features he noted that the intersection of the 778 cross cut with the fall drive was a wide span of some 9 metres which should have resulted in three rings of 7m twin strand cable bolts at 70, 90 and 70 degrees respectively to be installed a two metre spacing over a distance of 15 metres from stope brows.

325. When comparing the AMC recommendations with the ground support apparently installed, he found that the regime recommended by AMC had not been met. There were only 2 cable bolts installed in the backs of the fall drive between the 778 and 795 cross cuts and there had been no recognition that the presence of two critical criteria should have required a specific assessment of the area.

326. When considering the planning issues, Mr O'Toole noted that MDM 0274 did not take into account the influence of high mining induced stress concentrations in the south abutment of the 795 stope or the presence of a talc rich zone in the fall drive.

327. His table 2 of comparing the as designed and as formed pillar speaks for itself:

| **Rear Draw Point Development** | **Cross sectional area ($m^3$)** | **Maximum east-west dimension (m)** |
|---|---|---|
| Original planned development | 132 | 21 |
| MDM 0274 planned development | 72 | 14.4 |

| | | |
|---|---|---|
| As mined development | 58 | 12 |

328. From this information, Mr O'Toole developed an hypothesis to the effect that the trigger of the event was a combination of the mining of the 795 stope and the subsequent mining of the 778 cross cut extension. This caused the pillar, as formed, to yield, with more stress transferred to the block of rock in the high talcose zone in the fall drive and the steep 80 degree east dipping structure mapped in the central drill drive and projecting up into the eastern edge of the western pillar.

329. Mr O'Toole undertook some 3D stress analysis modelling, which, in his view confirmed his hypothesis.

330. In conclusion, Mr O'Toole said:

> "6. **PREVENTATIVE MEASURES**
>
> Coffey have considered the following preventative measures which we believe could significantly reduce the risk of a similar incident occurring.
>
> Coffey generally concur with the recommendations and procedures outline by AMC in their Audit of Ground Control Procedures with respect to the mine planning/design considerations and ground support design. We believe that if these procedures had been fully implemented, the risk of the rock fall would have been significantly reduced.
>
> Regular ground control and geotechnical hazard awareness training would have assisted in equipping the mine staff and underground personnel in identifying the two critical criteria which should had triggered a more rigorous approach to planning of the rear access drive and specific support design for the central drill drive rock fall area. This would also have assisted underground supervisors to interpret the significance of geotechnical warning signs such as stress cracking which may be precursors to larger failures.
>
> In the absence of a staff geotechnical practitioner more frequent site visits by the external geotechnical advisor are recommended when mining in a complex geotechnical environment such as the Rendeep ore bodies.
>
> The outcomes of these visits should be conveyed to all supervisory staff from both the mining company and the mining contractor. Where practicable the geotechnical advisor should make a site presentation to impart the information first hand, enabling personnel to ask questions, thereby ensuring the information is understood. Where this is not practicable, the site person nominated with responsibility for geotechnical issues should conduct tool box meetings to convey the key aspects of the geotechnical advisors findings and recommendations.
>
> Management procedures must be enforced such that mining cannot take place without appropriately signed off and authorised plans."

331. Mr O'Toole's second and third reports were generated by a request from WST to specifically address two of the issues arising out of this first report. The second report was the result of numerical modelling undertaken by Mr O'Toole in order to further develop his hypothesis relating to the triggering event. He concluded:

> "The results of the stress modelling support the hypothesis that mining of the rear draw point access drive caused increased stress in the western pillar and above the central drill drive backs in the region of the rock fall. The modelling results are consistent with the theory that the peak strength of the east pillar was exceeded, causing the pillar to yield and undergo a reduction in strength (post-peak strength), resulting in further stress concentration on the eastern edge of the western pillar in the region of the rock fall.
>
> The structural mapping on the 1359L indicated several subvertical, continuous structures both in the east pillar and the central drive. The role of these structures in deflecting and delaying stress redistribution will have influenced the rock mass strength.
>
> Rock mass strength exhibits a time dependency; hence, the effects of increased stress concentration may not have occurred simultaneously with the mining of the bypass drive. This may explain why the rock fall occurred sometime after the development was completed.
>
> In a geotechnical review in 2001, AMC recommended that the management of stress related ground control issues required specific planning and design awareness. This report shows that modelling the pillar stresses could have been used to investigated the intuitively expected stress behaviour in the east and west pillar areas."

332. The third report related to ground support and concluded:

> "From back analysis of the failure, the installed support capacity is considered to be inadequate to support the fallen ground. AMC (March, 2002) recommended three twin strand cables in the back (shown in Appendix B).
>
> This would have required the addition of at least one near vertical twin strand cable bolt to the installed pattern. Coffey do not believe that in isolation this would have been sufficient to prevent the failure taking into account the stress driving mechanism.
>
> Adopting AMC's empirical estimates of ground support for talcose and high stress Worst conditions would have resulted in an approximate doubling of cable support and included the use of 75mm of fibrecrete. Due to the absence of specific patterns for the recommended cable densities it is not possible to provide a definitive assessment of the ability of the Worst case support regime to have resisted the complex failure which occurred in the Huon 1359L. However, it is Coffey's opinion that the application of such an increase in level of support may have significantly restricted or delayed the rock fall.
>
> Given the magnitude of the stress redistribution associated with extraction of the 795 stope and development Z13153/1-AC January 2004 of the bypass drive, it is unlikely that 75mm of fibrecrete would have been sufficient to resist cracking and

> slabbing in the central drive. Thus some ground fall potential would have remained."

333. The views of Dr Medhurst and Mr O'Toole are broadly consistent. However, the question remains, to what extent might RBL have forseen the failure, and taken appropriate steps to prevent it.

## Mechanism of the fall

334. I accept the hypothesis of Mr O'Toole, and I note from his comments, that it is his belief if the recommendations and procedures outline by AMC in their Audit of Ground Control Procedures with respect to the mine planning/design considerations and ground support design had been followed and fully implemented the risk of the rock fall would have been significantly reduced.

