QUEENSLAND COURTS

OFFICE OF THE STATE CORONER

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Joshua Leslie Hopkinson**
TITLE OF COURT:	Coroner's Court
JURISDICTION:	Mackay
FILE NO(s):	COR 1782/05(3)
DELIVERED ON:	19 October 2009
DELIVERED AT:	Mackay
HEARING DATE(s):	26 March, 7, 8, 9, 10 & 14 July 2008 16, 17 & 18 March 2009
FINDINGS OF:	Coroner Ross Risson
CATCHWORDS:	CORONERS: Inquest – supervision of apprentice, refurbishment of cylinder from a drill rig, hazards of uncontrolled release of stored energy in equipment used in coal mining activities, division of authority between *Coal Mining Safety and Health Act 1999* and *Workplace Health and Safety Act 19*95

REPRESENTATION:

Counsel Assisting	Mr SJ Hamlyn-Harris
BM Alliance Coal Operations Pty Ltd	Mr J Murdoch SC (Freehills Lawyers)
Department of Mines and Energy	Mr D Lang (Crown Law)
Hardchrome Pty Ltd	Mr A Herbert (HopgoodGanim Lawyers)

The *Coroners Act 2003* (the Act) provides in s 45 that when an inquest is held into a death, the coroner's written findings must be given to the family of the deceased, each of the persons or organizations who were given leave to appear at the inquest and to various officials with responsibility in the relevant areas. These are my findings into the cause and circumstances surrounding the death of Joshua Leslie Hopkinson and they will be distributed in accordance with the Act.

INTRODUCTION

On the 21st July 2005, Joshua Leslie Hopkinson died when the cylinder he was working on "exploded"[1] causing him fatal injuries. His death occurred at Hardchrome Pty Limited's (Hardchrome) workplace at 201 Boundary Road, Paget, Mackay where he was employed as an Apprentice Fitter and Turner.

Because his death was a "violent or otherwise unnatural death"[2] in terms of the Act his death was reported to me as coroner at Mackay for investigation.

These findings

- Confirm the identity of the deceased, the time, place and circumstances and medical cause of Joshua Hopkinson's death;
- Consider the circumstances of the removal from the drill rig and sending of the cylinder from BM Alliance Coal Operations Pty Limited Norwich Park mine outside of Dysart to Hardchrome Pty Limited's workshop at Paget, Mackay for refurbishment;
- Consider the manner in which the cylinder was dealt with at Hardchrome Pty Limited's workshop at Paget.
- Consider whether the investigation of this death was hampered because of the division of authority between *Coal Mining Safety and Health Act 1999* and *Workplace Health and Safety Act 199*5.
- Consider whether any recommendations or comments can be made that could reduce the likelihood of deaths occurring in similar circumstances or otherwise contribute to public health and safety or the administration of justice.

The investigation

My investigation[3] commenced upon receipt on the 22nd July 2005 of Police Report of Death to a Coroner – Form 1 – prepared by an officer of the Queensland Police Service.

The medical aspects of the investigation were conducted by Dr Peter FitzPatrick, pathologist of Mackay who performed an autopsy on the 25th July 2005 and his report is dated the 1st September 2005.

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[1] This is the description of the incident used in the report to the Chief Inspector of Mines.
[2] Section 8(3)(b) *Coroners Act 2003*.
[3] Section 11(2) *Coroners Act 2003*.

My investigation of Mr Hopkinson's death relied on the report to the Chief Inspector of Mines dated the 25th January 2006 prepared by Peter Herbert, Inspector of Mines (Electrical) and Bruce McKinnon, Inspection Officer both based in Mackay. That report was prepared under the provisions of the *Coal Mining Safety and Health Act 1999*.

The other report relied on by me was that prepared by Gavin Scott Wesche, Principal Inspector (Investigations), Department of Industrial Relations – Workplace Health and Safety Queensland based at Mackay. That report was prepared under the provisions of the *Workplace Health and Safety Act 19*95.

The Inquest

I decided to hold an Inquest after requests to do so by both Mr Hopkinson's father Lionel Robert Hopkinson and his mother Louise Ann Altmann.

The inquest was held over nine days covering an extended period. Mr Hamlyn-Harris of counsel was appointed to assist me and leave was given for the owner of the cylinder, Mr Hopkinson's employer as well as a director and two employees of that company and the Department of Mines to appear.

