OFFICE OF THE STATE CORONER

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Colin Arthur GREAVES**
TITLE OF COURT:	Coroner's Court
JURISDICTION:	Rockhampton
FILE NO(s):	COR 1804/05(7)
DELIVERED ON:	14 August 2008
DELIVERED AT:	Rockhampton
HEARING DATE(s):	14 January, 6 March, 28 April - 2 May, 6 - 8 May 2008
FINDINGS OF:	Ms A Hennessy, Coroner
CATCHWORDS:	CORONERS: Inquest – work related accident, fall from height, hydroblasting, Workplace Health and Safety, fatigue management systems, review of risk assessment procedures, Safe Hours of Work and Fatigue Management policies, competency based training

REPRESENTATION:

MR J TATE appeared to assist the coroner

MR S C WILLIAMS (instructed by Corrs, Chambers, Westgarth) for Queensland Alumina Limited

MR D J MURRAY (instructed by Kenny and Partners) for next of kin

MS S MOODY (instructed by Ebsworth and Ebsworth) for Transpacific Industrial Solutions Proprietary Limited

These findings seek to explain, as far as possible, how this incident occurred on 17 July 2005. As a result of the evidence in this matter, changes to company and/or industry practice may be recommended with a view to reducing the likelihood of a similar incident occurring in future.

THE CORONER'S JURISDICTION

1. The coronial jurisdiction was enlivened in this case due to the death of Mr Greaves falling within the category of "*a violent or otherwise unnatural death"* under the terms of s8(3)(b) of the Act. The matter was reported to a coroner in Gladstone pursuant to s7(3) of the Act. A coroner has jurisdiction to investigate the death under Section 11(2), to inquire into the cause and the circumstances of a reportable death and an inquest can be held pursuant to s28.

2. A coroner is required under s45(2) of the Act when investigating a death, to find, if possible:-
   - the identity of the deceased,
   - how, when and where the death occurred, and
   - what caused the death.

3. An Inquest is an inquiry into the death of a person and findings in relation to each of the matters referred to in section 24 are delivered by the Coroner. The focus of an Inquest is on discovering what happened, informing the family and the public as to how the death occurred, but not on attributing blame or liability to any particular person or entity.

4. The coroner also has a responsibility to examine the evidence with a view to reducing the likelihood of similar deaths. Section 46(1) of the Act, authorises a coroner to "*comment on anything connected with a death investigated at an inquest that relates to – (c) ways to prevent deaths from happening in similar circumstances in the future."* Further, the Act prohibits findings or comments including any statement that a person is guilty of an offence or civilly liable for something.

5. Due to the proceedings in a Coroner's court being by way of inquiry rather than trial, and being focused on fact finding rather than attributing guilt, the Act provides that the Court may inform itself in any appropriate way (section 37) and is not bound by the rules of evidence. The civil standard of proof, the balance of probabilities, is applied. All interested parties can be given leave to appear, examine witnesses and be heard in relation to the issues in order to ensure compliance with the rules of natural justice. In this matter, the Employer, Plant owner, Workplace Health and Safety Division, and family of the deceased were represented at the Inquest.

6. I will summarise the evidence in this matter. All of the evidence presented during the course of the inquest and the exhibits

tendered have been considered even though it may not be specifically commented upon.

THE EVIDENCE

7. Mr Greaves was working for Transpacific Industrial Solutions (TIS) at the Queensland Alumina Limited Refinery (QAL) plant at Gladstone on the night of his death on 17th July 2005. His workmate on the shift was Mr Charlie Hepburn. Mr Greaves had been employed at the company since February 2003 as a casual employee. Mr Hepburn worked for the company and its predecessors for about 10 years, in Gove, WA and Gladstone. He is an experienced hydroblaster from his years of on the job training, there being no formal training program available in hydroblasting. Mr Hepburn was the primary witness in the Inquest regarding the events of that evening.

8. The task the men were undertaking on the night in question was hydroblasting scale from the inside of a Settler tank. Settling is a process in the refining of bauxite which involves the use of caustic acid. The settler tanks at the QAL plant were hydroblasted during the turnaround period which occurred every 4 - 6 months or so. The tanks are taken off line to remove the build up of scale inside them or to attend to maintenance for the settler. Contract companies performed the hydroblasting work as QAL had neither the specialised equipment or trained staff to undertake the work. Transpacific Industrial Services (TIS) was the company with the contract at that time. Prior to the contractors starting that work, the QAL Descale Team performs work on the tanks. Hatches in the top of the tanks are accessed for light and ventilation during some of the maintenance works. After hydroblasting, the tanks are handed over to the QAL Heavy Drives Section for maintenance tasks to be attended to.

9. The task of hydroblasting the settler tanks involved the use of a very high pressure pump, the size of a shipping container, which puts out about 250 litres of water per minute at 1000 bar. Hoses are attached to the pump and used to clean hard scale from the settler tank. The pump remains on the ground and hoses are fed up to the top of the settler tank and inserted through access hatches to clean the scale. The scale and water is released from the bottom of the tank through doors. The cleaning head attached to the hose may be manoeuvred in the tank via the use of wire ropes from the top of the tank. The work is arduous due to the lifting involved of the solid steel head, long and very heavy duty hoses, and the wire ropes.