## Minimum standard of ground support

335. The minimum standard of ground support that ought to have been installed in the 778 crosscut was that recommended in the AMC ground support guidelines. This required two steps. First, an identification of the worst case scenario for wide spans and, secondly, a specific consideration of the particular ground support required having identified that this was an area of high talc, and stress changes. The pervasive structures that were apparent and had been mapped should also have been taken into account. The minimum standards are defined in the Coffey reports.

336. It is obvious that the minimum standards were not met.

## Communication to Barminco

337. From the evidence it would appear that the only communications relating to ground support were made to Barminco through regular meetings. There is no evidence to support the view that AMC guidelines, or reports were passed on the Barminco. It may be that had Mr Anderson requested them, they would have been provided. However, the evidence is that the responsibility for planning and design of ground support was on RBL. Barminco's responsibility was to install it according to the directions it received from RBL.

338. I note that Mr Mayes who was the Site Manager for Barminco at the time of the death of Mr Pearce, was of the understanding that RBL was financially incapable of meeting all of the ground support requirements. In his record of interview he referred to the lack of shotcreting or fibrecreting, but said they, being RBL couldn't afford it.

So it was just allowed to happen. He indicated that "Renison had got further and further into debt to Barminco and we weren't prepared to carry the risk any more ..... It was virtually a skeleton operation at the end .... for the last couple of months." He indicated that others had expressed concern as to the mixing of CAF with mullock, and the risk of failure, yet this did not appear to cause any concern as the client RBL couldn't afford it. Despite these issues, they do not appear to have put him or Barminco on enquiry as to the precise requirements, or the risks that may be arising due to the lack of expenditure on support and safety matters. It appears that everyone was prepared to ignore most issues with the explanation "they just couldn't afford it"

## Geotechnical support during the period 6 June 2001 and 5 May 2003

339. RBL did not have sufficient geotechnical support at any time after September 2001, when AMC delivered its audit report and Coffey completed its structural mapping. Even in this regard, having obtained the assistance of Geotechnical expertise and recommendations being made and documented, little is done to implement those recommendations or even to continue to develop the matrix. It is though the entire exercise with AMC and Coffey was to respond to any criticism as to the deaths of Jones and Lister, and having indicated the steps that had been recommended it was merely shelved because of lack of finance.

## Was Barminco authorized to extend the 778 cross cut and, if so, to what, if any plan?

340. Having reviewed the evidence presented, I am satisfied that Barminco did receive authorisation to extend the 778. It was not done formally, by the issuing of a plan and having it countersigned. The only authorised plan in existence at the time of the development was MPA 1138 (as revised). The drive as developed actually undertaken departed significantly from this plan. Whilst I am unable to find that a subsequent Plan, being MDM 0274, was issued to Barminco, it would be an amazing co-incidence if Barminco or its management were unaware of its existence but happened to extend the cross cut in substantial compliance with it. Whether or not a copy of it was available and it was used to expedite the undertaking to free the trapped bogger I am unable to make a such finding

341. It is likely that both RBL and Barminco had it in mind that the cross cut could be extended broadly in line with the original design for the 1359 level, but rather as a

development cut, it was modified on the basis it would be utilised to free the trapped bogger. I draw this inference from the reduction in size of the pillar which can only be attributable to an intention to enable the rescue bogger to get into a position and alignment to achieve the recovery of the trapped bogger. From the manner in which the cut was undertaken it would seem that neither the employees of Barminco or RBL gave any consideration to the effect that the variance from the original plan would have upon the stability of the mine.

I have reproduced copies of MDM 0274 (P71) and MPA 1138A (P72) in the two pages which follow

## Could any of the factors which contributed to the rockfall have been reasonably anticipated by RBL or Barminco?

342. I have referred to the various factors, which contributed to the rockfall earlier, and they are fully traversed and summarized in the reports Dr Medhurst and Mr O'Toole.

## RBL

343. Whilst RBL had not followed the recommendations of the Geotechnical experts, they did have access to a wealth of material, which if it had been appropriately documented and readily available could have been utilised to make a more informed decision. RBL could then have been in a position to have reasonably anticipated a rockfall, in the circumstances as they were on the 5th May 2003 and immediately prior to that date and therefore implemented actions, which would have minimized the risk to the lives of miners.

