

DEPARTMENT OF NATURAL RESOURCES AND MINES

QUEENSLAND

Coal Mining Safety and Health Act 1999

INVESTIGATING OFFICER'S REPORT

TO

THE STATUTORY CHIEF INSPECTOR

ON

*Nature and Cause Investigation
into a Serious Accident to
s.73 Irrelevant information
at Broadmeadow Underground Mine
on Monday 27th February 2006.*

INVESTIGATING OFFICER: Kevin Clough
District Inspector of Mines
Mackay Central Region

DATE of REPORT: 27th July 2006

FILE REF:

Serious Accident to s.73 Irrelevant information at Broadmeadow Underground Mine.

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s.73 Irrelevant information

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1.0 SUMMARY. return

A single vehicle accident involving a 1991 model 6 cylinder diesel engine powered Mack CHR series tanker truck, Queensland registration number 795 IKD, occurred at the lower end of the main access Ramp 1 at the intersection of Ramp 4 on the surface of the Broadmeadow Underground Mine on Monday 27th February 2006.

The initial report from Broadmeadow Mine has indicated that second and third degree burns to 45 – 50% of the body of s.73 Irrelevant informat the truck driver has occurred.

The vehicle was travelling down Ramp 1 that has been constructed with an approximate grade of 1:10, with a full load of water in a fibre glass tank attached to the rigid tray of the truck. The water is used to consolidate the dust around the portal entries of the underground mine.

Vehicle requirements for travelling on the ramp specify a maximum speed limit of 30 kph and the use of second gear.

At some undetermined point on Ramp 1, the brakes on the truck apparently failed. It has been identified through witness statements that the driver informed his rescuers the truck brakes had failed and that he had tried to shift the truck gears from second to first gear, but missed the selection.

The truck continued down the ramp, scraping along the mine services pipelines on the left side of the ramp in several places. The right-side of the ramp has a safety bund approximately 1m high protecting a drop of varying height into the excavation.

When the truck reached the bottom of Ramp 1 grade, the driver attempted to turn the truck to the left up Ramp 4. This ramp has a formed and graded road and includes the conveyor belt to the surface stockpile area.

During the process of turning to the left, the truck tipped up onto the right side wheels, leaving the left side wheels without ground contact.

The out of control truck collided with Ramp 4 conveyor and burst into flames. Preliminary information from the Police Investigator has indicated that the fire commenced in the truck engine bay.

The position of the truck, including the fibre glass water tank up against Ramp 4 conveyor structure, had restricted egress from the truck. Mr. James climbed out of the driver's cabin, through the damaged left side passenger window and crawled under the return belt of Ramp 4 conveyor to the opposite side away from the fire.

Rescuers found him in this area.

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Witness statements obtained so far, indicate a poor initial emergency response to the accident by mine personnel.

2.0 PERSONAL DETAILS OF INJURED PERSON. return2

Name:
Date of Birth:
Address:

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Queensland Heavy Vehicle Driver Licence No:
Class:
Effective:

Surface Generic Induction:
Issued:
Expiry Date:

Coal Mine Medical Examination Date:
Position:
Nominated Medical Adviser:
Address:

Phone:

**Broadmeadow Mine
Contractor/Employee Induction.
Date:**

29th November 2005

3.0 MINE DETAILS. return3

Broadmeadow Mine commenced operations as the Goonyella Exploration Adit that was part of the Goonyella Riverside Open Cut Mine. The mine has been developed from the base of the highwall of a previously worked Open Cut as an underground punch mine Longwall operation. The entrance to the mine surface infrastructure is via the Red Hill road that branches off the Moranbah township to Goonyella Riverside Open Cut Mine road.

Operator:

B.M. Alliance Coal
Operations.

Mine Postal Address:

PMB 1003
Moranbah. QLD. 4744.

**Site Senior Executive:
Phone:**

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**Mining Manager:
Phone:**

G:\Mines\inspecto\mines\underground\Broadmeadow Mine\correspondence\incidents
incl 1A's\Water Truck_270206\Investigating Officers Report on s.73 Irrelevant in 3.doc

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4.0 NOTIFICATION. return4

The Department of Natural Resources, Mines and Water Mackay Office Mines Inspectorate were notified of the accident by the Queensland Fire and Rescue Service at approximately 12.10pm on Monday 27th February 2006. Mr. Peter Herbert, Inspector of Mines – Electrical received the phone call.

Mines Inspection Officer Kevin Clough, contacted Broadmeadow Mine at approximately 12.15pm for details of the accident s.73 Irrelevant information s.73 Irrelevant information confirmed the accident and that a person had been badly burnt. The Mackay Rescue helicopter had been contacted and was on the way to the mine.

The Department of Natural Resources, Mines and Water Deputy Chief Inspector of Mines (Coal) Mr. Brian Lyne and the Department of Natural Resources, Mines and Water Central West Region Manager Safety and Health Mr. Michael Downs were contacted consecutively from 12.35pm.

5.0 INVESTIGATION. return5

Broadmeadow Underground Mine is situated in the bottom of a previously worked open pit area of Goonyella Riverside Open Cut mine.

Access to the portal areas of the mine is via a ramp (Ramp 1) approximately 900m long with a gradient of 1:10. **(Photograph 1)** Signs erected at the top and bottom of the ramp limit vehicle speed to 30 km/h with the vehicle in second gear. **(Photograph 2)** The centre portion of the ramp width has been concreted to improve vehicle traction during periods of wet weather and to prevent deterioration of the ramp surface. **(Photograph 3)**

Ramp 1 intersects Ramp 4 on the pit bottom in a 90 degree "T" intersection. **(Photograph 4)**

A conveyor belt (Ramp 4 conveyor) has been installed on the right side of this ramp looking up the ramp to the coal stockpile on the ramp surface. **(Photograph 5)**

A single vehicle accident involving a 1991 model 6 cylinder diesel engine Mack CHR 788 RS series tanker truck, Queensland registration number 795 IKD, VIN No. 6FM12L06CBMR01185, Engine No. E7400/1L0252 occurred at the lower end of Ramp 1 on the surface of the Broadmeadow Underground Mine. **(Photograph 6)**

The Mack water truck travels Ramp 1 during daylight hours approximately 10 times. The truck is driven from the mine site onto a public road approximately 9.4km to a standpipe situated in a paddock off the side of the Red Hill road to fill the fibreglass tank fitted to the table tray of the truck with water. **(Photograph 7)**

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The standpipe is attached to the Moranbah town water and mines supply pipeline.

Information from the tank manufacturer Felco, has the tank capacity as 13,000 litres with a total gross weight, full, of 22.5 tonne. The tank is manufactured with transverse and longitudinal baffles for on/off road stability.

In a statement provided by s.73 Irrelevant information and dated 24th March 2006, the tank capacity is stated to be 13,800 litres with the Department of Transport advising a legal limit of 11,000 litres. He stated that it would not be possible to put more than 10,000 litres in the tank due to the steepness of Ramp 1 as the water would have overflowed through the fill point on top of the tank.

In a taped Record of Interview with s.73 Irrelevant information held on Thursday 13th April 2006 in the Mackay Office of the Department Natural Resources, Mines and Water, he has stated that a "sight" hose attached to the rear of the water tank is used to estimate the amount of water in the tank. The water level is stopped approximately 150mm from the top of the sight hose to give an estimated load of 11,000 litres. He also stated that the tank has a capacity of 14,000 litres and is baffled.