10. Settler Tank 6 came offline on 12 May 2005. As soon as the tank was offline, the Operations Group pumped out the tank for several days. It was then handed to the Refinery Support Group to commence the maintenance turnaround on 16 May 2005. Part of the turnaround scope was to inspect the vessel for any damage that may have occurred during the last operation phase. Any damage would be

corrected in the turnaround period. The Descale team moved into the Settler and determined that the centre column of the tank would need hydroblasting to allow access to the tank to carry out repairs. The descale team did what work they could, hosing out the tank until 19 May 2005. During this period they would have been accessing the hinged and round hatches on the tank top. On 23 May 2005 a maintenance order was raised calling for bars to be placed over voids in hatches on Settler 6. Mr Greenhalgh, the QAL Safety Manager, gave evidence that this was a standard work order for turnaround and did not necessarily indicate that there were bars missing on the hatches, it may have been a requirement for an inspection to ensure bars were in place. The action was listed as complete on 6 June 2005. TIS commenced to hydroblast the central column from 1 June 2005 intermittently until 21 June 2005.

11. TIS were called back to the Settler in the week leading up to the 17th July 2005 to perform additional duties on the tank due to the broken rake arm. Work commenced on 17 July 2005, a day shift, with Mr Greaves working on the second shift, a night shift, to conduct work on the tank in that cycle of work.

12. Mr Skipper was Mr Greaves' supervisor at TIS. He had been working at the QAL plant since 1989 for a variety of contracting companies, ending with TIS. He had 19 years hydroblasting experience and had been a supervisor since 1995. He had completed training courses in relation to supervision and had undertaken many inductions, including for each area of the QAL plant. He received work orders from QAL by computer and then allocated them to TIS crews. He was always very busy and there was usually pressure to get the jobs completed within the timelines set, but he did not feel under pressure in his work.

13. The job had been set up differently than usual due to the breakdown of the rotating rake arm in the top of the tank. This was an unusual event but not unheard of, occurring a couple of times in a 5 year period, according to Mr Skipper. The previous occasions were not on Settler 5 or 6, but on other tanks with different size hatches. Ordinarily, smaller circular hatches on Settler 6 which are positioned in rows radiating from the centre of the tank to the rim would have been accessed in order to clean the scale by hydroblasting with the assistance of the arm. The rake arms often break down but usually after the tank is drained, they can rotate to the appropriate place but this arm was stuck in one position. Consequently, the hydroblast head had to be suspended by ropes into the tank and then manoeuvred around the tank to perform the cleaning. This arrangement had been previously employed on other tanks.

14. Mr Skipper had gone to Settler 6 a couple of days before to inspect the job and saw the problem of access that was going to be occasioned by the rake arm breakdown. It was stopped and could not be moved, about a foot or two out of position from the usual access hatches for

the cleaning process. After inspecting the tank Mr Skipper had spoken to the Descaling Supervisor for QAL, Mr Aldridge, within the week prior to 17 July 2005 and requested that further small circular holes be cut in the tank to provide appropriate access for the head. There was some discussion about other methods of access including using the larger hatches and rigging a flying Fox for the head. Eventually, the request for additional holes to be cut was refused by QAL.

15. The information regarding the denied request for additional holes to be cut was passed on to Mr Hepburn and Mr Greaves during the handover – they were told to "use the large holes and go hard". QAL did perform this work on occasion and had put in place a policy to cut holes into the roof of tanks, including double skin tanks such as this one (although the preference seemed to be not to cut double skin tanks unless absolutely necessary due to insulation issues).

Day Shift

16. The first shift to work on Settler 6 was the day shift of Mr Middleton and Mr McDonald, both of whom are very experienced hydroblasters. Mr Middleton gave evidence that the usual procedure at the start of the shift was to go to QAL to sign onto the permit. This was usually done in the QAL section supervisor's office where, after checking of the details of the permit, the TIS team is tagged into the permit and work can commence. The entrance to the work site is flagged and tagged and signed to indicate hydroblasting is in progress. Mr Middleton gave evidence that they went to the office and saw Glen Kehoe about the permit and at their request he attended the tank for about 10 minutes to complete the housekeeping form and show them what was required. According to Mr Middleton, discussion took place at that time regarding the access for the cleaning of the rake. They asked Mr Kehoe whether holes could be cut in the tank to provide access and he said no. Following that, they discussed the hatches that would be needed for access, in particular, the sling arrangement that would be necessary for the suspension of the head was spoken of.

Housekeeping

17. The purpose of the housekeeping document was to identify the condition of the work site before, and after, a contractor or QAL section commenced work. Mr Kehoe considered that the completion of the form is more of a courtesy to avoid contests between parties as to who created mess rather than a safety related issue. He stated that it was the responsibility of the work crew leaving the site to leave it in a safe and tidy condition and for the contractor to ensure that the worksite was safe when they took it over. The procedure is clearly a safety related task.

18. Mr Kehoe's evidence was that he did not attend at the tank top that morning and denied that any of the conversation referred to earlier took

place. He says he completed the housekeeping documentation when Mr McDonald approached him in his office at about 5pm that afternoon. Mr McDonald could not recall what happened in regard to the form or conversations but did remember seeing Mr Kehoe on the tank in the morning. He gave evidence that the practice was for the job not to be commenced until the form was completed and that at times, he had waited for many hours for someone from QAL to attend to complete the form. Mr McDonald did not think that he had gone to the office at 5pm with the completed form as his handwriting was not on the form.

19. Mr Kehoe usually attended the site for the specific purpose of an inspection in order to complete the housekeeping form. On this occasion he had made a casual observation of the tank during a walk around the site and a cigarette break taken on Catwalk B overlooking Settler 6. Mr Kehoe admitted that this was a breach of QAL procedures. At the time of the observation, he did not observe any work going on at the tank and he was unaware that hydroblasting was underway. This version of events is difficult to accept given the flagging and tags and signs that would have been evident at the area that Mr Kehoe walked.

20. Mr Middleton disputed Mr Kehoe's version and stated that the work should not commence until the housekeeping form was completed by QAL. He conceded that there were no physical barriers erected prior to commencing the work. A lesser barrier was put in place, that being the flagging on the walkway and the entrance to the tank.