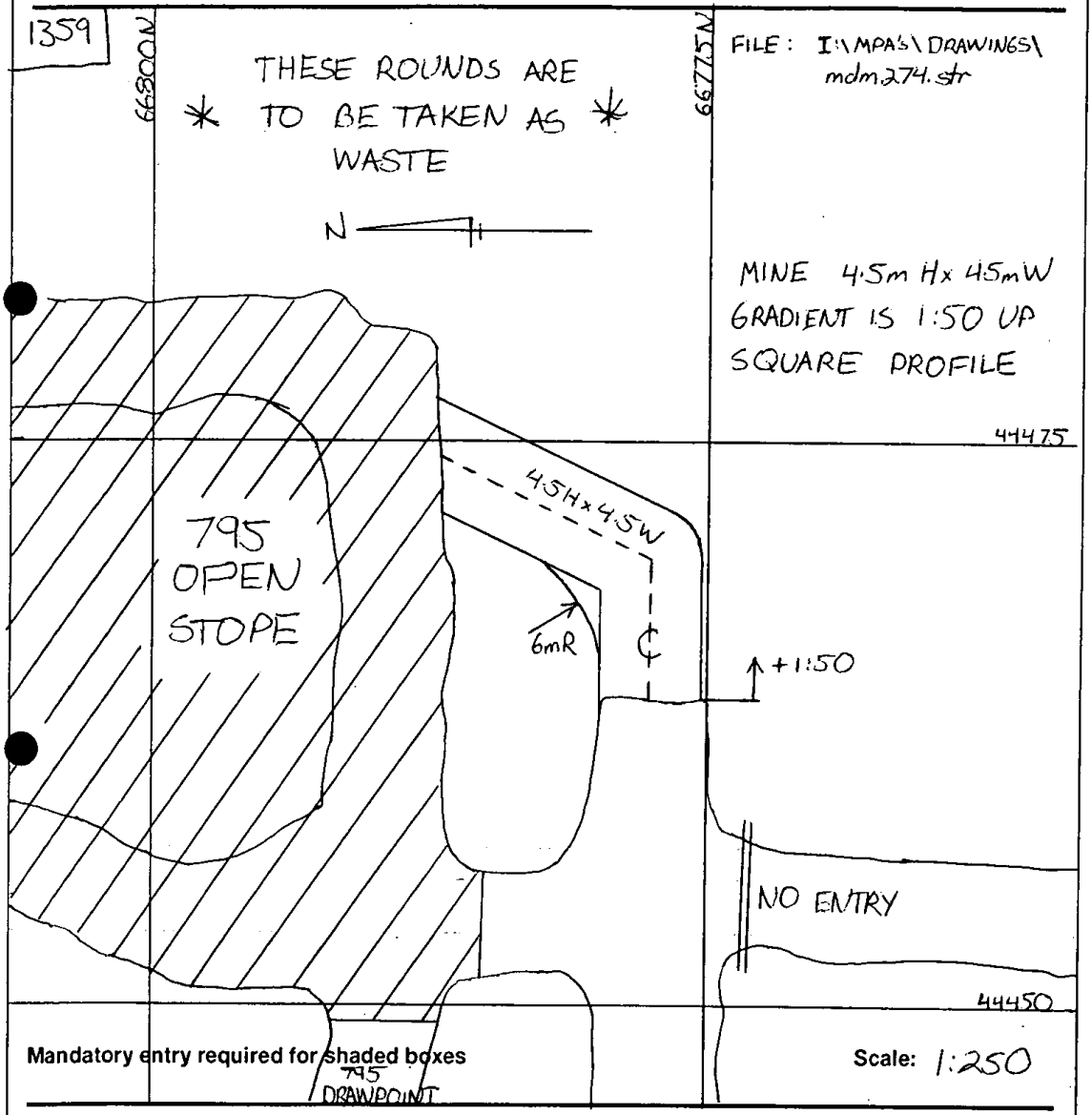
## MINE DESIGN MEMORANDUM

Subject: HV 1359 795 REAR DRAWPOINT

Date: 11/4/03

Engineer: STEPHEN FITCH

MDM 0274




Mandatory entry required for shaded boxes

Scale: 1:250

APPROVED

REFERENCE MPA No: 1138

Planning Engineer: ~~SD Mack~~ 11/4/03

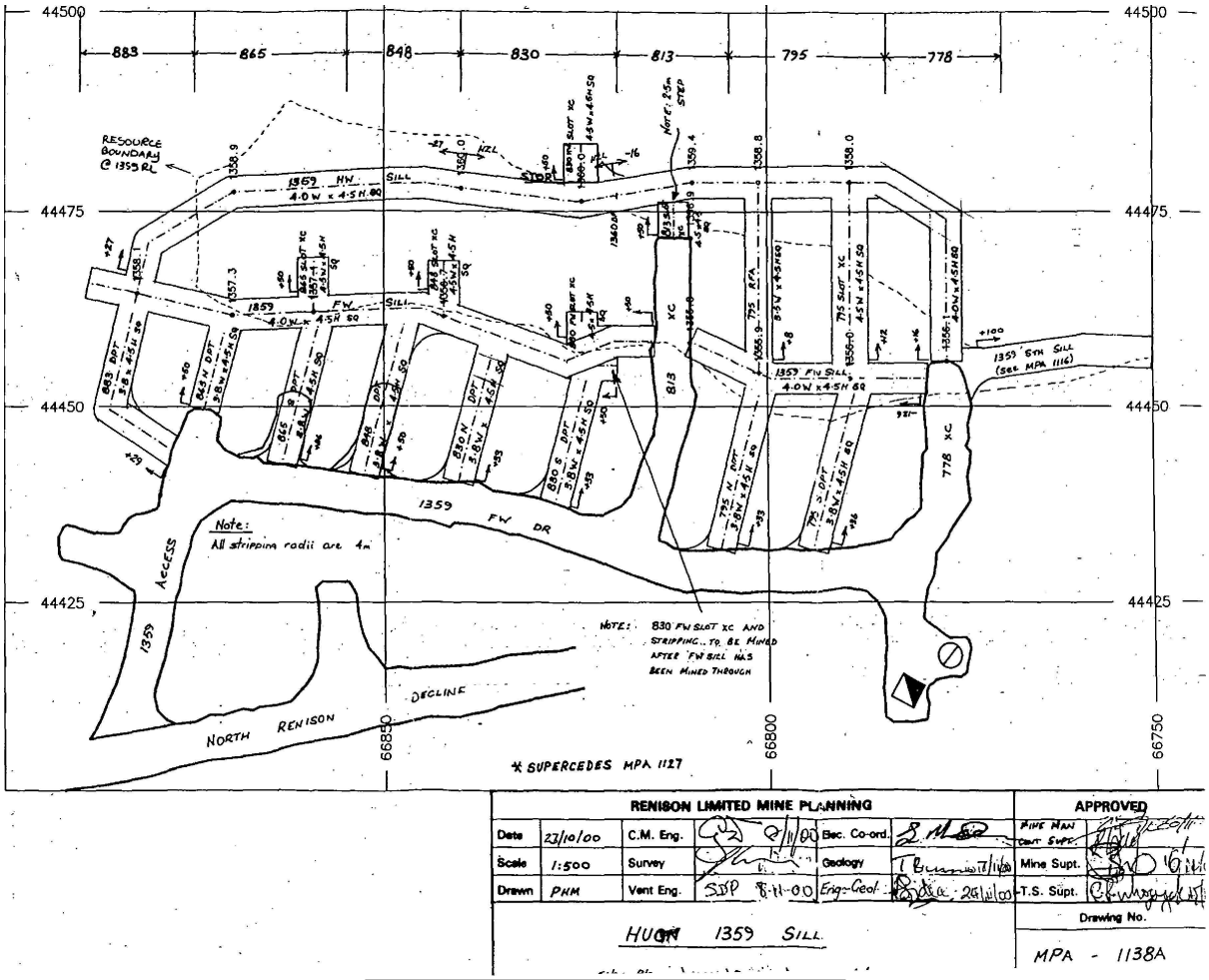
GEOLOGY ~~Mine~~ Superintendent: 11/4/03

Tech. Services Superintendent: 11/4/03

Other (Specify): BARMINCO:

MINE MANAGER:

**P71 – MDM 0274**




**P72-MPA 1138A**

## Barminco

344. On the evidence presented, it is highly likely that Barminco was not made fully aware of the various reports that had been obtained by RBL. Barminco acted upon the instructions of their client and installed such ground support as they were so instructed. Whilst Barminco may not have been supplied with material it is clear from the statements of Mayes that concerns had been expressed as to the ground support in the Huon development and he had personally raised the issue of shotcreting, but had not pursued it due to the client's perceived impoverished financial state. I accept that if they had made an enquiry as to the recommended ground support for the 795 draw point they would have found it in conformity with that as recommended by AMC in its letter dated the 15th March 2002, the circumstances existing at that time was dramatically different to that which existed at the time of the development of the extension and the failure of the CAF.