The truck is then driven back to the mine site and down Ramp 1 with a full tank of water. This water is used to consolidate the dust around the portal areas from the Adit to Tailgate 1 conveyor. Ramp 4 is also included in the watering schedule as required. **(Photograph 8)**

Witness statements have indicated that the truck may have made several trips prior to the accident.

s.73 Irrelevant information Broadmeadow Mine, made a comment in his witness statement that he was working at the water treatment plant adjacent to the top of Ramp 1 when he saw the water truck pass and heard a, quote: "loud type of engine compression braking – which seemed louder than what I would have expected, in particularly given that the slope/decent was not so great (near top of ramp)".

Indications from tyre marks on Ramp 1 has shown the probable truck position when the driver started to lose control. **(Photograph 9)** The truck has veered from the centre of the ramp to the left where it mounted the concrete gutter **(Photograph 10)** causing the left side wheels to contact the 150mm pipeline that is attached to steel uprights along the edge of the ramp. **(Photograph 11)**

The out of control truck continued down the ramp still running on top of the concrete gutter **(Photograph 12)** until reaching the bottom where it veered from the left to the right side of the roadway. **(Photograph 13)**

Investigations have indicated that the truck was in the process of attempting to turn up Ramp 4 at the intersection of Ramp 1 and Ramp 4. **(Photograph 14)**

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Scrape marks in the ground at the lower end of Ramp 1 indicate that the truck, while attempting to turn up Ramp 4, was starting to roll over onto its right side. **(Photograph 15)** Scrape marks indicate the truck right side lower bull bar has gouged into the ground while attempting the turn to the left. **(Photograph 16)**

The out of control truck continued to roll over and slide before impacting Ramp 4 conveyor. The speed of the truck prior to impact has been estimated by the Department Natural Resources Mines and Water Compliance Unit Investigators to be between 50 to 60 km/h. **(Photograph 17)**

It was at this point, that witnesses heard the impact. Refer to witness statement from s.73 Irrelevant information stated that he saw the front of the truck rise to a height that he could see the bottom of the bull bar above the Ramp 4 conveyor.

Damage to the truck cabin has indicated that the truck had turned completely over with the left side of the cabin passenger door impacting on the Ramp 4 conveyor structure. **(Photograph 18)** An impact of a hexagon head of a self-tapping bolt from the top of the conveyor structure roof canopy **(Photograph 19)** was identified on the outside of the left side fuel tank. **(Photograph 20, Photograph 21)**

The truck then settled back onto its right side.

Witness statements have indicated that a loud compressed air noise was heard after the impact. This was caused by the mine compressed air-line-on-the-off-side of Ramp 4 conveyor being damaged by the impact when the conveyor structure was forced out of alignment. **(Photograph 22)**

One witness who was standing some 50m away from the impact zone and not in a direct line of sight has stated that smoke was seen rising above the Ramp 4 conveyor, **(Photograph 23)** quickly followed by flame. **(Photograph 24)**

The driver of the truck was found lying on the ground on the opposite side of Ramp 4 conveyor from the burning truck suffering from horrific burns to his upper body. He was able to speak to one witness and has said that the brakes failed and he tried to get the truck into a lower gear, but failed to do so. Refer to witness statement of s.73 Irrelevant information **(Photograph 25)**

Witnesses have stated that the mine Emergency Procedure Protocol was followed with initial limited response from mine personnel to the emergency. The injured person was transported to the mine office area up Ramp 1 in the rear of a utility vehicle to the First Aid office for medical attention.

He was later airlifted to the Mackay Base Hospital and then onto Royal Brisbane Hospital burns unit reportedly suffering second and third degree burns to 45 to 50% of his body. He was admitted to the intensive care unit and put under an induced coma.

The truck has been transported to Queensland Transport Mackay depot for analysis and a thorough examination by Queensland Transport Inspectors, Police Scientific Officer, Natural Resources Mines and Water Compliance Unit Investigators Mr. Michael Dunn and Mr. Conrad Russo, District Mechanical Inspector of Mines Mr. John Smith, Inspection Officer Mechanical Bruce McKinnon.

Initial examination of the truck has identified problems as follows:

5.1 Steering box

- Steering wheel & collapsible column severely heat effected but intact. (*Photograph 26*)
- Steering box appears undamaged and was securely mounted, input shaft of box still turned freely and operated the steering arms and tie rods. (*Photograph 27*)
- No noticeable wear or tight spots.

5.2 Kingpins and bushes

- No noticeable wear or looseness in bushes or pins on both sides of the front/first axle.

5.3 Steering rods and joints

- No excessive wear or movement in any of the ball joints in the steering system tie rods or steering arms. (*Photograph 28*)

5.4 Clutch

Operation

- Not able to check operation due to fire damage.
- Turning of the tail shaft resulted in engine rotation thus indicating a positive hook up of the clutch.

Contamination

- No visible sign of oil contamination.
- Inspection plate was removed and the clutch appeared okay.

Adjustment

- Appeared to be within specification.

5.5 Gears

What gear is the gearbox in?

- Gear selector housing removed and selector rods showed that it was in third gate, low split, high range which translates to seventh speed.
- The gear selection positions were confirmed using a gearbox service manual. This task was completed by using a service technician from Crokers Mackay and an electronic service manual.
- The service technician confirmed that the gear selection was seventh speed.

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- Turning of the tail shafts once the drive axles had been removed from the final drives indicated that a positive connection to the motor was in place. (Turning the tail shafts resulted in motor rotation).

5.6 Drive Train

Drive-shafts

- All intact and serviceable.

Universal-joints

- All intact and serviceable.
- No detectable movement in crosses or trunnions.

5.7 Differentials

Are the diffs 2 speed?

- Differentials are not 2 speed but they do have power dividers eg. share the available torque/power evenly between each differential.

5.8 Brakes

Service/Primary

5.8.1 First axle/Front Left

Contamination

- Light to medium brake dust with some coal slurry, not excessive.
- Brake chamber/actuator was not fitted with a dust-boot-on-the-piston rod.
- The brake assembly was fitted with a backing plate to reduce/prevent outside contamination impacting on the assembly. (Photograph 29)

Adjustment

- "S" Cam adjustment was within specification and adjuster not seized.
- Friction material is riveted to the shoe.
- Friction material depth/thickness was within specification; 8.35mm above rivets.

Condition

- Air supply line to the brake chamber/actuator has been burnt away due to fire damage.
- The brake chamber/actuator piston rod is free to move and did not appear damaged.
- "S" Cam adjuster and spindle is free to move. (Photograph 33)
- Brake shoe pivot points are free to move. (Photograph 30)
- Brake shoe operation when operated manually appeared normal.
- Brake drum had severe grooving and significant heat cracking on the friction surface, some glazing evident. (Photograph 31)

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- Brake maybe expected to operate with good to reasonable efficiency.
- Brake efficiency would be compromised due to grooving and glazing. (Photograph 32)

Comment

- This brake would have been operating with good efficiency in comparison to all other brakes on the vehicle.
- It is reasonable to assume that when the truck was traversing the ramp and the first major brake application was attempted that this brake may have caused the truck to veer left.

5.8.2 Second axle/Front Diff Left

Contamination

- Very heavy and compacted dried coal slurry and dirt in and around all components, including the brake chamber/actuator. (Photograph 37)
- Friction material/brake pad dust slot heavily contaminated with compacted dried slurry and dirt. (Photograph 36)
- Friction material clogged with dried slurry and dirt. Brake chamber/actuator was not fitted with a dust boot on the piston rod.
- The brake assembly was not fitted with a backing plate to reduce/prevent outside contamination impacting on the assembly. (Photograph 34)

Adjustment

- "S" Cam adjustment appeared to be within specification and adjuster not seized.
- Friction material is bonded to the shoe.
- Friction material depth/thickness is within specification.
- Spring/emergency brake appeared to be applied.