Whilst neither Mr Lionel Hopkinson nor Ms Altmann sought formal leave to appear they were present throughout the hearing and both of them, Mr Hopkinson through Mr Hamlyn-Harris, and Ms Altmann personally, made well thought out submissions as recommendations and/ or comments I might make.

I record here that all parties co-operated and assisted me in the conduct of the Inquest.

The evidence

Apart from those matters forming the basis of my investigation, the parties produced and tendered various statements and reports during the course of the inquest. This resulted in a substantial amount of information before me and I have made no attempt to even try to include in my findings a summary of all that detail.

In making my findings I only have to be satisfied on the balance of probabilities although "*the seriousness of the allegation, the inherent unlikelihood of an occurrence of a particular description or the gravity of the consequences flowing from a particular finding"* [4]are matters which I must take into account in deciding if a matter has been proved on the balance of probabilities.

Personal Background

Joshua Leslie Hopkinson was 17 years at the time of his death having been born on the 20th January 1988. He was the son of Lionel Robert Hopkinson

[4] Briginshaw v Briginshaw (1938) 60 C.L.R. 336 at 362 per Dixon J

and Louise Ann Altmann. He was a second year apprentice fitter and turner in the employ of Hardchrome Pty Limited.

Chronology

On the 21st July 2005, at about 9.15pm, Joshua Leslie Hopkinson died when the cylinder he was working on "exploded" causing him fatal injuries. His death occurred at Hardchrome's workplace at 201 Boundary Road, Paget, Mackay.

The events leading to that point are clear.

The cylinder on which Joshua Hopkinson was working was a nitrogen tensioning cylinder. This cylinder formed part of the track tensioning system on a Drilltech Inc. Overburden Blast Hole Drill Model C90K-D which was owned and operated by Norwich Park Mine. This tensioning equipment is associated with an idler sprocket which provides tensioning to the track. If there is no tensioning arrangement, the track would become very loose and it would come off during tramming or movement of the drill. The tensioner assembly nitrogen formed part of the track tensioning system on the machine. The nitrogen cylinder is used as a shock absorber in conjunction with the tensioner assembly hydraulic, a grease filled cylinder to ensure that the tracks are adjusted correctly.

The cylinder consists of a case, a piston and cylinder rod. The rod is 150mm in diameter and the case has an outside diameter of 240mm and an inside diameter of 180mm. The rod has a maximum travel of 70mm before the piston contacts the end cap and, at that time will be approximately 77mm beyond that cap.

The nitrogen cylinder is charged to 15.67 megapascals or 2272 pounds per square inch – figures quoted in the Intersafe Report - or 2300 pounds per square inch – the figure quoted in report to the Chief Inspector of Mines although the difference is said to be insignificant - under normal operating pressures. This ensures that the piston is at its maximum travel until the idler contacts some obstruction while tramming. When this happens, the case will move with the sprocket and the piston will remain stationary as the shock is absorbed.

The cylinder is made of a number of components i.e. the barrel, the piston with attached rod, the flange (or end cap) and retaining bolts. The flange has a weight of 5.2kgs and is bolted to the cylinder by means of 15 bolts which weigh 18kgs each, giving a weight of the bolts of 2.7kgs. Therefore the flange plus bolts weighs 7.9kgs. The barrel has a weight of approximately 55kgs and the piston has a weight of 27.5kgs. Therefore, the combined weight of piston and flange which are the components that were driven vertically upwards was 32.7kgs.

On the 29th May 2005 the left hand track of Drill Rig EDD No. 40 was refitted after the track had come off. This work was performed in the field during the

nightshift. On the 30th May 2005 the track came off again and during the dayshift the track was refitted in the field and the nitrogen cylinder recharged. Again on the 4th June 2005 the track was loose and came off the track frame and it was refitted in the field. The track was refitted again and the cylinder recharged on the 16th June 2005.

Because of the problems with the leaking cylinder it was determined to replace it when the drill rig was in for its scheduled maintenance.

As the drill rig was due for such maintenance it was taken to the workshop on the 17th June 2005. It was first washed at the wash plant and then walked to the maintenance workshop. When the drill rig was walked into the workshop it was seen that the left hand track was loose.