21. It is curious that Mr Kehoe has volunteered that he breached QAL procedure in this way. Considering all of the evidence on this issue, I am satisfied that the form was completed in the morning of the 17th July 2005.

Work Method

22. Mr Middleton and Mr McDonald then inspected the job and looked through hatches to see how the job could be set up. They determined that they needed to use Hatch A, a large hatch not fitted with bars, and slid the lid off the hatch. Mr Middleton gave evidence that the lid was heavy and it took the two of them to lift it carefully off the hatch. Once they had determined the method to be used on the job, they replaced the hatches and returned to the crib room to explain the process to Mr Skipper.

23. Mr Skipper instructed the day shift crew to ensure that the lids of any hatches removed, were replaced. This was confirmed by Mr Middleton. Mr Skipper said that he further told them not to completely remove the lid on Hatch A but to secure their rope and then close the lid again. He did not instruct the crew on which hatches to use or how to set the job up but consented to the system Mr McDonald designed to complete the work.

24. They actually commenced hydroblasting about 1pm. The lid of hatch A was not entirely closed, as a rope had been run through the corner of the hatch. Mr Middleton gave evidence that during hydroblasting, when the jet was coming around to that area, the lid started lifting and the men decided that it needed to be removed as they were concerned that it would be dislodged and perhaps fall into the tank. When they stopped for lunch, all hatch lids were replaced. After lunch, only Mr McDonald returned to the top of the tank as there were pump problems that Mr Middleton stayed below to attend to. Mr Middleton confirmed with Mr McDonald that he had replaced the lids on hatches at the end of the day shift.

25. Mr Skipper gave instructions for the handover to the night crew. Mr Middleton and Mr McDonald were to explain the set up and have the night crew ring Mr Skipper at home for further instructions. The latter did not occur and Mr Skipper rang to speak with them but was unable to speak to the night crew.

Night Shift

26. On the night in question, Mr Hepburn and Mr Greaves started work in the TIS crib room for the shift changeover. Mr Hepburn commented that Mr Greaves seemed to be in good spirits and was alert on that night. The night shift supervisor gave them the paperwork and told them to go and start hydroblasting. There was no safety discussion at this time, but a Job Safety Analysis (JSA) was required to be completed by the crew at the commencement of each shift. The Job Sheet completed by Mr Skipper (the Day Shift Supervisor) for the night shift indicated that Hatch A was open.

27. The day shift workers, Mr McDonald and Mr Middleton, told the night crew that they were to blast Settler 6, as the scale was very, very hard and there had already been some blasting on the tank during the day shift. In other words, the job was already set up. They showed Mr Hepburn the diagram of the set up and explained all of the details of the job. They advised him to watch Hatch A as it had to be lifted during the operation due to lifting, under pressure, as a result of the positioning of the ropes and hoses. Mr McDonald stated that Mr Hepburn was a very competent operator and had taken over similar jobs in the past.

28. Mr Hepburn gave evidence that the JSA sheet had been completed by him prior to commencing work on the tank. The JSA was in a list form, detailing a list of safety checks to be commented upon (a tick list) and checked before work commenced. Mr Hepburn placed the JSA into the utility for safe keeping during the shift and to prevent its destruction from water during the work. A QAL Job Hazard Sheet was also completed and left in the utility. Poor lighting was indicated in the

affirmative. Working at heights – risk of falling was formally identified as a hazard on the sheet (due to the open voids of the hatches).

29. Mr Hepburn stated that he and Mr Greaves just jumped in the utility and went to the tank and the job was all set up. They had to reposition some gear as the previous shift had tidied up before they left the site. The walkways which were the only entrances to the tank top had been barricaded with the use of flagging to restrict access during work. The work permit was displayed on the entrance at Catwalk B to indicate that the tank is isolated for that work group to perform their tasks.

Hatch A

30. Mr Hepburn and Mr Greaves pulled the lid off Hatch A, where they had to look in to start hydroblasting. This hatch lid had earlier been removed by the day shift. It was necessary to move the lid in order to see into the tank. This involved the men leaning into and over the open void from a kneeling position on the top of the tank. Mr Hepburn described this as common practice and was not a cause for concern.

31. In order for the wire ropes which were used to position the cleaning head in the tank some hatches had to be opened. Lids were also left open due to the risk of being dislodged by the water pressure during hydroblasting. After the hydroblasting was undertaken, and before the head could be moved to a new position, it was necessary to let the steam escape for the view of the job to be clear for checking. Hatch A was the only hatch opening with no bars fitted, according to Mr Hepburn.

32. They located the head and Mr Hepburn engaged the pump and started blasting. It was a two man job to reposition the head after each session of hydroblasting and to ensure that the head was held firmly in position with the wire ropes. Between blasting sessions, Mr Greaves went over to the top of the adjoining tank, Settler 5 (accessed via a walkway linking the tanks) as it was a cold night and tank 5 was still in operation and, therefore, warm. He was gone for about 15 minutes on each occasion. Each time Mr Greaves went to the other Settler, he would have been walking within a metre or so of Hatch A. The pump was not engaged until he reached Settler 5.

The Incident

33. After about an hour of work, a QAL representative, Cecil Hale, came and started signalling that he needed to speak to the men. Mr Hale was a Team Leader for QAL in the Clarification Section and was Acting Supervisor for his crew on that night. His crew were a maintenance crew who were attending to flows through that section of the plant, monitoring caustic strengths and pump changes to ensure continuous operation of the system without restriction and in preparation for tasks to be undertaken on the following day by other crews.