Condition

- Brake shoe pivot points seized, shoes were not able to retract onto the "S" Cam actuating ramps. (Photograph 35)
- Application of a crow bar to the brake shoes resulted in the shoe flexing and only a slight movement of the shoe on its pivot point.
- Relaxation of the leverage pressure did not result in the brake shoe returning to its starting position.
- Brake drum friction surface was heavily scored with some rust scale evident on the surface. (Photograph 38)

Comment

- Brake may be expected to operate with poor efficiency due mainly to seizure of the brake shoe pivot points.

5.8.3 Third axle/Rear Diff Left

Contamination

- Very heavy and compacted dried coal slurry and dirt in and around all components including the brake chamber/actuator.
- Friction material/brake pad dust slot heavily contaminated with compacted dried slurry and dirt.
- Friction material clogged with dried slurry and dirt.
(Photograph 41) Brake chamber/actuator was not fitted with a dust boot on the piston rod.
- The brake assembly was not fitted with a backing plate to reduce/prevent outside contamination impacting on the assembly. **(Photograph 39)**

Adjustment

- "S" Cam adjustment appeared to be within specification and adjuster not seized. **(Photograph 42)** Friction material is bonded to the shoe.
- Friction material depth/thickness is within specification.
- Friction material on the trailing edge of the trailing shoe was badly worn in comparison to the leading edge of the same shoe, indicating shoe drag probably due to the seized shoe pivot points.
- Spring/emergency brake appeared to be applied.

Condition

- Brake shoe pivot points seized, shoes were not able to retract onto the "S" Cam actuating ramps. **(Photograph 40)**
- Application of a crow bar to the brake shoes resulted in the shoe flexing and only a slight movement of the shoe on its pivot point.
- Relaxation of the leverage pressure did not result in the brake shoe returning to its starting position.
- Some glazing was evident on the friction material/brake pad indicating that the pad was in contact with the brake drum friction surface. **(Photograph 43)**
- This was probably being achieved through either shoe flex when the service brake was applied or the shoe dragging when the parking/emergency brake was released.

Comment

- Brake may be expected to operate with poor efficiency due mainly to seizure of the brake shoe pivot points.

5.8.4 First axle/Front Right

Contamination

- Brake shoes were contaminated with oil due to a leak from the wheel bearing. **(Photograph 48)**
- Oil coated the brake backing plate, "S" Cam, shoe pivot points and brake drum friction surfaces. **(Photograph 45)**
- Oil leak does not appear to be a recent event or as a result of the accident.
- The leaking oil emanated from the hub wheel bearing cavity that when removed from the axle was found to be water

contaminated. **(Photograph 46)** A leak from the wheel bearing seal would be the most likely cause.

- Light to medium brake dust with some coal slurry.
- Brake chamber/actuator was not fitted with a dust boot on the piston rod.
- The brake assembly was fitted with a backing plate to reduce/prevent outside contamination impacting on the assembly. **(Photograph 44)**

Adjustment

- "S" Cam adjustment was out of specification with the brake chamber/actuator push rod having to push the "S" Cam adjuster over centre (past 90 degrees) before the brake shoes contacted the brake drum.
- "S" Cam adjuster not seized.
- Friction material is riveted to the shoe.
- Friction material depth/thickness is within specification, 8.5mm above rivets. **(Photograph 47)**

Condition

- Air supply line to brake chamber/actuator burnt away due to fire damage.
- Brake chamber/actuator piston rod free to move and did not appear damaged.
- "S" Cam adjuster and spindle free to move.
- Brake shoe pivot points free to move.
- Brake shoe operation when operated manually appeared normal.
- Brake drum had severe grooving, significant heat cracking and oil contamination on the friction surface, with some glazing evident. **(Photograph 49)**

Comment

- Brake may be expected to operate with very poor efficiency due to oil contamination, grooving, glazing and out of specification adjustment.

5.8.5 Second axle/Front Diff Right

Contamination

- Very heavy and compacted dried coal slurry and dirt in and around all components including the brake chamber/actuator. **(Photograph 51)**
- Friction material/brake pad dust slot heavily contaminated with compacted dried slurry and dirt. **(Photograph 52)**
- Friction material clogged with dried slurry and dirt.
- Brake chamber/actuator was not fitted with a dust boot on the piston rod.
- The service brake chamber of this actuator was disassembled and severe coal dust/dirt contamination was found within the chamber. The contamination may have had a deleterious effect on the operation of the service brake.

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- The brake assembly was not fitted with a backing plate to reduce/prevent outside contamination impacting on the assembly. (*Photograph 50*)

Adjustment

- "S" Cam adjustment appeared to be within specification and adjuster not seized.
- Friction material is bonded to the shoe. Friction material depth/thickness is within specification.
- Spring/emergency brake was not applied.
- Spring brake was removed and a rattle was evident in the spring brake chamber.
- A disarming bolt was applied to the spring brake piston and the piston was found to be skewed at an angle within the chamber.
- An attempt was made to cut open the spring brake chamber but as the job progressed it was judged too dangerous to those conducting the work to continue.
- Indications from the disassembly process show that the spring in the chamber was possibly broken but definitely inoperable.

Condition

- Brake shoe pivot points seized.
- Shoes were not able to retract onto the "S" Cam actuating ramps. (*Photograph 53*) Application of a crow bar to the brake shoes resulted in the shoe flexing and only a slight movement of the shoe on its pivot point.
- Relaxation of the leverage pressure did not result in the brake shoe returning to its starting position.
- Brake drum friction surface was heavily scored with thick rust scale and ingrained dirt sitting on the friction surface. (*Photograph 54*)
- There were also thick ingrained coal slurry/dirt deposits on the face of the brake shoe friction material indicating that the shoe had not made contact with the brake drum for some quite considerable time.

Comment

- From the above observations, it is reasonable to assume that this brake was not operating at the time of the accident.

5.8.6 Third axle/Rear Diff Right

Contamination

- Very heavy and compacted dried coal slurry and dirt in and around all components including the brake chamber/actuator.
- Friction material/brake pad dust slot heavily compacted with dried slurry and dirt. (*Photograph 57*)

- Friction material clogged with dried slurry and dirt. Brake chamber/actuator was not fitted with a dust boot on the piston rod.
- The brake assembly was not fitted with a backing plate to reduce/prevent outside contamination impacting on the assembly. (**Photograph 55**)

Adjustment

- "S" Cam adjustment appeared to be within specification and adjuster not seized.
- Friction material is bonded to the shoe.
- Friction material depth/thickness is within specification.
- Spring/emergency brake appeared to be applied.

Condition

- Brake shoe pivot points seized.
- Shoes were not able to retract onto the "S" Cam actuating ramps. (**Photograph 56**) Application of a crow bar to the brake shoes resulted in the shoe flexing and only a slight movement of the shoe on its' pivot point.
- Relaxation of the leverage pressure did not result in the brake shoe returning to its' starting position.
- Brake drum friction surface was heavily scored with thick rust scale and ingrained dirt sitting on the friction surface. (**Photograph 60**)
- There were also thick ingrained coal slurry/dirt deposits on the face of the brake shoe friction material indicating that the shoe had not made contact with the brake drum for some quite considerable time. (**Photograph 55**)
- The trailing shoe pivot point retaining bolt was missing its' retaining nut and the bolt had started to move out of position. (**Photograph 58**)
- The spigot that the shoe was mounted on had also started to move out of position. (**Photograph 59**)
- A washer on the bolt had started to deeply groove the brake drum.

Comment

- From the above observations it is reasonable to assume that this brake was not operating at the time of the accident.

5.9 Brakes

Emergency/Parking

- The emergency/parking brake operating valve was destroyed in the fire and no comment can be made on its' condition.

5.9.1 Second axle/Front Diff Left –

- Appeared to be applied.

- Seized brake shoe pivot points would have compromised the operation and efficiency of the Emergency/park brake on this wheel.