Christopher John Bugeja a maintenance supervisor at Norwich Park Mine was supervising Dean Alexander Thacker, Geoffrey William Hamill and David John Knyvett on the day shift on the 17th June 2009. Mr Thacker had been trained and assessed as competent to perform maintenance on a D90KS Drilltech Drill. He had not changed out an adjuster cylinder on a drill before. He had previously changed out adjuster cylinders on dozers although they were not nitrogen charged. He did regularly work with struts on trucks which are nitrogen charged.

The Original Equipment Manufacturer's manual (OEM) was consulted and the drill was locked and tagged. The process of locking and tagging out the drill is to ensure – to make certain - by actually locking the ignition and placing an identifying tag on the lock - that the drill could not be started whilst work was being performed on it. Before starting the job Mr Thacker read the instructions for the discharge kit.

Mr Thacker took the plate off the side of the machine to access the cylinder. He took off the cover plate and the cap for the Schrader valve and screwed on the discharge tool to that valve. He put the drain line on to the discharge tool and he operated the release tap which, according to his evidence, felt like it was operating correctly. He felt the tap plunger contact the Schrader valve but he did not hear much pressure being released in that he only heard a small amount of noise of gas being released.

He then refitted the discharge tool onto the Schrader valve and operated the tap. He felt the plunger contact the Schrader valve and heard no gas being released. He determined that there was no gas in the cylinder and he confirmed this to his satisfaction as the piston was about level with heads of the bolts on the casing of the cylinder.

The cylinder was still on the track frame of the drill rig at the end of the day shift and Peter Miotto and Steven McNaughton of the night shift were assigned the task of completing the job. Mr Miotto received a hand over from Mr Thacker who told him that the nitrogen had been discharged from the cylinder.

Mr Miotto used the discharge tool and on not hearing even a faint noise of gas being released he had confirmed to his satisfaction that the cylinder was "dead" i.e. no longer charged with nitrogen gas. Once the cylinder was removed from the track frame it was observed by a number of people that the piston was retracted in that it was showing about the same length or distance of rod as the new and uncharged cylinder.

Whilst at one stage it seemed that the cylinder would be dumped - it had to be rescued from the rubbish bin - a decision was made to refurbish it and Hardchrome was selected to do the job. The cylinder was received at Hardchrome on the 13th July 2005 leaving Norwich Park mine on the 12th July 2005. The cylinder was placed in the bottom of a racking system to be left there until it was to be worked on.

On the 21st July 2005 Kim Van Poelgeest, Hardchrome's production manager inspected the cylinder. He did not at this stage view the Schrader valve. He then instructed Damien Aaron Welch to have the cylinder disassembled. Mr Welch as supervisor of the hydraulics department was involved in allocating overseeing and processing all work through that department. The cylinder had to be disassembled so that a report could be prepared for a quote to be given to Norwich Park for the refurbishment. As supervisor, Mr Welsh oversaw the training of apprentices such as Joshua whilst they were in the hydraulics department. Mr Welch gave the job to Joshua Hopkinson at about 3.00 p.m. on the 21 July 2005.

When Mr Welch gave Joshua the job they were near the racking system where the adjuster was still on its pallet on the floor at the bottom of the racks. Whilst Mr Welch pointed out the cylinder it was positioned so that the Schrader valve was on the side away from them and they did not really inspect it.

If the Schrader valve was removed it would clearly have demonstrated that the cylinder was uncharged.

Joshua was working the afternoon shift and whilst there was some overlap with the day shift only three persons were going to work that shift. Apart from one person working in the machining section the other person on the shift with Joshua was Jamie Luke Ferguson who was a qualified fitter. Whilst Joshua was an apprentice fitter and turner and as such worked in both the machinery and the fitting or hydraulics departments, Mr Ferguson only worked in the fitting or hydraulics department. The machinery department was where the lathe work – turning, milling and machining was done whist in the fitting department items were dismantled, assembled and tested.

Mr Ferguson does not accept that he was for that afternoon shift directed to supervise Joshua although it is Mr Welch's evidence that he was. Mr Ferguson does accept that as the only trade qualified person working in the

fitting department for that shift he would have assisted and advised Joshua if he had requested assistance or advice.

The evidence does not disclose what Joshua did from the time he was given the job to work on the adjuster cylinder until Mr Ferguson noticed him using the overhead or gantry crane to move the adjuster to where he, Joshua, was going to work on it.