34. Mr Hepburn stopped the pump and signalled Mr Hale to enter. Mr Greaves presumably heard the pump being turned off and came back to Settler 6. The three men had a discussion. Mr Hale gave evidence that he had a problem with a lead washer which was an important section of the process which needed to be kept operational at all times. There was a restriction in an underflow line which, on inspection, was seen to be badly scaled and required hydroblasting. The shift controller instructed Mr Hale to approach the hydroblast crew on Settler 6 to see whether they could move to that job immediately.

35. Mr Hepburn explained to Mr Hale that they could not move to the other job as the pump they were using was stationary, but there was a mobile crew not too far away. He asked Mr Greaves to go and alert that crew that they would be needed once a job allocation was attended to. Mr Hale left and Mr Greaves went to see the other crew. He headed in the direction of Settler 5 (where there was ladder access to the ground). Mr Hepburn started attending to the pump but then realised that he could not see Mr Greaves. He called out to Mr Hale but he had not seen Mr Greaves. Mr Hepburn approached the pump switch and thought that something was wrong as there was not sufficient time in which for Mr Greaves to reach the other tank. He walked in that direction and saw Mr Greaves' helmet on the top of the tank adjacent to Hatch A. He quickly retrieved the light used for looking into the tank and shone it in the tank, and through the hatch. He saw Mr Greaves lying inside the bottom of the tank.

The Rescue

36. Mr Hepburn immediately ran down to ground level and used the phone to raise the alarm. Phones are located around the plant for the purpose of emergency contact. Contractor staff were not issued with radio communication to facilitate immediate communication with security, but QAL staff were.

37. The emergency response team was dispatched. It is manned by various supervisors and operators 24 hours a day, seven days a week, for the entire plant. The role of the rescue team is first response to an incident, assist in fire fighting and to attend to injured persons with advanced first aid.

38. Mr Hale had returned to his office and heard a radio call querying a flashing light on Settler 6. He took a hand held spotlight and went straight to the top of Settler 6 to assist. The tank was guarded by that time by an emergency response person to prevent entry to the tank top, but Mr Hale was let through to assist with lighting into the tank.

39. After raising the alarm, Mr Hepburn had gone back to the top of the tank. He had a conversation with one of the emergency response crew, Jeffrey Jones. Mr Jones had worked at the plant as a

boilermaker for 15 years but had only been on the emergency response team for about 2 months and had not yet completed the second level of training. He carried a pager as a member of the team and was paged by security with a message that a man had fallen into settler 6. He was working close by and notified a co-worker, Mr Dignam, who was a member of the ERT and proceeded to Settler 6 with him.

40. After speaking to Mr Hepburn and discovering that a man had fallen into the tank (he had assumed someone had fallen off the tank), Mr Jones got onto his knees and moved carefully over to the open hatch and looked into the tank. Mr Hepburn and Mr Jones decided that access to Mr Greaves could only be had via the doors at the base of the tank. They both went to the bottom of the tank.

41. A bobcat and shovels were called for by Mr Jones on the radio in order to clear the scale/mud build up away from the ground based hatch to the tank (it had built up in mounds during the hydroblasting process). It was estimated that the scale had built up about 2/3 of the way up the hatch from the inside, as well as building up on the outside. Mr Hepburn and Mr Jones commenced digging with their gloved hands to clear the doorway sufficiently to enter the tank. The bobcat which was dispatched had a rockbreaker attachment fitted which Mr Hepburn said was “not much chop” as it was unable to clear away the scale quickly enough. He thought a bucket attachment would have been more useful. Mr Jones stated that the bobcat was of assistance and it arrived quite quickly after the emergency call. He was also of the opinion, though, that a bucket attachment might be of more use. A second bobcat later arrived with a bucket and that was employed to assist in the removal of the mud/scale. A couple of large pieces of the scale came away and entry was able to be made by the rescue crew and others.

42. Mr Warren Dennien was a shift maintenance supervisor and team leader of the rescue team. Mr Dennien had been in the rescue team for six or seven years at the time of this incident. He gave evidence that Initial and ongoing training was provided for the team by the Queensland Fire and Rescue Service, regarding fire, hazmat incidents and breathing apparatus training and St John’s Ambulance Service for advanced first aid. Training was held for 4 -6 hours per month. Risk assessments relevant to the rescues were part of the procedure for the emergency response team.

43. Mr Dennien received the call on the night of this incident at about 9.30pm and because he was close to the fire station, he took a truck (which was fitted with rescue gear) to Settler 6. He handed out two way radios to RT members on the ground and went to the top of the tank, but was called down by Mr Jones enroute. He phoned security and asked for the ambulance to be called, as there was a possibility of a fatality. Mr Dennien assisted with the hand digging of the scale

outside the tank until the bobcat arrived. Access to the tank was gained, reasonably quickly, and two of the rescue team entered. Mr Dennien sent a third person in who had recent first aid experience. CPR was administered to Mr Greaves until the ambulance arrived.

44. Mr Dennien conducted a mental risk assessment on entry to the tank to ensure that he was not putting other people's lives in danger in the process of the rescue. He took into account that the tank had been offline for at least a week and a lot of scale had been removed from the tank using large volumes of water, so the caustic atmosphere and caustic content of the mud would have dissipated. Also, a fair amount of drainage of the mud had occurred as the doors at the base of the tank had been open, and the surrounds of the bottom of the tank were clear of the drained material. His major concern was slip hazards, as the tank was wet from the hydroblasting and there was water with diluted caustic lying around, and dripping out of the tank. He had no concerns of serious injury to any person.