5.9.2 Third axle/Rear Diff Left –

- Appeared to be applied.
- Seized brake shoe pivot points would have compromised the operation and efficiency of the Emergency/park brake on this wheel.

5.9.3 Second axle/Front Diff Right –

- Spring/emergency brake was not applied.
- Spring brake was removed and a rattle was evident in the spring brake chamber.
- Indications from the disassembly process show that the spring in the chamber was possibly broken but definitely inoperable.

5.9.4 Third axle/Rear Diff Right –

- Appeared to be applied.
- Seized brake shoe pivot points would have compromised the operation and efficiency of the Emergency/park brake on this wheel.

5.9.5 Compression/Exhaust brake

- The truck engine is fitted with a proprietary MACK engine retardation system.
- The system is a MACK DYNATARD.
- It is an Electric over Hydraulic system, all wiring and switches to control the system were damaged or destroyed in the fire.
- The electric over hydraulic solenoid valve that is situated under the valve cover appeared to be in good condition and the wiring for the valve was intact.
- Exhaust valve rocker arms were free to move.

Comment

- From the above observations it is reasonable to assume that the engine retardation system would have been in an operable state at the time of the accident.

5.9.6 Air Feed to Brakes

Pressure vessels

- Three pressure/storage vessels were fitted to the truck, one for engine start as the truck was fitted with an air operated starter motor, one for operational air which would have fed the brake system, high low range selection and gear split selection as well as any other ancillary air system fitted to the truck and one for operation of the pneumatic watering system on the water tank.
- All were still securely mounted and connected.
- Some surface corrosion was evident on the outer surfaces of the vessels but none exhibited any mechanical insult or damage.

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- There appeared to be no disconnection of piping.

Air lines

- Air lines in and around the front of the truck were severely fire damaged.
- Air lines that ran to the rear axle area of the truck for brakes and air suspension were also fire damaged.
- Air lines that ran from the brake distribution valves at the rear of the truck to the rear brakes were intact and undamaged.
- Front brake air supply lines were severely fire damaged but there appeared to be no disconnection of piping.

Compressor

- Compressor was intact and slightly fire damaged.
- Reticulation piping was severely fire damaged but exhibited no mechanical insult and there appeared to be no disconnection of piping.

Comment

- From the above observations it is reasonable to assume that prior to the accident the truck air system would have been intact, connected and serviceable.

5.10 Suspension

Air bags

- Rear suspension was of an Airbag/Pneumatic type.
- Air lines that fed the system were fire damaged but there appeared to be no evidence of pipe disconnection to the active members of the system at the rear end.
- Airbags/bladders appeared to be intact with no evidence of cuts or holes.
- Front suspension is leaf spring with no damage or excessive wear seen.

5.11 Shock absorbers

5.11.1 First axle/Front Left –

- Bent mounts and bushes burnt out.

5.11.2 Second axle/Front Diff Left –

- Badly worn and flogged out top bushes.

5.11.3 Third axle/Rear Diff Left –

- Okay.

5.11.4 First axle/Front Right –

- Bushes burnt out.
- Bent bottom mount with the shock absorber disconnected probably as a result of the accident.

5.11.5 Second axle/Front Diff Right –

- Okay.

5.11.6 Third axle/Rear Diff Right –

- Badly worn top mounting bushes, dust shield broken and floating on the piston shaft.

5.12 Springs

Pins/Shackles/Bushes (Front Only)

5.12.1 Front Left –

- Leaf spring intact and all bushes displayed little movement.
- Shock absorber lower mount bent and shock absorber disconnected probably as a result of the accident.

5.12.2 Front Right –

- Leaf spring intact and all bushes displayed little movement, rear “U” bolt for axle to spring mount slightly loose but not excessive.

5.12.3 Pins/Shackles/Bushes (Rear Only) –

- No excessive movement or wear in any of the mounting point bushes. All suspension torque rods and bars intact.

5.13 Tyres

5.13.1

**Front Left
Tread depth
6mm**

**Air pressure
0 KPA (0 PSI)**

Damage

- Severe fire damage to approx 1/2 of the tyre.
- Severe chipping of the intact and non fire effected section of the tyre.
- Evidence of chord/belt breakage and tread separation.

(Photograph 61)

5.13.2

**Front Diff
Tread depth
Left Inner 3mm**

**Air pressure
510 KPA (74 PSI)**

Damage

- Nil

5.13.3

**Front Diff
Tread depth
Left Outer 4mm**

**Air pressure
592 KPA (86 PSI)**

Damage

- Nil

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5.13.4 Rear Diff
Tread depth **Air pressure**
Left Inner 13mm 620 KPA (90 PSI)
Damage
○ Nil

5.13.5 Rear Diff
Tread depth **Air pressure**
Left Outer 12mm 634 KPA (92 PSI)
Damage
○ Nil

5.13.6 Front Right
Tread depth **Air pressure**
5mm 0 KPA (0 PSI)

Damage

- Severe fire damage to approx 1/2 to 2/3 of the tyre.
- On the fire damaged section there was evidence of old chord/belt breakage approx 10- 15 cm in length.
- Severe chipping of the intact and non fire affected section of the tyre.
- Evidence of chord/belt breakage and tread separation.
- A major cut was evident in the sidewall of the tyre.
- Cut damage appeared to be a recent event. (Photograph 62)
- Sections of tyre were found lying on the ground (Photograph 63) behind the truck in the area that has shown scrape marks from the truck bull bar. (Photograph 64)

5.13.7 Front Diff (Photograph 65)
Tread depth **Air pressure**
Right Inner 7mm 496 KPA (72 PSI)
Damage
○ Nil

5.13.8 Front Diff
Tread depth **Air pressure**
Right Outer 7mm 0 KPA (0 PSI)
Damage
○ Nil

5.13.9 Rear Diff
Tread depth **Air pressure**
Right Inner 15mm 648 KPA (94 PSI)
Damage
○ Nil

5.13.10 Rear Diff
Tread depth **Air pressure**
Right Outer 18mm 648 KPA (94 PSI)

5.14 Wheels

5.14.1 Front Left

Spiders

- all mounting bolts were tight.

Bolts

- all wheel mounting bolts were tight.

Rims

- Rims appeared in good condition.

5.14.2 Front Diff Left

Spiders

- all mounting bolts were tight.

Bolts

- all wheel mounting bolts were tight.

Rims

- Rims appeared in good condition.
- Difficulties were experienced in removing the rims and spacer bands from the hubs due to the amount of dried slurry and dirt that had lodged in and around the rims.

5.14.3 Rear Diff Left

Spiders

- 5 of the 6 spider mounting bolts were loose, 3 of which were finger tight.

Bolts

- all wheel mounting bolts were tight.

Rims

- Rims appeared in good condition.
- Difficulties were experienced in removing the rims and spacer bands from the hubs due to the amount of dried slurry and dirt that had lodged in and around the rims.

5.14.4 Front Right

Spiders

- all mounting bolts were tight.

Bolts

- all wheel mounting bolts were tight.

Rims

- Rims appeared in good condition.

5.14.5 Front Diff Right

Spiders

- all mounting bolts were tight.

Bolts

- all wheel mounting bolts were tight.

Rims

- Rims appeared in good condition.

Serious Accident to s.73 Irrelevant information at Broadmeadow Underground Mine.

- Difficulties were experienced in removing the rims and spacer bands from the hubs due to the amount of dried slurry and dirt that had lodged in and around the rims.

5.14.6 Rear Diff Right

Spiders

- all mounting bolts were tight.

Bolts

- all wheel mounting bolts were tight.

Rims

- Rims appeared in good condition.
- Difficulties were experienced in removing the rims and spacer bands from the hubs due to the amount of dried slurry and dirt that had lodged in and around the rims.