Mr Ferguson was working on a gland that had a gasket surface on it which needed to be cleaned and to do this he had to use a sander which operated by air and he walked over to where Joshua was working so he could use the air line that was there. Mr Ferguson cannot recall if the air line was connected to either a deburrer or a rattle gun. The former is a small cylinder tool to which can be fitted a grinding attachment so as to grind out a bolt hole so that an Allen key can be fitted. Then, with the Allen key fitted to the rattle gun and to the bolt hole, the bolt can either be loosened or tightened.

Mr Ferguson, as he walked to the bench to use the air line, noticed the adjustor cylinder which was on the floor. He estimated that there were six to eight bolts left in the gland and, although he was looking from on top of it and therefore not in the best position to estimate it, it appeared to him that the rod was about level with the top of the remaining bolts. Therefore, it looked to Mr Ferguson as it would appear if it was depressurised.

Once he had finished with the air line Joshua took it and Mr Ferguson walked back to where he had been working before he needed to use the air line. As he did so, there was “a huge bang and a huge air blast”. He knew what had happened and that it was too late. Joshua had received fatal injuries.

Because two bolts were broken and one was stripped for about 10mm of its 50mm of thread, Joshua had completely removed 12 bolts and was in the process of removing the thirteenth bolt when the cylinder “exploded”.

The evidence is that on the 16th June 2005, the cylinder was recharged with nitrogen gas and would have had approximately 15.67 MPa or 2,272 psi being the pressure for normal operations. At this pressure the piston would be at its maximum travel and the rod would then be approximately 77mm beyond the end cap. Whilst that is the case for normal operations only a low pressure is needed to cause the piston to travel to it maximum extent.

On the 17th June 2005 it was seen as the drill rig was walked into the workshop from the wash plant that the left track was loose indicating that some of the charge had been lost. The cylinder could not be removed if it was fully charged.

I accept that both Mr Thacker and Mr Miotto used the discharged tool on the cylinder to discharge and/or to check that the cylinder was discharged. I also accept that because of the distance that the rod extended beyond the end cap, the cylinder appeared to be fully discharged. It was as one witness said

similar to the new and uncharged cylinder that was to replace the one removed.

Even Mr Ferguson, although he may not have been in the best position to view any extension of the rod, just moments before the explosion considered that the cylinder was discharged. Yet clearly it did have gas in when Joshua commenced work on it.

So the situation is that if the cylinder did not have any gas charge when it left Norwich Park Mine it must have been re-gassed at least to some extent by some person at Hardchrome.

As far as that possibility is concerned the evidence is that the cylinder would not have been recharged by Hardchrome even to a limited extent. A number of reasons were advanced to support that conclusion namely: -

- there was no recharge tool available,
- there was no suitable gas supply on hand,
- any testing of cylinders after refurbishment was done with oil,
- to recharge a cylinder which had been brought in for refurbishment was potentially dangerous in that it was not known what fault the cylinder may have had; and
- as it was to be pulled down so a quote could be prepared for its refurbishment there was simply no point in recharging it.

Even though he was an inexperienced apprentice it seems less than probable that Joshua would have charged the cylinder, assuming that he had the means to do so, and then proceed to dismantle it. There is no evidence that apart from Mr Stich who received the cylinder at Hardchrome that any one other than Joshua touched it.

But, if it was not re-gassed even to a limited extent by someone at Hardchrome then two things must follow namely

- the cylinder was not completely discharged when it left the mine; and
- the piston had jammed inside the barrel.

Even Mr Kahler, who was the author of The Intersafe Report and who considered that there was no evidence that the piston was jammed and that it could not jam, conceded that if it was accepted that cylinder was not re-charged to some extent at Hardchrome, the piston had to be jammed. This was because even with a low charge of gas the rod would extend to a greater distance than the distance that the rod was observed at by a number of people before it was shipped off site from Norwich Park Mine. The evidence is consistent throughout that after removal the rod only protruded an estimated 20 to 40 millimetres above the top of the flange.

Again from the evidence of Mr Kahler in spite of the fact that the cylinder was leaking and losing charge the bottom seal was capable of holding a

substantial charge. A test conducted by Mr Kahler was that around 1200 psi was held in the cylinder for sixteen days.