45. Terrence Alloway, an Advanced Care Paramedic, attended the site with other members of the Queensland Ambulance Service. They arrived on scene at 9.51pm and were escorted from the main gate of QAL. Ambulance officers in Gladstone have undertaken a general industrial site induction, but not a specific one to QAL. They are escorted and supervised whilst on site. About 5 minutes after their arrival, access was gained to the tank. The Ambulance officers did not conduct a risk assessment on entry to the tank but relied on the information provided by QAL staff. Mr Dennien ensured that they were provided with mono goggles for eye protection and that they were suitably dressed. He asked them to be careful where they were putting their hands etc, due to the presence of caustic in the tank. Some of the ambulance officers donned their wet weather gear which they considered adequate for the job, but one ambulance officer who did not, sustained some minor burns around his neck. None wore gloves.

46. Two officers, Mr Alloway and Mr Brown, assessed Mr Greaves and found no signs of life. He was laying right at the edge of a cone near the base of the tank. It was very wet with water dripping down. Each time the Ambulance officers tried to position Mr Greaves to administer CPR, he was slipping, threatening to slip down into the well of the tank where there was a significant quantity of red mud mixed with caustic residue. The decision was taken to remove him from the tank in order to conduct a proper assessment. A back board was used to remove Mr Greaves from the tank and, an assessment conducted in the ambulance, showed that his heart had stopped. His body was removed from site.

47. Mr Dennien discovered that Mr Hepburn had entered the tank during the rescue. He was unaware of that fact until the later debrief. He explained that at the time of the entry to the tank there was a lot of organising going on, in a short period of time, and that he must have

missed this. Counselling was provided to all staff involved after the incident.

THE POLICE INVESTIGATION

48. Ms Reynolds, formerly Constable Cheong of the Gladstone Police, attended at the Queensland Alumina Limited (QAL) plant in Gladstone on the 17th July 2005 to conduct an investigation into the death of Mr Colin Greaves. She had received a communication that the death had occurred at about 9.40pm. She and Constable Bates attended as first response officers. As first response officers, their responsibility was to secure the scene, determine whether there were any suspicious circumstances surrounding the death and gather information for the coroner (to enable the Coroner to attend to the formalities surrounding the death such as post mortem examination etc.).

49. As the death occurred in a workplace, the primary investigation role lay with Workplace Health and Safety Division (WPHS) of the Department of Industrial Relations. Constable Cheong agreed in evidence that the Police rely heavily on the WPHS investigation being thorough and expert in order to fulfil the needs of the coronial report to the Coroner. I will deal with the WPHS investigation later in these findings.

50. Constable Cheong spoke to various persons from management and interviewed a number of people in the crib room while Constable Bates inspected the scene. She did not seize any documents other than a job sheet to indicate what Mr Greaves was doing on the night. Constable Cheong went to the top of Settler 6 to make a brief inspection herself. She saw the open hatch and Mr Greaves' helmet in close proximity. She said that the hatch cover was moved forwards, slid away from the steps end of the hatch. She was assured that the scene was left the way it was at the time of the incident. There was no cordon, rope, flagging or barricade around the hole itself. She further stated in evidence that Mr Greaves would have walked in the vicinity of the hatch to move from the area where he was with Mr Hepburn and Mr Hale to go to the exit he was intending to use, particularly if he "cut the corner" which was in the area of the white rope entering the hole. She further stated that he did not need to walk immediately in that area but when he came around the corner of the central walkway, he would have been walking straight towards the hole.

51. Sgt Pittendreigh, the Scenes of Crime Officer, gave evidence that when he attended the tank that evening, there was no-one guarding the scene or preventing access to the top of the tank apart from the people escorting him.

52. Constable Cheong was charged with the entire investigation from a Police perspective. Detective Sergeant Lehmann of the Gladstone Criminal Investigation Branch was contacted at 1.45am about the incident but a decision was obviously taken by QPS that Constable

Cheong would attend to the matter. She satisfied herself that there were no suspicious circumstances surrounding the death and Police involvement would not be required on a criminal basis. Constable Cheong reported back to the Officer in Charge of Gladstone Police and he was happy with the report. Constable Cheong did not feel that she needed the assistance of any more senior Police on site. As is the usual case in such circumstances, the scene was handed over to WPHS. In due course she forwarded a report on these preliminary matters to the Coroner.

53. In the time intervening between the death investigation and the Inquest, Constable Cheong left the employ of the Queensland Police Service but was good enough to attend the Inquest and not only give evidence but to provide other assistance to the Coronial process. Her assistance was appreciated.

MR GREAVES

54. Mr Skipper gave evidence that Mr Greaves was an experienced person in the company. He was a good bloke, easy to get along with and was well liked. His work mates agreed. He was not prone to be a risk taker and there were never any concerns about his approach to safety. Mr Skipper was absolutely happy with his work. It was not considered that Mr Greaves was intentionally acting in a dangerous way when he fell to his death. He was a keen worker and would take whatever shifts were offered to him.

RESCUE ISSUES

55. It is quite clear that everyone involved in the rescue process did all they could to assist Mr Greaves in the shortest time possible and many were quite brave in the face of potential danger to themselves, particularly Mr Hepburn and Mr Jones. Further, those two men and others were very affected by the incident with Mr Hepburn not returning to work and Mr Jones resigning from the ERT.

56. Immediately following the incident, it was implicit in the actions of the men involved in the rescue that the presumption was that Mr Greaves was still alive. It was very much a rescue effort and not a recovery operation. This, of course, had to be the case despite the fact that it was later shown in the autopsy report that Mr Greaves did not survive the fall. This aspect of the incident was not investigated by WPHS despite the fact that they could not have definitively known that Mr Greaves did not survive the fall. Certainly it would be a dangerous assumption to make so early in the matter.

57. Initial contact with emergency procedures involved Mr Hepburn running down a significant set of stairs to reach a phone. Mr Hale gave evidence that all QAL staff wore radios which enhanced immediate communication with security (the central point of contact for the plant).