5.15 Chassis

All chassis members were intact and no bending or malformation was evident, All except one quick disconnect coupler for the water tank frame had to be oxy cut apart to release the tank frame from the chassis indicating that the water tank frame suffered some bending and deformation as a result of the accident. No major cracking or corrosion was evident on any of the chassis rails

5.16 Operators Cabin

Operators cabin was severely fire and accident damaged. All wiring and controls were burnt away or destroyed as a result of the fire damage and only the steel frame is left. (Photograph 66)

5.17 Queensland Transport Report.

5.17.1 An independent report commissioned from the Queensland Transport titled "Special Motor Vehicle Inspection Report on Behalf of Natural Resources and Mines" Accident Report No. AR2586 and conducted by Queensland Transport Inspector Henryk Wojcik No. 224 from Mackay, states in the part titled: **General Opinion of Mechanical Condition.**

- Vehicle had sustained major incident damage and as a result a test drive could not be carried out.
- Extensive fire and collision damage to front and top of vehicle.
- All brake components not affected by fire were fitted and secure.
- All rear brakes seized and extensively contaminated with dust and coal dust.
- Emergency spring brake applied with right 2nd axle not operational.
- Right 2nd axle spring brake broken and not effective.
- Right 1st axle brake extensively contaminated with oil and dirt.

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- Left 1st axle brake appears to be the only brake that was operational but has dirt and dust contamination.
- All other brakes non operational and extensively contaminated.
- A check of the gear box selector position indicated the vehicle was in 7th gear low ratio.
- Both front tyres have indication of severe chipping and damaged steel reinforcing wires prior to the incident.
- Vehicle appears to be in a poor state of maintenance with the seized and contaminated brakes being a major contributing factor to the incident.

5.17.2 Queensland Transport.

Documents obtained through Queensland Transport relating to vehicle inspections on this particular truck have indicated the following:

- **Name:** s.73 Irrelevant information
- Inspection date: 06/12/2004
- Ref: V6FM12L06CBMR01185
- Engine: E74001L0252
- Plate: 993 DED (*Note different registration number*)
- Issued DN (*defect notice*) No. 393579X (*spelling mistakes as written*)
 - Make all brakes equal and effective
 - Rectify air leak at rera? Brakes. This item to be done before vehicle used on a road.
 - Make all lights operate, refit all missing-lights.
 - Make revers? light operate.
 - Fit rera? number plate visible.
 - Rectify steering box oil leak.
 - Rectify RH front hub cover leak.
 - Make speedo operate.
- **Name:** s.73 Irrelevant information
- Inspection date: 13/01/2005
- Ref: V6FM12L06CBMR01185
- Engine: E74001L0252
- Plate: 993 DED
- Issued DN No. 6470024
 - Make the brake on the front drive axle operate.
 - Make the brake front right side too much drag.
 - Make the left front indicator operate.
 - Rectify movement at the right front wheel bearing.
 - Fit rear marker plates
 - Rectify movement at the right front drive axle shock absorber.
 - Rectify oil leak at the steering box and clean.
 - Secure the suspension bolt on the right side rear axle.

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According to s.73 Irrelevant information statement dated 24th March 2006, the truck was purchased in December 2004.

The truck registration was changed on the 30th September 2004 from 993 DED to 795 IKD with a changed engine number of 5470M11617901. (This may be the manufacturing casting number of the engine).

5.18 Fire Ignition Point

5.18.1 Engine Turbocharger.

The suspected ignition site of the fire was determined by analysis of photographs and examination of the remains of the truck.

Photographs of the site taken immediately after the accident indicate a flame in the front part of the engine bay around the radiator and the front of the engine block. These photographs were taken from the main office block on top of the mine excavation, approximately 900m away from the accident site. (*Photograph 67*)

An examination of the engine has indicated that the exhaust gas driven radial flow, engine oil lubricated turbocharger has been damaged with the front segment of the turbocharger broken off through the force of the impact when the truck hit the conveyor structure.

(*Photograph 68*)

The front segment of the turbocharger could not be found during the search of the remains of the truck, either directly after the fire was extinguished or when the truck was moved to allow a thorough inspection.

The outer case of the remaining segment has been subjected to heat and has started to melt. (*Photograph 69*)

Adjacent to the turbo charger is the power steering fluid container. This container had the top missing and it can be reasonably suspected that the fluid ran out of the container onto the hot and damaged turbocharger and ignited. (*Photograph 70*)

The engine heads were extensively damaged by heat and had melted, (*Photograph 71*) possibly as the result of the fire in the vicinity of the turbocharger that is situated on the right side of the engine block (*Photograph 72*) and would have been on the lower side of the engine heads while the truck was laying on its' right side. (*Photograph 73*)

It has been suggested that the truck engine may have continued to run for a period of time after the impact. With the truck lying on its' right side and the turbocharger damaged, engine oil that is used to lubricate the turbocharger would have continued to be sprayed onto the flames.

5.19 Other Possible Fire Ignition Points.

5.19.1 Fuel Cans in Truck Cabin.

The truck was fitted with a petrol fuel driven water pressure pump that was used to pressurise the water sprays at the rear of the truck under the fibreglass water tank. (*Photograph 74*)

This pump was situated behind the rear of the drivers' cabin and attached to the right underside of the chassis.

The pump has been affected by the fire, but did not appear to have been subjected to extreme heat. The top of the fuel tank was removed and the small tank found to have an oily residue left in the bottom of the tank. There is no evidence of an ignition source in the pump area.

There were several 4 litre fuel cans identified in the remains of the truck cabin "dog box" with some tools. (*Photograph 75*)

One of the fuel tins still held a small amount of fuel. (*Photograph 76*)

The other tins exhibited signs of being crushed. If they did hold fuel, it had leaked out during the accident and may have caused the fire to move down grade towards the fibreglass water tank. (*Photograph 77*)

Mr. s.73 Irrelevant information has stated in his statement that as soon as the truck hit the ground, he saw flames coming from the water tank part of the truck.

5.19.2 Electrical control cables attached to Ramp 4 conveyor structure.

Ramp 4 conveyor has electrical control cables attached to the conveyor structure on the road side looking up the ramp. (*Photograph 78*)

When the truck impacted the conveyor structure (*Photograph 79*) and severed the control system electrical wires, the conveyor belt power was removed immediately, but the belt continued to move for approximately 7.56 seconds while slowing down from its initial velocity of 4.71 metres per second and continued for approximately 43m until coming to a complete stop. (*Photograph 80*)

The control cables would not have ignited any fuel in the area of the impact due to a short fail safe cut-off. (*Photograph 81*)

5.19.3 Mack truck diesel fuel tanks.

The right side diesel fuel tank on the truck was damaged in the impact (*Photograph 83*) and would have allowed additional fuel to add to the rapidly expanding fire around the drivers' cabin. The left side tank filler cap had the alloy safety inserts burnt out. (*Photograph 84*) This would have allowed the fuel from the tank to flow over the drivers' cabin adding volatiles to the fire. (*Photograph 82*)

The right side fuel tank has drained the fuel through a hole that had been punched in the tank as the result of the incident. There is evidence that fuel was burning around this hole.

If, as has been suggested by witnesses to the incident, but unsubstantiated, the engine continued to run for a period of time, diesel fuel would have been either pumped through a damaged injection pipe or flowed under gravity from the left side fuel tank that is now higher than the engine due to the position of the truck lying on its' right side.

Evidence identified during the investigation has indicated that diesel fuel "pooled" in the partially molten engine head covers. (*Photograph 85*)

6.0 ANALYSIS OF INCIDENT CAUSE. return6

The service braking capacity of the truck would have been severely compromised by the poor mechanical state of the brake components.