345. Two matters require further consideration. First, whatever the plan that Barminco was using for mining the 778 cross cut, (and I note that Counsel for Barminco seemed to submit that it may have been used)[143] clearly they did not comply with it. Secondly, Barminco demonstrated by their actions that they were prepared to undertake unauthorized work in the cross cut by its stripping of the pillar, and clearly the sole purpose of this was to free the trapped bogger.

346. Mr Mayes gave evidence that when he found out the 778 cross cut was being extended he had specifically asked about whether the pillar would be undermined and the resulting stress changes caused by the development. He was told that "the ground was pretty reasonable as they advanced."144 At the time Mr Mayes was in West Australia and he seemed to be satisfied with the explanations he was given.

347. The stripping of the pillar produced slabbing, which was symptom of the stress change that was resulting. Mr Speight was concerned about the spalling of the pillar, but his supervisor, Mr Smith did not share his concern nor did he give appropriate consideration to the safety of those working in the area. On the evidence it would appear that the flaking of the pillar was a sign of the changing stresses. As an experience miner, Mr Smith may have been entitled to his view, but in my view this does not justify his failure to refer the concern to Mr Anderson or RBL.

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143 Mr Jackson's submissions p15 par4.2 & 21 par5.6

144 T-Mayes 20/11/07 p711

348. The lack of precautionary approach to the pillar's condition is further evidence of the systemic attitude of those involved in the mining industry, a matter which was amply explained by Rory Wray-McCann to which I will refer later.

349. The lack of giving adequate consideration to the concerns of Speight, suggests a failure in Barminco's OH&S systems that shift bosses, even experienced shift bosses, were not obliged to report possible stress changes to the engineers or supervisors. I note that Mr Mayes, despite the fact that he was thousands of miles from the mine, when he first became aware of the extension his first concerns were as to whether the development would undermine the pillar and further the impact of the development on mine stresses. These concerns should have been at the forefront of the mind of every person who was involved in the operation.

350. Barminco knew that it was conducting operations in a dangerous part of the mine. It knew or ought to have known that it had mined the 778 cross cut without adhering to an authorised plan. Apart from what could be described as a cursory observation only, it did nothing to ensure that the resulting stress changes would not endanger its employees. Whilst the pervading culture may have dictated that mere observation of ground conditions was sufficient by Barminco's supervisors at the time, clearly it was not.

## Should the mining or bogger recovery operations have been conducted?

351. The operations to remove the bogger should not have been continued after it had become impossible to recover it without mining the 778 cross cut and without giving proper consideration as to the impact of such action. There should have been a comprehensive assessment undertaken by a geotechnical engineer, and this should have become vital once a decision was made to reduce the size of the pillar. If the extension was authorized by RBL, it should never have been authorized in that area without an appropriate assessment. If the work was not authorized, RBL should have taken immediate steps to remove Barminco from the 1359 level as soon as it became aware of the work being undertaken.

352. In either event, in my view, both RBL and Barminco share the responsibility for the continued operations after the 778 cross cut had been mined otherwise than in accordance with an authorised design.

## WST response, resources

353. The responses of WST to the deaths of Messrs Jones & Lister has been dealt with above.

354. For the purposes of this part of the Inquest, the crucial time for the response was the period between 6 June 2001 and 5 May 2003. From the evidence it would appear that the last specific involvement that WST had in relation to the ground conditions and ground support at the mine was during the desktop audit in November 2002. This was not specifically in response to the previous deaths, but part of a general audit taken of all mines on the West Coast and involved the deployment of considerable resources by the WST.

355. Evidence submitted by WST shows "a significant resource shift downward from 1994 to 1996." This is said to have been the result of the introduction of the Workplace Health and Safety Act 1995, and the anticipation that employers would self-regulate and identify, assess, control and monitor hazards to meet "duty of care" requirements in all industries including mines.

356. During 2000 and 2002 there were only three personnel dedicated to mines, quarries and energy, namely:

    a. The Chief Inspector of Mines, a statutory position;

    b. A senior mining engineer; and

    c. An inspector, described as a generalist, which can be taken to mean a person with OH&S skills, but not mining expertise.

357. A further reduction occurred in 2003 with the retirement of the senior mining engineer. He was replaced by a professional with experience in safety regimes and audits in the offshore gas industry.

358. This is to be compared with 1994, when the then department of mines employed a Chief Inspector of Mines, 5 mining engineers and 4 specialist engineers and chemists together with a Chief Inspector of Explosives and 8 inspectors of explosives.

359. I acknowledge that since July 2006 there have been attempts to recruit a further three people to Office of the Chief Inspector of Mines. Three people have been recruited, but there was a considerable challenge in recruiting a senior mining engineer.

360. The Chief Inspector of Mines holds mine specific engineering qualifications. Other inspectors with more general qualification or training are likely to be at a disadvantage when being asked to inspect and identify technical aspects in mines. In many cases, investigating officers will be discussing technical issues with mining staff who are significantly more qualified and experienced than they are. This puts the officers at an immediate disadvantage and is an issue which requires further consideration.

361. There is evidence that other programs have been embarked upon by WST during the period after July 2003. This is of course irrelevant to the issues surrounding the deaths in this inquest. However, it is notable that some people have perceived that some of these programs have stalled "due to the unprecedented activity" of the 2003 Renison mine fatality and subsequent investigation. This is a case where a major incident stretches the resources of government too thinly to cope with its OH&S responsibilities.