Contractors did not have radios. Obviously if they did, Mr Hepburn could have raised the alarm much more quickly and without possibly putting himself in jeopardy by the rushed journey he took to reach a phone.

58. Mr Hepburn and Mr Jones were moving muddy scale out of the way of the access to the bottom of the tank with gloved hands. The scale was caustic. Mr Hale commented that the residue of caustic in the settler tank mud could be "bitey" to the skin. Neither Mr Jones nor Mr Hepburn noticed any ill effects in the process. However, the possibility for injury was real.

59. Rules apply before a person can enter a confined space such as the settler tank. Australian Standards place stringent requirements on confined space entry due to the raft of significant risks associated with confined spaces. This particular tank presented elevated risk levels due to its contents containing caustic residue. Mr Hepburn explained his understanding of the confined space requirements as including having a standby person on the outside of the space to monitor the situation, and the performance of air tests prior to entry. Mr Jones was the first emergency response team member onsite. He did not conduct a risk assessment but relied on his supervisor Mr Dennien who was the senior person in the team to perform that task.

60. Mr Dennien's evidence about the procedures followed has been described previously. It is uncertain whether he made an accurate assessment during the mental risk assessment he conducted on entering the tank, particularly in relation to what activities had been going on at the settler, as the usual schedule was disrupted quite significantly due to the breakdown of the rake arm. Whether, in those circumstances, he could make an accurate assumption on the level of dissolution of caustic in the scale/mud could be questionable and was partially informed guesswork at best. Certainly there was sufficient caustic in the tank to inflict minor burns on the neck of one of the ambulance officers, presumably from the dripping water in the tank. It is appreciated that there was a feeling of urgency, the rescuers not being aware of the condition of Mr Greaves, but the risk assessment was perhaps a little perfunctory and based in the main on supposition in the main.

61. Further, Mr Dennien was not completely in control of the scene as he was unaware that Mr Hepburn had entered the tank until after he left. Since this incident part of the rescue process includes a person being appointed to control persons' movements in and around the scene.

62. Mr Hepburn, understandably, felt the need to quickly enter the tank and attend to Mr Greaves whose condition was unknown at that time.

LIGHTING ON SETTLER 6

63. Mr Hepburn ticked poor lighting on the QAL Job Hazard Sheet. He said that in general the lighting on top of the tanks is never very good. The steam rising from the tanks during operation coats the light fittings, turning them red over a period of time which causes the lighting to become progressively duller. The fittings are changed by the QAL electricians once the lighting becomes too dull.

64. Mr McDonald gave evidence that as soon as it was nearly dark on Settler 6 there would be "major shadowing or very dark spots" that would make it difficult to make out features on the tank. He described the lighting on the top of Settler 6 as being situated on the central catwalk which provides the main access to the tank, as well as other lighting on Catwalk B which runs between all of the tanks and from which the individual tank catwalks run. He classed the lighting on the top of the tank on the night of the incident as adequate.

65. Mr Hale, who had gone onto the tank during the night thought the lighting to be "pretty good" but stated that it was noticeably brighter on the northern side. He had no difficulty navigating his way around the tank in the existing lighting and could see features clearly.

66. Mr Dignam who was a member of the emergency response team had spent 25 years working at the plant. He thought the lighting was fair and normal for the settler tanks but did accept that there were shadows. He further stated that one becomes accustomed to working in that environment within a couple of hours after darkness descends.

67. Constable Cheong commented in evidence that the lights were glowing gold, an orangey gold colour. She stated that the haze or dust at the plant contributed to the colour of the light which came from the fixed lighting on the top of Settler 6, as if the light was shining through particles. The effect of the lighting was that you had to be a little more aware when you were walking around the area on top of the tank, the Constable was more wary, watching where she was walking.

68. Constable Bate stated in evidence that the top of the tank was dark on the night in question and there were a few shadowy areas so he was a bit wary about where he was walking on the tank top. He was told where the open hatch was but he commented that it was not easy to see as it blended with the shadowy areas. He considered that the lighting was very poor.

69. Mr Greenhalgh gave evidence that the lighting on the top of Settler 6 was tested as part of the QAL investigation of the incident. At Hatch A the lux reading was 12 which was stated to be at the bottom end of acceptable lighting for conducting work. By comparison a full moon at its zenith sheds light of lux .3 and the light in the court room on the day Mr Greenhalgh gave evidence was 100-150.

HATCH SECURITY

70. When the settler tanks are online, they contain material kept at very high temperatures, around 100 degrees centigrade. Hatches cannot be safely opened during this period of operation due to the heat and steam involved. Consequently, hatches are usually secured during this period. Tanks need to come offline before any maintenance work can be done on them for similar reasons.

71. Hatch A was located directly in front of a ship's ladder at the end of the catwalk on Settler 6. That ladder was flagged off on the night in question but in general, the position of the hatch was dangerous given its proximity to the ladder. Flagging or bunting is an indicator and not a physical barrier which physically prevents access to the area.

72. Mr Tomlinson, the Turnaround Co-ordinator at QAL, gave evidence that he had inspected Settler 6 at the commencement of the turnaround period relevant to this incident. He walked past Hatch A on 16 May 2005 and it was closed. To his knowledge it was secured. He walked across the hatch and did not notice the lid to move around and assumed that it was therefore welded shut. He accepted in cross-examination that the lid may not have moved due to its weight and that this was not necessarily an indication that it was welded closed. Mr Tomlinson stated that the turnaround instructions required all hatches to be closed or barricaded during work. Further, when one crew was finished their activities on the tank, they must ensure that the tank was in an acceptable state for the next crew. The following crew were required to conduct their own risk assessments prior to commencing work on the site. Part of the JSA process required hatch lids to be replaced at the end of the shift on hatches where no bars were present.