The front left brake would have been the only brake on the vehicle that would have been operating close to an acceptable level of efficiency and appears from the investigation, to have caused the truck to veer to the left when brake pressure was applied while driving down Ramp 1.

The engine retardation braking system may have been operational but due to extensive fire damage that has destroyed the majority of the components, this cannot be proven.

The truck appears to be in third gate, low split, high range, that according to the service manual, translates to seventh gear/speed. It is not possible to confirm when the gear position that the truck was found in was selected. Gear position, range and split may have been selected before, during or immediately after the truck commenced descending the ramp and subsequently crashed.

All undamaged or non fire affected components such as suspension, chassis, driveline and steering appear to be intact and serviceable.

Tread condition on both front steering tyres showed severe chipping, evidence of chord/belt breakage and tread separation. There is evidence to show that the

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right side tyre did loose some of its tread during the attempted turn to the left at the bottom of Ramp 1.

It is logical to assume that the brake system control components such as the operators foot pedal and treadle valve, emergency brake operating switch and compressed air piping to the wheel based components were operational immediately prior to the accident and were made inoperable and destroyed only as a result of the fire.

It is the investigators belief the brakes would not have been able to arrest the momentum of the truck as it descended the ramp, due to the condition of the wheel based brake components, eg seized, heavily contaminated with oil and dust/mud, had broken elements, friction material not in contact with the brake drums, etc.

7.0 CONCLUSIONS. return7

The injuries suffered by s.73 Irrelevant informa as a result of the accident are subject to conjecture due to the complexities of the fire ignition source. Was diesel fuel sprayed onto him as the result of a failure to the diesel injection system in the engine bay of the truck as he exited from the damaged drivers' cabin or did the several tins of petrol in the cabin tool box contribute to his injuries? The fire damage to the cabin will make this difficult to determine.

The position of the truck on Ramp 1 when the initial failure of the brakes occurred has been provisionally determined by tyre marks on the concrete portion of the ramp.

The investigation has determined that extensive brake failure on the truck has occurred due to faulty maintenance procedures. This has been compounded by the ingress of contaminants into the rear bogie brake assemblies causing the seizure of critical components and preventing them from correctly operating.

The oil leak from the front right steering axle onto the brake pads significantly contributed to the lowered braking performance of this particular wheel.

The safety sign erected at the top and bottom of Ramp 1 that specifies a speed of 30 km/h and the use of second gear is open to misinterpretation by vehicle drivers. The sign should specify either high or low range selection of the gearbox for trucks that use the ramps.

The Broadmeadow Contractor Management system appears to have not been applied rigorously as per the requirements of the Coal Mining Safety and Health Regulation 2001 s66 *Braking systems*.

It has been recognised throughout the investigation that the initial emergency response from Broadmeadow Mine to the Emergency Procedures relating to acknowledgement of emergency radio calls was not to a high standard and that

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a major review of the procedures would be required, including the response from the Control Room.

8.0 RECOMMENDATIONS. return8

It would be difficult to apportion blame to Broadmeadow Mine in relation to the brake failure of the truck. This issue should be taken up by Queensland Transport to enable them to pursue CQE Hire Pty. Ltd. for faulty maintenance procedures and falsification of the maintenance records.

Queensland Police may become involved because the vehicle was being driven on public roads with faulty brakes.

It is recommended that a copy of the final report be given to both Queensland Transport and Police for further investigation.

Broadmeadow Mine has shown a lack of contractor management with a lack of control identified with brake testing requirements of the Safety Management System and of the following:

8.1 With reference to the Coal Mining Safety and Health Act 1999 s39 Obligations of persons generally,

(1) A coal mine worker or other person at a coal mine or a person who may affect the safety and health of others at a coal mine or as a result of coal mining operations has the following obligations -

(c) to take any other reasonable and necessary course of action to ensure anyone is not exposed to an unacceptable level of risk.

(2) A coal mine worker or other person at a coal mine has the following additional obligations -

(b) to ensure, to the extent of the responsibilities and duties allocated to the worker or person, that the work and activities under the worker's or person's control, supervision, or leadership is conducted in a way that does not expose the worker or person or someone else to an unacceptable level of risk.

s43 Obligations of contractors

A contractor at a coal mine has an obligation to ensure, to the extent that they relate to the work undertaken by the contractor, that provisions of the Act and any applicable safety and health management system are complied with.

With reference to the Coal Mining Safety and Health Regulation 2001 Part 10 Plant, Division 1 Fixed and mobile plant,

s66 Braking systems

(1) A coal mine's safety and health management system must provide for the continued effectiveness of braking systems on fixed and mobile plant used at the mine.

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- (2) The system must include provision for the following –
 - (a) the dynamic testing of service brakes;
 - (b) appropriate testing of parking brakes, emergency brakes and other braking systems the failure of which may create a risk to a person;
 - (c) keeping a record of the brake test results in a location that is easily accessible by each coal mine worker at the mine.

**With reference to the Coal Mining Safety and Health Act 1999
s34 Discharge of obligations**

A person on whom a safety and health obligation is imposed must discharge the obligation.

Maximum penalty –

- (a) if the contravention caused death or grievous bodily harm – 800 penalty units or 2 years imprisonment.

Therefore, it is recommended that action be taken against identified persons at Broadmeadow Mine for failure to comply with the above sections of the Coal Mining Safety and Health Act 1999 and the Coal Mining Safety and Health Regulation 2001.

9.0 APPENDICES. return9

9.1 Appendix 1. List of persons interviewed and/or providing statements. return10

9.1.1 s.73 Irrelevant information

9.1.2

9.1.3

9.1.4

9.1.5

9.1.6

9.1.7

9.1.8

9.1.9

9.1.10

9.1.11

9.1.12

9.1.13

9.1.14

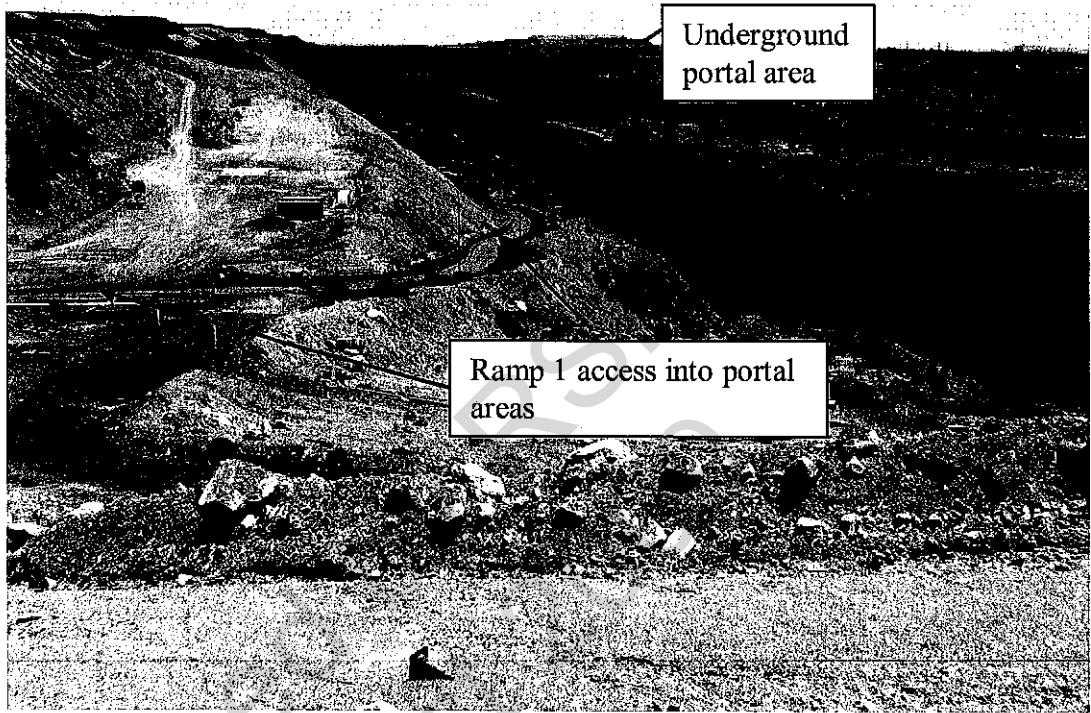
Serious Accident to s.73 Irrelevant information at Broadmeadow Underground Mine.