## Legislation

362. At all relevant times the applicable legislation relating to occupation health and safety at mines in Tasmania was the Workplace Health and Safety Act 1995 and Workplace Health and Safety Regulations 1996 (hereinafter referred to as "the Act"). The Tasmanian legislation, unlike mainland states, does not have "mines specific" OH&S legislation. This means that the same standards apply to all workplaces, regardless of the danger or complexities of the tasks carried out. This would be an acceptable legislative infrastructure, provided the legislation could be drafted to be applicable to all industries, but mining, in my view, is not an industry which readily falls under a general umbrella of workplace health and safety.

363. Section 9 of the Act establishes general duties of care for employers to ensure (so far as is reasonably practicable) that employees are kept safe from injury and risks to health. The duty is more specifically particularised, but not to a prescriptive level.[145] There is also a general duty on employers who are in a position of management or control over a workplace to ensure that the workplace is safe from injury and risks to health.[146] The duty of the employer is also extended to contractors and their

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145 The Act, s9(1) and (2).

146 The Act, s9(4)

employees to ensure that they do not carry on work in a manner that the employer reasonably believes would place the health or safety of any person at risk.[147]

364. Under s10 employers are to appoint a responsible officer, who must, under s11, perform the duties of the employer at the workplace.

365. This scheme represents a departure from the pre 1995 position, in which OH&S legislation detailed prescriptive or specification standards, supplemented by further detailed technical specification standards in regulations, as was the case in respect of the previous Mines Inspection Act 1968 and regulations.

366. I infer that the prescriptive approach was considered to have short comings, so the more general approach was adopted. I acknowledge that the general duty approach should not be denigrated; it is appropriate that employers are required to be subject to general duties of care. The issue is whether the mining industry in Tasmania is sufficiently regulated.

367. It is important to understand that regulatory action is not confined to a choice between generality and prescription. There are four broad ways in which the industry may be regulated, viz,

a. Prescription;

b. General duties;

c. Performance standards;

d. Systematic process standards.[148]

These need to be considered as tools for achieving a suitable regulatory mix for the purpose of encouraging compliance with and, when necessary, enforcing the law.

368. The Tasmanian legislation relies solely on general duties. In my view, and it is highlighted by the death I am investigating, this is an undesirable state of affairs. The existing Tasmanian legislation clearly fails to meet the situations so tragically illustrated in these inquests. The shortcomings of the Tasmanian system have been recognised by others.

147 The Act, s9(5) and (6)

148 Gunningham, op cit, p 14

369. In his book, Mine Safety, Law Regulation Policy, Neil Gunningham summarised the Tasmanian position succinctly when he said at page 10:

> *"Tasmania, through the Workplace Health and Safety Act 1995 (Tas), addresses general duty requirements but lacks adequate provision for OHS management systems, provisions specifying key positions within the mine management and supervision structure, provisions specifying safety and health policy for a mine, and a variety of other mine-specific requirements. Tasmania also lacks mine-specific regulations. The final report of a review of Tasmanian OHS legislation was published in early 2007. This too provides an opportunity for substantial legislative change."*

370. Under the Act, s57 authorizes the making of regulations in respect of any of the matters specified in Schedule 1. Item 20 in the Schedule provides

> *The safety of excavations at mines, including safeguarding on discontinuation of use and prohibiting interference with, misuse of, or damage to, measures taken for that safeguarding.*

I assume it was anticipated that some regulations would be promulgated relating to the "the safety of excavations at mines…" However, the Workplace Health and Safety Regulations 1996 are almost devoid of regulations relating to mines. There is nothing in them of any relevance to any issue in this inquest.

371. The Act provides that mines are a designated workplace.

372. Section 24 makes provision for the appointment of responsible officers for designated workplaces under s10 and are to hold "prescribed qualifications". In the present case, Mr Thompson, the mine manager, had been appointed the responsible officer. In his evidence, Mr Thompson continually asserted that although he was the responsible officer he did not have control over expenditure by RBL and, was therefore unable to carry out the duties assigned to him under the legislation. The person with the most control over expenditure was Mr Patterson, who was not a qualified mining engineer. Neither Mr Thompson, nor Mr Patterson were invested with authority to close the mine if they became sufficiently concerned about the company's inability to meet its safety obligations. This is an issue which does require legislative intervention.

373. Gunninghan in his book has noted that a stronger focus on the operator at a corporate level is a desirable legislative aim, where responsible officers are emasculated to this degree. Under such a regime, there is more emphasis on the management systems of operator, rather than the responsible person, to ensure compliance with OH&S requirements.[149]

374. There is nothing in the legislation that addresses the need for communication about critical technical aspects of mining between principal and contractor. Accordingly, RBL was able to manage ground support without advising Barminco of the recommendations of AMC for minimum levels to be installed. Barminco had responsibilities for its employees and could only make fully rational decisions about their safety if it was armed with the necessary technical information. This included geotechnical and ground support considerations.

375. There is nothing in the legislation that compels employers to undertake a structured risk assessment process when dealing with routine work. A cursory examination of the Regulations, r18 confirms this. It should be noted that Mr Thompson claimed to have carried out a risk assessment in relation to the 778 cross cut, he did this on his own. It was not recorded anywhere. He received no geotechnical input in relation to it. At that stage, on his evidence, he had not sighted a plan for the work, nor was he in any position apart from his own observations, to observe what stress changes might have occurred. The competence of the legislation to respond to a situation of this nature is, at best questionable.[150]

376. More specifically, there is nothing in the legislation that compelled RBL or Barminco to ensure that appropriate geotechnical considerations were taken into account before embarking on the mining of the 778 cross cut. The lack of geotechnical knowledge about the operations proved to be a fatal omission in this case.