73. Mr Middleton had lifted the lid during the day shift and recalled seeing rusty welds on the hatch lid but he had no knowledge of when the welds were broken. Mr Middleton said that it was the first time that he had worked on this tank and that Hatch A needed to be used in the hydroblasting process. Mr McDonald, however, had worked on Settler 6 previously over a nine year period and had always been able to open the Hatch A lid, it was not welded shut on any occasion that he had cause to open it.

74. As the hatch lid had been removed by the day crew and Mr Hepburn was not aware of who, or when, the welds had been broken. He further raised the prospect that the extreme heat, movement, and pressure involved in the tank's use and cleaning, could have affected the strength of the welds over time.

75. Mr Hepburn gave evidence that most of the larger hatches had bars in them to prevent falling when lids were off – except for Hatch A. The second largest hatch only had one bar present on the night of the incident when it should have had two. Some had bars lying on the top

of the tank beside the hatch. No bars had been removed by Mr Hepburn or Mr Greaves. Mr Hepburn gave evidence that it was common for there to be hatches with hinged lids, or lids that aren't securely fastened. Mr Skipper gave evidence that it was common for there to be bars missing from the hatch openings. Mr Middleton stated that a lot of times the hatches would be open on the tanks with some or all bars missing. This would sometimes be for the purpose of airing the tanks out. TIS staff reported having no need to remove bars in the course of their work as there was sufficient room and access to do their work with the bars in place. There was some reference to QAL staff having cause to remove bars when descaling but this was not put to the QAL staff in evidence and it is by the by in relation to the present matter, other than from a general safety point of view.

76. Settler 6 was the only settler that Mr Hepburn had seen a hatch such as Hatch A on. In fact, Settler 5 also has that hatch. Hatch A had been a special hatch which was used some years before by QAL (in the 1990s), through which a pump was lowered to drain the tank. The trial of that process was unsuccessful and the hatches were not used for that purpose again. The Hatch on Settler 5 had not been disturbed.

77. It was considered by Mr Hepburn there was no risk of falling through Hatch A as barricades to the area were in place – the flagging preventing entry to the work site. In relation to Hatch A specifically, he stated that there was no way that a barricade would stay around Hatch A as the pressure from the hydroblasting would just blast it away. For the same reason the hatch cover can not be put on while the work is being performed.

78. Ordinarily this hatch would not be an issue as the smaller circular hatches are used for the hydroblasting when the arm is in full use. There is no fall risk associated with those hatches due to their size.

79. Mr Middleton gave evidence that there was no need for barricades to be in place around the hatches as the control being used was to replace the lids at the end of the shift. According to Mr Middleton, there was also no need to close the lids until leaving the site and they were left open while the work was progressing. It would have been inconvenient to continually open and close them during the course of the operation. The fact that there were open hatches and some hatches without bars was not a safety concern for Mr Middleton. He further stated that the workers knew the open hatch was there and knew what the problem might be with the open hatch while working. He knew what his capabilities were and was experienced in the work. Common sense prevented him from falling down the open hatch. A hard barricade would have addressed the risk but was not considered by Mr Middleton on the day of the shift.

80. Mr Middleton also gave evidence that he and Mr McDonald had, during the shift, knelt down with their hands on the surface of the tank and

leaned over the hole and looked inside the tank. It was not an action that concerned him and he felt quite safe doing that. The open hatch was not considered a danger to them. Further, Mr McDonald gave evidence that he had previously, on most turnarounds, stood over even larger holes in the top of tanks without restraint or barricades.

81. Mr Skipper was aware of the policy requiring barricading of holes but none were apparent on the tank. He was not concerned by that because when the cover is on the hole there is no hazard. According to Mr Skipper Hatch A was only opened for the set up of the flying fox, had a rope coming from the corner of it so that the lid could then be replaced, with the lid not needing to be opened again during the work. He was of the opinion that the lid for Hatch A was too heavy to be dislodged during blasting. Mr Middleton's evidence, however, was that this did in fact happen. Mr Skipper commented that there was a general requirement to replace all lids that might have been dislodged during the blasting process so that they did not constitute trip hazards. In his mind, any such hazards needed to be fixed before work could continue.

82. Mr Skipper's view was that hard barriers around the holes would have been a safer system of work, with hindsight. In the event that barricades needed to be installed, QAL would attend to that upon request. Mr McDonald gave evidence that, in his experience, this could take from a day up to two weeks. Since the incident TIS ensure that all holes are hard barricaded on all jobs.

83. Sgt Pittendreigh gave evidence of having to lie on his stomach with a person holding onto his legs in order to take a photo inside Hatch A. He felt it was quite unsafe but it was the only way he could do it.

84. Mr Hale gave evidence that he first saw the open hatch after the incident when he took lighting to assist the investigations inside the tank. He was "a bit surprised" when he saw the open hatch with no barricades around it and commented that there was not even a lip around the opening of the hatch (which might alert someone to the presence of the void). His means of approach was around a chimney which partly shielded his view of the hatch until he was quite close. He stated further that he was alarmed by the open void. This was primarily due to his not seeing the hatch until he came within 3–4 metres of it. As a result of the circumstances he was alert to hazards, and even so, he was surprised.

85. Mr Hale gave evidence that he would not permit a work crew to work on the tank with a large hatch like that opened without the use of safety harnesses. He would make enquiries as to why the hatch was open and request rectification of the hazard. He stated that on other tanks, he had seen barricades called scaffolds (referred to elsewhere in the evidence as handrails) around similar hatch openings. Since the incident such barricades are used during shut down on the tanks.