- 9.1.15
- 9.1.16
- 9.1.17
- 9.1.18
- 9.1.19
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- 9.1.21
- 9.1.22
- 9.1.23
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- 9.1.25
- 9.1.26
- 9.1.27
- 9.1.28
- 9.1.29
- 9.1.30
- 9.1.31
- 9.1.32
- 9.1.33
- 9.1.34
- 9.1.35
- 9.1.36
- 9.1.37

s.73 Irrelevant information

Released by RSHQ
RTI Act 2009

9.2 Appendix 2. Photographs. [return11](#)

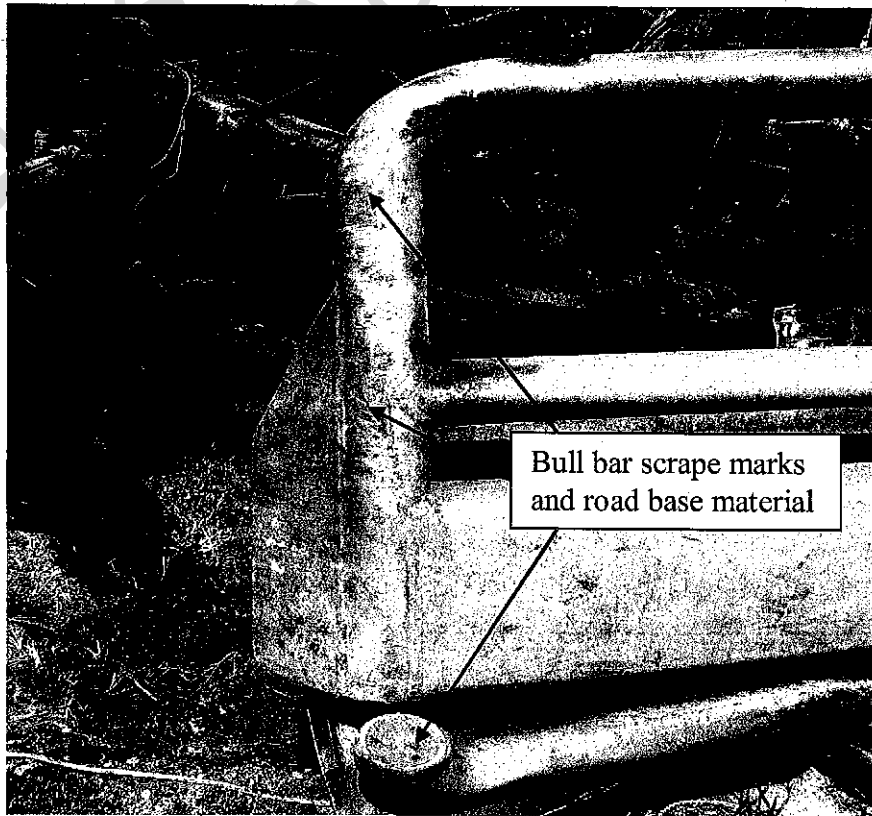


Photograph 1. [return17](#)
Ramp 1 access into Broadmeadow Mine.