377. The lack of regulatory framework is to be compared with states such as Queensland, Western Australia, New South Wales and Victoria, all of which have mine specific regimes. It is notable that Queensland and Western Australia have effective regulations dealing with geotechnical and ground support aspects.[151] The regulations

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149 ibid, p32

150 The Regulations, r18

151 *Mining and Quarry Safety and Health Regulations 2001* (Qld),r44; *Mines Safety and Inspection Regulations 1995*, r10.28

ensure that there is appropriate geotechnical input into the planning and development phases of mining. They provide models of practical standards that can be adopted to ensure risk management systems for mines. It has been suggested that the Queensland and New South Wales models are the most advanced.[152]

378. The Act, s22 makes provision for the Minister to approve a code of practice, to provide "practical guidance to employees, employers and any other person on whom a duty of care is imposed" under the Act.[153] Breach of an approved code of practice does not, by itself, impose civil or criminal liability on the contravener. However, under s54, there are evidentiary provisions to the effect that a contravention of a code of practice is taken to be proved, unless the Court is satisfied that the person complied with a provision of the Act other than by observance of the code of practice.[154]

379. Future approval of some existing codes of practice may be of assistance in providing a more robust framework in managing the issues of health and safety.

380. It is obviously desirable for the legislative regime to achieve a suitable mix of compliance and enforcement standards, to meet the types of difficulties that might be expected to arise in mines.[155]

## Culture

381. Throughout this Inquest one matter caused me the greatest concern, which was what I perceived to be the culture that pervaded mining. This culture needs to be addressed perhaps by the provision of more stringent training of persons employed in mines, with a strong emphasis on the issues of workplace safety

382. At the conclusion of his evidence,[156] Mr Wray-McCann, made the following comments, which amply reflects this culture:

> *"…we were all at fault, the whole lot of us, sir. Right, and by that I mean, and when I say true miners… I could not looking up, and actually weighing up the overall dangers of working on unstable ground….*
> …
> *of an open stope, and the fact that we were, we were in this kind of cycle of the mine's life where we were under the pump to actually just make it, well, make it bloody survive…. Because metal prices were at a really bad low that they were going at three and a half thousand dollars a ton or so…*

152 Gunningham, op cit., p18
153 The Act, s22(1)
154 The Act, s54(2)
155 Gunningham, op cit. p 43
156 T-Wray McCann 5/12/07 p1735-8

*which was just a critically bad… situation. Everyone was focused on the bogger… because we actually needed the bogger out, we needed it more than we actually kind of let on… We'd… expend about I think it was about eight hundred thousand bucks on it, right, about three weeks earlier, on this … major-…overhaul… and that was our prime bogger… and it was sent in down there because …that ore was very high …grade, and also therefore heavy. Very heavy ore, and basically after it actually got like, snowed in, we were all thinking oh, no, there goes the best bogger in the fleet, we have you know – and also we …needed that ore to actually blend with the other … mine ore, which was only about – I think average of about one per cent, and then the other ore was about you know four point three… because it was a very high grade ore.*

*…*

*and therefore hopefully … ensure that the actual mine stayed open. Because everyone knew the actual vitalness [sic], get the damn thing out somehow, bit by bit right, so we worked on it for about five to eight days you know, …but … the aim was to get the damn thing out.*

*…*

*Now, 'cause every mine goes through cycles … Of course every mine will eventually die, … But the actual best base metal, best price back then meant that our… mine was in a kind of day to day situation…so hence rather than focus on the overall problem as in… bogger, stope, …oxidised ground… fretting here and there, we were more concerned with the actual recovery… As opposed to the obvious…. We were all experienced men, most of us …[T]here was no one reason why it kind of just dropped in, but the main reason was that because it was oxidised and there had been … signs. And also the Huon fault. Now the faults are a kind of standard thing in that mine… They'd been mining there for forty years… and … we utilized… cable bolts and we pinned them back and they are…so much safer. But faults are just a standard part of all the bloodyt West Coast mines… But experienced miners don't fear them as a rule… because we kind of know them. We understand them. Pin them back. Hold them. Mine it out. Fill it up. And then kind of back into it…Next section of the ore body…That section at the time it was the overall lifeblood of the mine…And even though… several men there had actually said 'Oh Christ, this is, you know, suspect, this place'… We've all worked in suspect … stopes where … no-one like says rightio, we will get in there mate and they are actually whipping you right.*

*…*

*You are there to actually mine it safely… But you have got to …just actually get in there and mine it …because …it is meshed, grouted, …cable bolted.*

*…well I have seen it happen too many times now in my own mining life which is roughly like thirty odd years, where that - mines is going bad tend to become a little bit – well slip …shod.*

*HIS HONOUR: A bit reckless perhaps?*

*WITNESS: Yeah, reckless, right. Not through any kind of…failings of the people, but the fact that when you are under the pump, mines are going bad, like I have been laid off at about seven mines in – since the early eighties you know. So I understand how…these situations do arise where there is no cash. … [T]here is no cash to say, okay, stop that heading, leave it let it settle, sign it off… You have got to get in there and actually mine it…*

*…*

*so hence you cut corners or – you don't mean to cut corners, but that is how it is actually evolves… because well these days you know we don't have a fully staffed mines department*

…
*…Government since the early nineties…slashed the workforce which overall I can recollect as having a workforce down at Rosny and Launceston of about two hundred and fifty, now there's roughly sixty odd doing virtually triple the workload of the other…"*

## General Comments and Observations

383. A number of matters arose during the inquest that gave rise to concerns about the attitude to safety in the mine, at all levels: corporate, management, technical and workforce. A brief summary is as follows.

a. The rock fall in June 2001 illustrates a failure of a systemic approach to accessing previously worked areas.

b. The departure in about September 2001 from the previous commitment to ensure that there was a permanent geotechnical presence in the mine.

c. The failure to review, or accurately meet the AMC guidelines for ground support in intersections in the Huon 1359 level.

d. The failure to ensure that the ground support risk matrix was updated on regular and systematic basis.

e. Mining the 778 cross cut without conforming to an approved design.

f. Miners, up to the level of supervisors entering an open stope to place explosives and equipment.

g. Allowing miners to operate in near the brow of an open stope without secondary ground support in place.

h. Allowing miners to operate in an area in which there was evidence of instability, without first ensuring that the area was made stable with secondary ground support.

i. The lack of any clear policy that would prevent a miner from undertaking work in an area in which the miner had identified a safety hazard, without the hazard first being rectified.

j. The lack of candour by RBL during the WST desktop audit.

k. The lack of a readily available database as to the ground support and date of installation, type, pattern and the like.

l. The lack of adequate communication and recordings of incidents.