An explanation of why the cylinder did retain some charge in spite of the fact that Mr Thacker believed that he had discharged it and Mr Miotto had checked that it was discharged has been provided by Mr Kahler. Ultimately I cannot accept that Mr Thacker used his finger as well as a screw driver to depress the Schrader valve.

Mr Kahler whilst conducting tests on a similar adjuster and using a similar discharge tool found that by placing a slightly thicker washer on the end of the discharge tool that tool would be prevented from engaging the Schrader valve.

Of course the issues of whether the cylinder was charged when it left the mine or whether it was recharged at Hardchrome and whether it was jammed or not only were live issues before me at this Inquest because no one ensured, made certain, that the cylinder was discharged before it left the mine. To make certain that the cylinder was completely discharged would have involved removal of the Schrader valve. That, of course, is not to say that Mr Thacker did not believe he had discharged the cylinder or that Mr Miotto had not checked to see if it was discharged or that those persons involved in readying the cylinder for transport saw any evidence that should have put them on notice that the cylinder could still contain some charge. This was because the evidence is clear that the rod was only protruding an estimated 20 to 40 millimetres above the top of the flange indicating to experienced trades people that the cylinder was discharged.

Obviously the removal of the Schrader valve before the cylinder left the mine would have removed all doubt that the gas in the cylinder was fully discharged. It would have provided certainty that the cylinder was fully discharged and avoided the fatal combination of what in all probability was the failure to fully discharge the cylinder because the Schrader valve was not engaged because of a too thick washer used on the discharged tool and the jamming of the piston giving the false impression that the cylinder was discharged.

The evidence of Mr Thacker was that before he started work on the drill rig he locked and tagged it making certain that the drill rig could not be started whilst it was being worked on. Removal of the Schrader valve and replacing it with a coloured plug as has been suggested would have been the cylinders equivalent of it being locked and tagged.

The Department of Mines and Energy Safety Bulletin No. 70 dated the 8th November 2007 highlighted the dangers of stored energy containers. That bulletin was issued as a result of five fatal accidents, including Joshua's, due to the uncontrolled release of stored energy. Amongst other things it highlighted the need to remove a plug valve or hose and to keep them separate from the cylinder as an open circuit cannot contain pressure.

Stewart Bell, Executive Director, Safety and Health Division, Department of Mines and Energy also had taken steps to highlight the dangers of stored energy containers as he has outlined in Exhibit No. 70. He also referred to the visits of Bruce McKinnon to all of the mines in the Mackay area of the Bowen Basin during which he highlighted this as well as other safety issues.

It is a matter of some concern that the cylinder was transported with some charge in it and without any notice identifying it as a vessel that in operating mode it contains a dangerous charge of gas. The fact that it was delivered to Hardchrome containing some charge, would not have had the catastrophic consequences that it did if some check had been conducted at Hardchrome. I accept that Mr Welch when he instructed[5] Joshua as follows:-

> *"You see that track adjuster. I want you to dump the pressure and then strip it"*

that to "*dump the pressure*" meant:-

- inspect the item to determine any discharge points or damage;
- depressurise the item by any means provided on the item for that purpose;
- place the item on a workbench or proper support;
- loosen (not remove) each bolt progressively from the gland in a 'star pattern';
- tap the cover plate of the gland whilst loosening the bolts to make sure that no residual pressure remains, or if it does remain, that it is allowed to escape the item without expelling any loose components;
- do not position the body over the top of any item while working on it, that is, in the direction that any loose part may travel if it comes off the item.

It may be that to any experienced person such as Mr Welch all those things might be second nature but Joshua was an apprentice. He was not experienced; he was a young person learning his trade and in some better fashion he should have been reminded of safe working procedure. Whilst well intentioned a 'shorthand' reference to or as a reminder of safe working procedure was not sufficient.

The evidence does not disclose if Joshua made any effort to depressurise the cylinder. It may be that from his observation of it he, like others before him, believed that it was depressurised. It is quite clear that Joshua failed to follow safe work procedure. It was his complete removal of twelve of the fifteen bolts which allowed the force of the gas remaining in the cylinder to cause the release of the piston and rod and their violent expulsion from the cylinder.