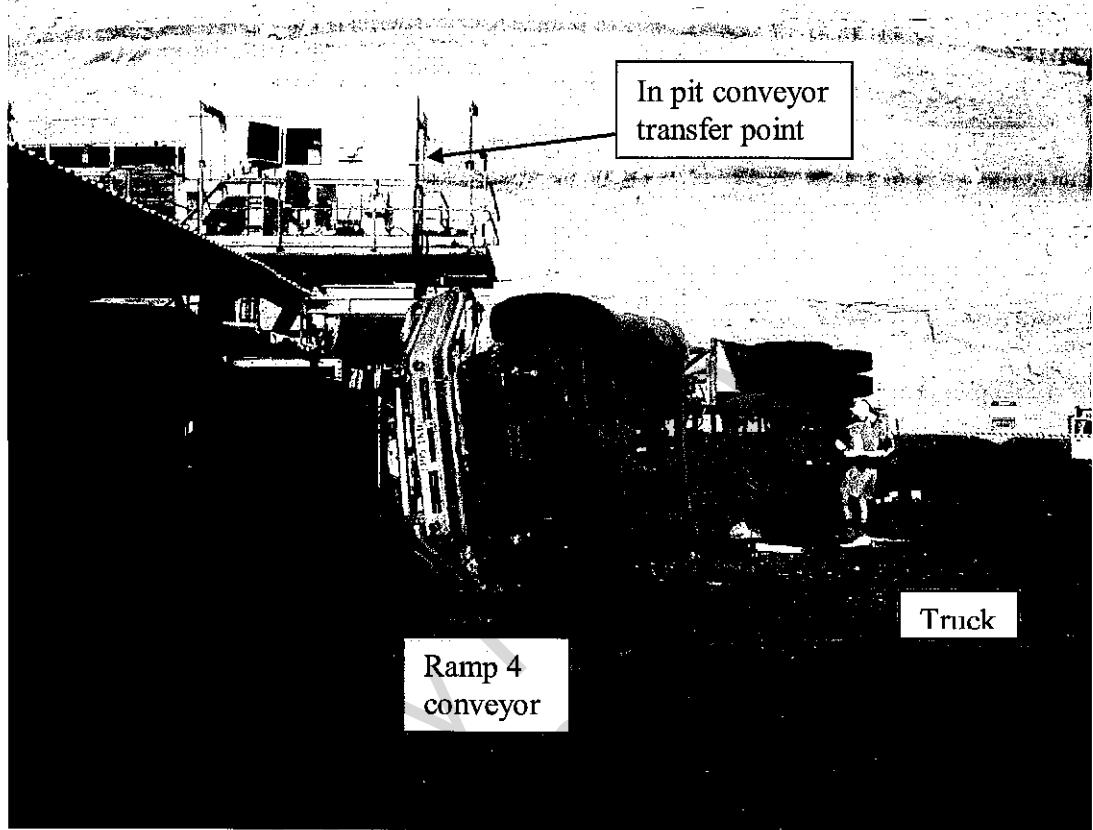
s.73 Irrelevant information

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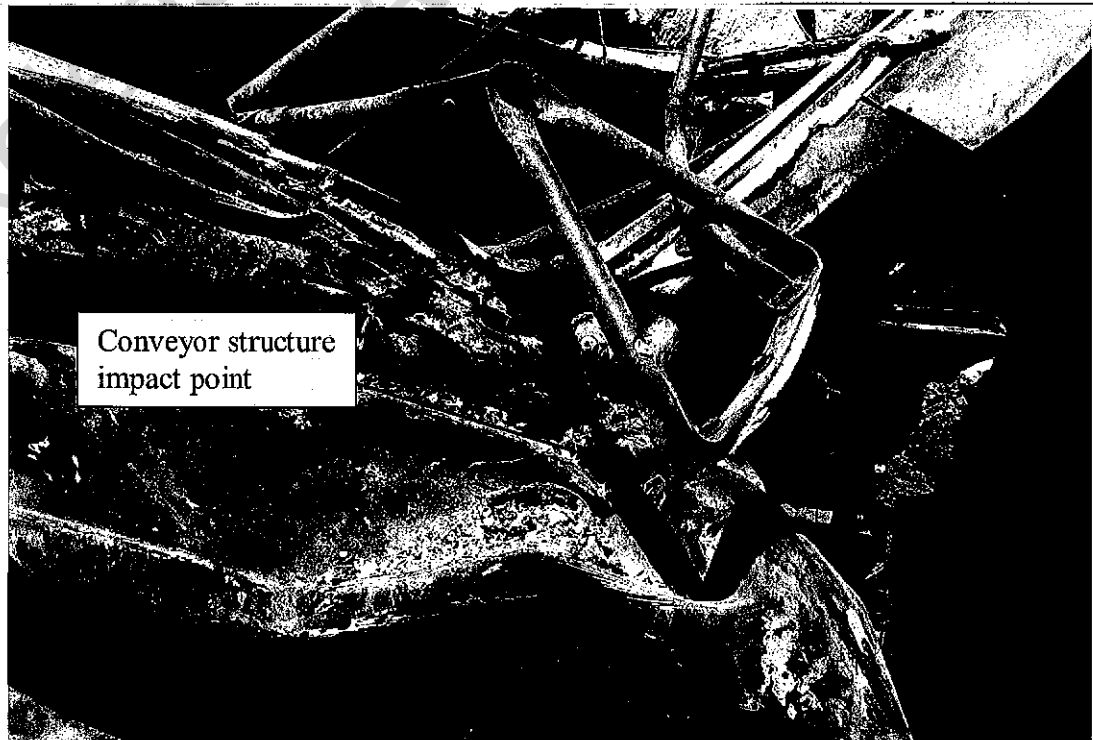
s.73 Irrelevant information



Photograph 16. return33
Right side bull bar indicating scrape marks and damage.



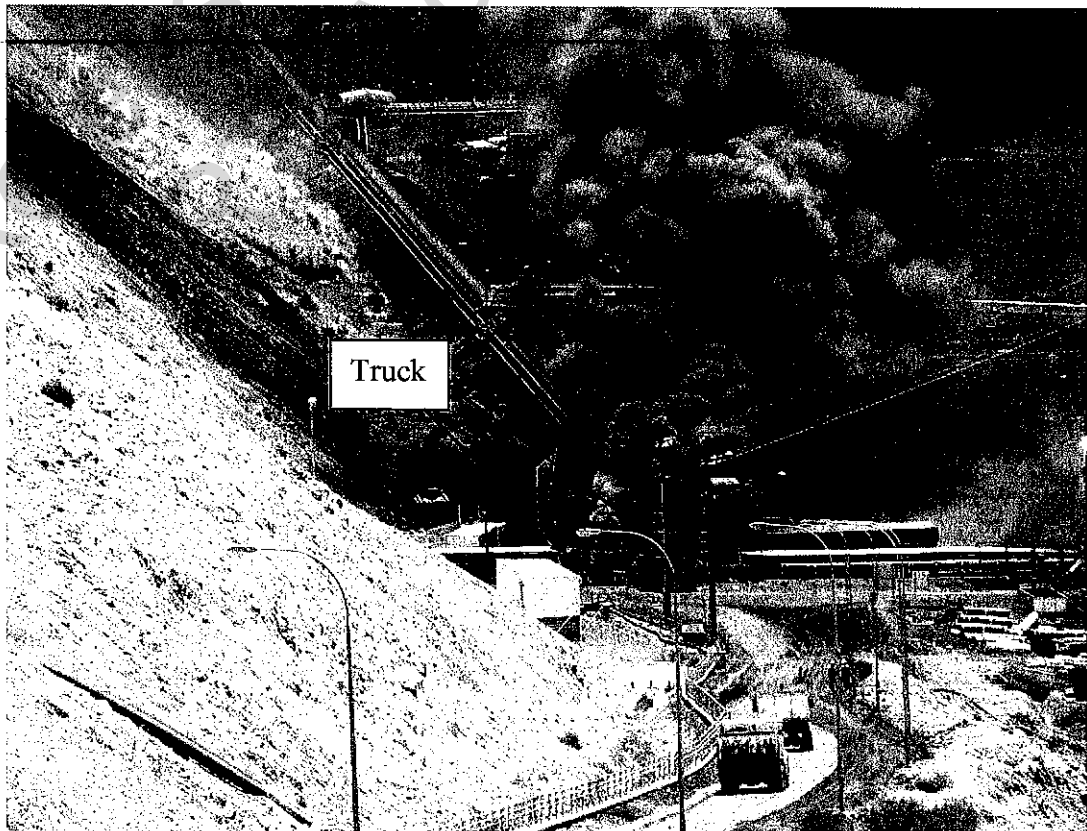
Photograph 17. return34
Position of truck against Ramp 4 conveyor.



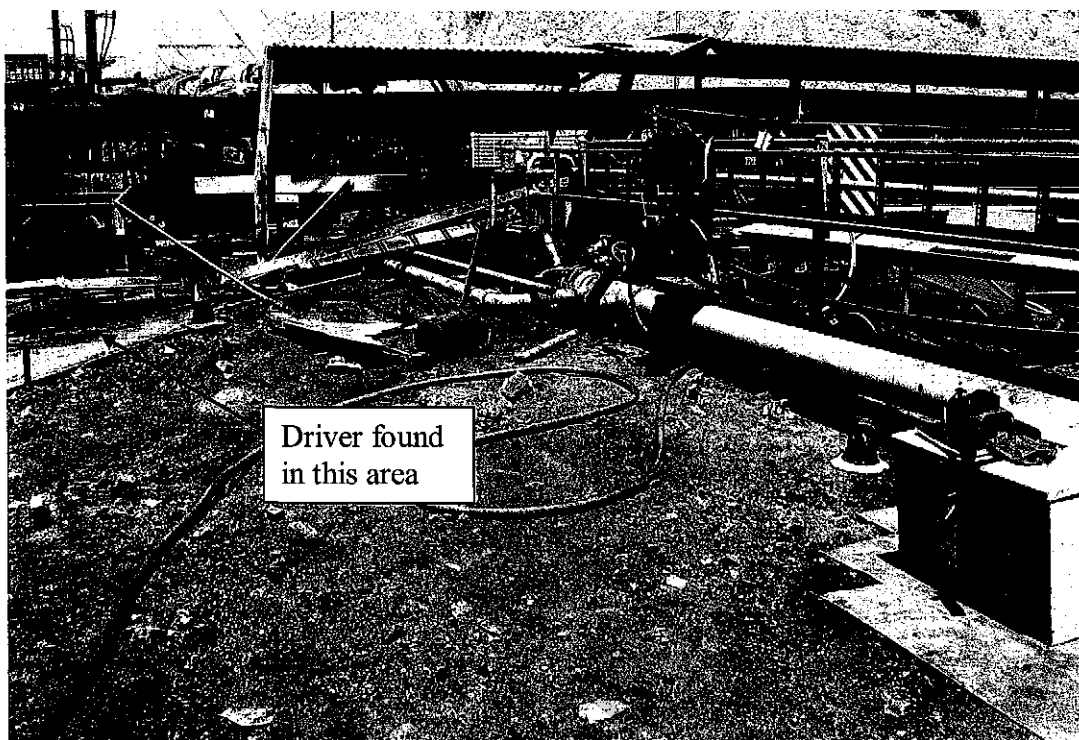
Photograph 18. return35
Impact damage from conveyor structure on left side of drivers' cabin.



Photograph 23. return40
Initial commencement of fire.



Photograph 24. return41
Truck fully engulfed in flame.



Photograph 25. return42
Driver found in this area.

s.73 Irrelevant information

Released
RTI Act

s.73 Irrelevant information



Photograph 28. return45
Steering linkages assembly front wheels.