384. Mining is a dangerous activity. Miners routinely take risks that other people would not consider taking, and which expose them to serious injury and death. The aim should be to ensure that risks are minimised to the greatest possible extent. This involves conscientious efforts by everyone involved in the process. It starts at Board level, and should cascade through management, technical staff and to the miners at operations level.[157]

385. There was extreme risk taking in the mine shortly before the deaths of Sidney Pearce and this was within the recent memory of the deaths of Messrs Jones and Lister. The explanation of Mr Wray-McCann gives some helpful insight into the reasons why safety standards had slipped to this degree.

386. Legislative action can be taken to encourage business organisations to meet better corporate standards. The enforceable undertaking regime in the Act, s55A presents a good method. In its terms, s55A may be too restrictive. Perhaps undertakings should not be limited to those matters in which the Secretary has a power or function under the Act,[158] but should be linked to matters which are generally referable to the scope and purpose of the Act, including employers' duties. Also a provision which enables the Court to require an employer to enter an enforceable undertaking as part of the enforcement regime available under the Act, rather than limited to a situation which requires the Secretary to make an application to the Magistrates Court when the Secretary believes a person has contravened a term of the undertaking only.[159]

387. Similar regimes have been introduced in other fields. The *Trade Practices Act 1974* (Cth) provides a good example. In that area, enforceable undertakings are routinely used to implement and enforce compliance programs to prevent restrictive trade practices throughout corporations. A similar model could be incorporated into mining legislation to ensure compliance with safety standards.[160]

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157 Gunningham, op cit., p46

158 The Act, s55A(1)

159 Query whether this is possible under the *Sentencing Act 1997*, ss7(f) and 59. It may be preferable to include a specific provision under the *Workplace Health and Safety Act 1995.*

160 See Gunningham, op cit., pp145-6

388. Generally, compliance programs are used to achieve three objectives: prevent law breaking; promote a culture of compliance and encourage good corporate citizenship.[161] The focus here is on the second.

389. A legislative regime with performance and systematic standards can meet these requirements. Setting benchmarks for performance, the design and implementation of management systems with suitable auditing controls are things, which might usefully assist mining companies to meet OH&S goals and encourage a suitable culture.

161 ACCC website: Best and Fairest program; Foreword and Introduction.

## Formal Findings

## Jarrod Jones

390. Jarrod Keith Jones:

a. died between 1630 hours and 1730 hours on 6 June 2001 at the Heemskirk 1670 level at the Renison Bell Tin Mine, near Zeehan in Tasmania;

b. was born at Burnie in the State of Tasmania on 25 April 1978; and

c. at the time of death

i. was aged 23 years.

ii. was living in a de facto relationship;

iii. was a Miner.

391. Jarrod Keith Jones died in a rock fall as a result of asphyxia having been pinned irrevocably beneath the collapsed roof of the mining vehicle, which he was operating at the time.

392. At the time of his death, he was not being treated by a medical practitioner.

393. Renison Bell Ltd contributed to the death.

## Matthew Lister

394. Matthew David Lister:

a. died between 1630 hours and 1730 hours on 6 June 2001 at the Renison Bell Tin Mine, near Zeehan in Tasmania;

b. was born at Sydney in the State of New South Wales on 24 February 1977; and

c. at the time of death was:

i. aged 24 years;

ii. single; and

iii. a Mine Planning Engineer and Trainee Miner.

395. Matthew David Lister died as a result of multiple injuries sustained in a rock fall while assisting in mechanical scaling operations.

396. At the time of his death, he was not being treated by a medical practitioner.

397. Renison Bell Ltd contributed to the death.

## Sidney Thomas Pearce

398. Sidney Thomas Pearce:

a. died at approximately 1700 hours on 5th May 2003 at the Huon 1359 level Renison Bell Tin Mine near Zeehan, in Tasmania;

b. was born at Ouse in the State of Tasmania on 28 February 1960; and

c. at the time of his death was:

i. aged 43;

ii. married;

iii. a Miner.

399. Sidney Thomas Pearce died as a result of head injuries sustained in a rock fall.

400. At the time of his death he was not being treated by a medical practitioner.

401. Renison Bell Ltd and Barminco Ltd contributed to the death.

## Recommendations

These Inquests have highlighted what I perceive to be fundamental deficiencies in the current legislation applicable to mining in Tasmania. Whilst the current legislation, the Workplace Health and Safety Act 1995 is applicable to mining, it is a more generalized approach while mining requires more industry specific legislation due to the nature of its operations.

Mining has always been referred to as being hazardous, certainly when considering underground mining. Such activity can only benefit by specific regulatory legislation to assist all involved in the issues of safety and safe workplaces.

To achieve appropriate standards of safety there needs to be a well resourced, amply qualified regulatory authority invested with the power to ensure that mines operate to a standard expected in workplaces.

There needs to be provisions whereby owners or board members are not able to starve mining personnel of funds required for the provision of safety and force them to operate with limited financial resources. The provisions should ensure those responsible for the management and operations of the mine have the power or authority to suspend mining operations when the issues relating to safety become of significant concern.

The issues of training of those involved in mining in all of its facets needs to be reviewed so that those employed in mines are well skilled to understand their role and responsibility in respect of their position.

Whilst the buddy system utilized in mining has many advantages, it needs to be supplemented with appropriate training. I note that other States have mining specific training and this is another area which could be embraced in this State.

There needs to be a clear definition of the roles of those engaged in mining, with their statutory obligations clearly set out and this should extend to directors and members of Boards so they are under no illusion as to their responsibility in providing adequate resources to mine management to ensure compliance with workplace safety requirements. The legislation should incorporate appropriate sanctions, including the imposition of daily penalties for ongoing failures where the responsibilities are not complied with, including the power to close and suspend a mine.

The legislation should also encompass the need for geotechnical support in relation to mining and to make it mandatory when re-opening old workings, working off plan, or the like. There should be sanctions by way of fines where a mine continues to operate without geotechnical staff on site or without a written contract with off-site consultants, that provides for a minimum requirement for on-site visits sufficient to ensure adequate geotechnical management.