[5] Welch statement date 5 December 2005 (Exhibit 11) at paragraph 18

With appropriate supervision such unsafe practices may have been detected and corrected. Clearly it is not appropriate supervision where the 'supervisor' - Mr Ferguson in this case – did not consider himself to be and as the evidence suggests that he was not the supervisor.

Whilst there is some record of Joshua testing vessels for energy before dismantling them[6] this cylinder or adjustor from Norwich Park mine was the first of its kind that the workshop had received.

There is no evidence before me to suggest that the investigation of the incident as a whole has been impeded because of the division of jurisdiction between the Chief Inspector of Mines under the provisions of the *Coal Mining Safety and Health Act 1999* or the Department of Industrial Relations – Workplace Health and Safety Queensland under the provisions of the *Workplace Health and Safety Act 19*95.

There is also no evidence that on a practical level between the persons actually conducting the investigations that there was any difficulty.

The end result of the investigation was that Workplace Health and Safety prosecuted Hardchrome as a person upon who is imposed a workplace health and safety obligation who has failed to ensure that its workers were not exposed to risks to the health and safety arising out of the conduct of the employer's business or undertaking.

Hardchrome pleaded guilty and was convicted of that offence. A conviction was not recorded. It was fined the sum of $80,000.00 and ordered to pay $5,000.00 investigation costs, $750.00 professional costs and $65.40 costs of court in default levy and distress. It was allowed three (3) months to pay.

Whilst Workplace Health and Safety commenced action against the mine it was not proceeded with on the basis that jurisdiction rested with the Chief Inspector of Mines. This aborted prosecution clearly demonstrates that there is some confusion or uncertainty as to where responsibilities lie.

My findings are: -

The deceased was Joshua Leslie HOPKINSON who died on the 21st July 2005 at the workshop of Hardchrome Pty Ltd at 201 Boundary Road, Paget, Mackay, Queensland. The cause of his death was chest injuries. Those injuries were the result of an uncontrolled release of stored nitrogen gas which was released as he was in the process of dismantling a nitrogen charged track adjuster/cylinder from a Drilltech Inc. Overburden Blast Hole Drill Model C90K-D. Such item having been received in a partially charged state from BM Alliance Coal Operations Pty Limited Norwich Park mine. The uncontrolled release of the gas caused the piston and flange to be rapidly expelled from the cylinder casing in an upward direction striking him with a great force in the chest causing fatal injuries.

[6] Work Record for 21/01/2004 "Rear suspension cylinder – let out pressure."

COMMENTS

1. Recommend that coal mine operators critically review the effectiveness and implementation of their mine safety and health management systems in accordance with section 41(1) (f) of the *Coal Mine Safety and Health Act 1999* in relation to stored energy to ensure
    - that procedures for the safe discharge of energy are effective and comply with any equipment manufacturer's instructions; and
    - that the discharge is validated by an independent person by the removal of any plug, valve or hose thereby ensuring an open circuit or zero energy state.

2. Recommend that coal mine operators and others involved in the maintenance and repair of stored energy equipment used in coal mining operations in dispatching and transporting any such equipment, ensure that the nature of the item and the hazards associated with it are appropriately documented and displayed for the benefit and safety of both transport operators and those receiving the equipment.

3. Recommend that coal mine operators and others involved in the maintenance and repair of stored energy equipment used in coal mining operations review procedures for the safe dismantling of such equipment to ensure that no dismantling of any such equipment is commenced before it is confirmed, by independent validation if necessary, that it is fully discharged.

4. Recommend that coal mine operators and others involved in the maintenance and repair of stored energy equipment used in coal mining operations review procedures to ensure that all apprentices and others without formal trade qualifications are appropriately supervised at all times when working on such equipment.

5. Recommend that the departments responsible for the administration of the *Coal Mining Safety and Health Act 1999* and the *Workplace Health and Safety Act 1995* are clear as to who is responsible for any investigation and prosecution in relation to any accident relating to coal mining operations which occurs elsewhere than at a coal mine and that any legislative amendment be sought if thought necessary.

6. That the Mining Inspectorate liaises with other departments, industry and professional bodies to ensure that awareness of the hazards of uncontrolled release of stored energy in equipment used in coal mining activities and the need for training for those exposed to the hazards is disseminated across all industries and applications of the equipment.

I close the Inquest.

Ross Risson, Coroner