More specifically, the following matters need to be reviewed and acted upon.

1. The legislation should exhibit, at a minimum, the following features.

   (a) It must apply to everyone whose actions or conduct may affect the safety or health of anybody at mines. In particular it must apply to:

      (i) tenement holders;

      (ii) mine operators;

      (iii) mining employees; and

      (iv) mining contractors and others who carry out functions and duties at mines.

   (b) The legislative purpose should be to protect the safety and health of all people at mines and to minimize to the best extent possible the risks inherent in mining.

   (c) The focus of the legislation should primarily be on mine operators; whether they are the tenement holder, or a contractor. There must be a register kept by WST of the details of every mine operator. In default, the tenement holder will be the mine operator. In order to register another operator the tenement holder must both:

      (i) appoint the mine operator; and

      (ii) notify WST of the appointment –

      in writing.

   (d) In the case of there being more than one mine operator for different parts of a mine or with different responsibilities, the register must record the responsibilities of each mine operator and the parts of the mine for which they are responsible. This includes cases where the tenement holder has retained for itself control of parts of the mine or its operations. The tenement holder will be responsible for accurate information being supplied to WST.

(e) In any case, the tenement holder must ensure that the mine operator is provided with all information relevant to assessing and managing to the best extent the possible risk to safety and health of any worker or other person that might be affected by the mine operator's operations at the mine.

(f) A responsible officer must be appointed by the mine operator at a mine and must be:

(i) based on site;

(ii) a qualified mine engineer; and

(iii) have sufficient control over mining operations to close, or suspend operations at the mine or in parts of the mine that expose employees to an unreasonable risk to health or safety.

(g) In addition to the general duties of responsible officers at workplaces, the responsible person in consultation with the governing body of the mine operator must have obligations to:

(i) develop and implement risk management systems; and

(ii) develop and implement a suitable management structure -

to ensure that risks to health and safety are minimized to the best extent possible.

(h) Meaningful sanctions must apply to all individuals concerned in the management of the mine for contraventions of the legislation. This includes the directors and senior management of the mine operator. The scope of WHSA, s53 could be broadened for this purpose.

(i) Minimum qualifications for mining engineers and other engineers responsible for mine operations should be prescribed.

(j) Every mine worker should have successfully completed a suitable, accredited course in the basic operations of mining, including risk identification and obligations for safety and health, in addition to any trade qualification or operator's ticket necessary to undertake their duties.

(k) Regulations should be made to ensure that mine operators adhere to minimum operational standards. In particular:

(i) the circumstances in which a risk assessment must be undertaken and recorded;

(ii) the person(s) responsible for undertaking a risk assessment;

(iii) the process and content of a risk assessment, including its recording in writing, appropriately dated and signed;

(iv) the proper management of any risks identified by a risk assessment by risk reduction, and monitoring including the written records that must be kept;

(v) the identification and categorisation of accidents and incidents that must be reported to WST, including the disclosure of all relevant material necessary for WST to determine what, if any, action that it must take in relation to mining operations affected by the accident or incident.

(1) Without limiting the matters that should be covered in the regulatory regime, in the context of the accidents the subjects of these inquests, the regulations should address:

(i) the application of specific standards for the management of health and safety in mines, including:

(1) Occupational Health and Safety Management Systems - Specification with guidance for use AS/NZS 4801:2001.

(2) Occupational Health and Safety Management Systems -General guidelines on principles, systems and supporting techniques AS/NZS 4804:2001.

(3) Risk Management AS/NZS 4360:2004.

(4) Conveyors - Safety Requirements AS 1755:2000.

(5) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment (NOHSC: 1003(1995)).

(6) Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment (NOHSC 3008 (1995) 3rd Edition).

(ii) the provision of adequate geological and geotechnical services and support at mines to ensure that ground control and mine planning are carried out in such a way as to minimize the risk to safety and health to the best extent possible, together with appropriate sanctions for failing to provide such services;

(iii) the keeping of mine plans, maps, surveys and other information relevant to the planning, development and production of mines in a systematic and readily accessible form, and if appropriate a computer database incorporating all such information, readily available and accessible by those with responsibility for the area subject to such risk and mining inspectors;

(iv) the antecedent investigations and enquiries necessary before re-entering mine workings or developments after a specified period, including the examination of relevant mine records;

(v) the antecedent investigations, planning and other relevant enquiries necessary to determine whether any previously unplanned operation at a mine poses a risk to health and safety of any person, before that operation is undertaken.

(m) Mine workers must have obligations to ensure their own safety and health and the safety and health of co-workers. In order to discharge those obligations a worker must have:

(i) adequate training to ensure that he or she can recognise hazardous situations as and when they arise; and

(ii) unqualified power to withdraw from the mine, or a part of it, until the hazardous situation has been brought under control.

(n) Mining contractors and their employees should have similar obligations to mine workers.

(o) Strict compliance is necessary where a regulation specifies that a risk is prohibited or the manner in which a risk is to be managed. Where a regulation, standard, or code of practice states the way in which the management of risk may be achieved, the obligation to manage the risk is sufficiently discharged if

the regulation, standard or code of practice is met, or if the action achieves a reduction in the level of risk commensurate with that required in the standard or code of practice.

(p) There should be a review of what, if any, mine industry standards can, or should form part of a code of practice, within the meaning of WHSA, s22.

(q) Adequate resources should be made available for the purpose of ensuring that mines inspectorate in WST is:

(i) competent and properly qualified;

(ii) and capable of undertaking:

(1) audit and inspection functions; and

(2) investigation and enforcement functions -

necessary to enforce compliance with all relevant workplace health and safety legislative requirements.

This recommendation entails that the legislation will specify minimum qualifications that must be held by the Chief Inspector of Mines and mines inspectors under his control.

It also entails that WST must have sufficient qualified staff to carry out all the necessary tasks of the inspectorate, especially inspections and audits of mine safety at mines in Tasmania.

**Dated this 20th Day of May 2008**

**DONALD J JONES**

**CORONER**