87. Constable Bate gave evidence that he was told by a Mr Mackay of QAL that there may have been no safety rail around the hatch as the hyrdoblasters were setting up the job. However, it seems that there were no safety rails.

88. Mr Hepburn gave evidence that there were difficulties in getting QAL staff to attend at the tanks to, for instance, weld bars on hatches or cut further holes in the tank due to their being very busy. Mr Hepburn was very concerned that despite the issue of barricades and hatches on the settler tanks being discussed, it was not an issue that was resolved in a positive way. He was of the opinion that a fixed barricade with handrails being in place around the hatch would have prevented the incident from occurring.

HISTORY OF HATCH A

89. The history of Hatch A was examined by Mr Greenhalgh. The previous turnaround for Settler 6 was in December 2004 and one of the maintenance jobs was to weld down all hatches and install bars on hinged hatches. That task was completed. There was no record of Hatch A ever being touched in the period between that turnaround and the incident in this matter.

90. As the hatch was welded shut, it was considered by QAL to be a part of the structure of the tank roof. QAL procedure for the opening of Hatch A required a management of change request which call up certain procedures (as this process would be considered if breaking into a solid tank roof). A work order including a risk assessment of the task would be generated, once the management of change process was approved by a superintendent. The work would be tasked to the QAL Heavy Drive crew and the work order would be required to be signed off on at the completion of the task. There is no evidence that any of that process was undertaken in relation to Hatch A, indicating that the hatch seal was broken unofficially.

91. The welding of Hatch A seemed to be by way of tack welds rather than a continuous weld around the opening. The QAL investigation attempted to discover when and by whom the welds were broken and the hatch opened. A metallurgist, Mr Bletchley, examined the broken welds on the hatch opening and lid. He found that the welds had been broken by a number of methods including grinding, chiselling and an oxy torch. TIS do not have grinding or oxy equipment on site. Any work of the nature which would have been required would be a QAL task. The metallurgist was unable to date the broken welds as they were rusted, but given the nature of the material it was exposed to in the tank that was not a telling factor in dating the breaks.

92. Mr McDonald gave evidence that in his experience, the hatches were quite often damaged during the hydroblasting process and repairs were

necessary to resecure them. He also stated that there were a number of pressures on the welds on hatches on these tanks. The hydroblasting could crack welds, he said. Further, some of the machinery that was used on top of the tanks was quite large and heavy and would be capable of damaging the welds.

93. It was not able to be determined when or who broke the welds on Hatch A. Both companies contended at the Inquest that they did not have any reason to break the welds. Mr Greenhalgh gave evidence that there was no evidence uncovered by the QAL investigation to indicate that the hatch had been opened prior to the tank being handed over to TIS.

94. No audit procedure on hatches was in place within QAL at the time of the incident.

95. Ironically, Mr McDonald identified another issue in relation to moving around hazards on the tanks. Monogoggles, worn as a mandatory item of PPE, in certain circumstances limit peripheral vision, especially in a downwards direction, increasing the likelihood of falling foul to trip hazards.

SAFETY MEETING MINUTES

96. During a Contractors Safety Meeting on 15 August 2002, a contractor raised an issue regarding hinged hatches. Mr Greenhalgh, following a review of the minutes of that meeting, gave evidence that the hatches referred to were different to Hatch A. The hatches referred to were the hinged hatches around the radius of the tanks and not Hatch A which was welded shut. The item remained on the minutes for many months. It was taken off the minutes when a work order was placed on the QAL system. The work was unable to be done whilst the tank was in operation and was attended to when the turnaround cycle permitted. The reason for the timing was not self-evident on the face of the minutes. There was also discussion of the metal strapping or bars in some of the hatches.

IDENTIFICATION OF THE HAZARD OF FALLS FROM HEIGHT

97. Q-Comp statistics regarding falls from height indicate that in the 2005/06 financial year 3222 claims, from 3408 applications, were accepted in Queensland and, in the 2006/07 year, 4920 claims from 5281 applications were accepted. These figures indicate that falls from height are a significant problem in Queensland workplaces.

98. Mr Greaves had undertaken an induction on 21/10/04 which included fall from heights and barricades and cordons. Mr Hepburn has been similarly trained.

99. Mr Hepburn did identify fall from height as a hazard, due to the open hatches. The control which was in place was to close the lids on hatches at the end of the task. However, he seemed more concerned about the issue of someone, other than TIS workers, being in danger and focused on securing access to the area. Mr Hepburn was not aware until after the incident that there was a requirement in the procedures in place for a barricade to be around any open voids. He was able to stop work until a hazard was corrected, but the action usually taken, was to close hatches with no bars and not to work near them.

100. Mr Hepburn (and Mr Greaves according to Mr Hepburn) was not concerned about using that hatch opening once he had looked at it. They didn't consider that it could be a problem as they worked around open hatches every day of the week. Mr Hepburn was of the view that Mr Greaves fell into the open hatch, because he forgot it was there and, consequently, some sort of barricade would have helped.

101. The evidence suggests that these workers had normalised the risk associated with open hatches and therefore did not give it due regard.

102. It is of concern that a photo taken during the investigation showed two persons leaning around the open hatch. They should have been restrained in some way but no restraint was visible. This was an unacceptable practice in the QAL system but it seems from the work wear that one of the persons was a QAL worker.

SAFETY RESTRAINTS AND HARNESSES

103. Mr Skipper agreed that the TIS policy on falls from height requires harnesses to be used if a worker is within 2 metres of a potential fall of more then 2 metres. Harnesses were not provided to the men on this job as TIS had no harnesses. They could have been borrowed from QAL. Further, he argued that there was no need for harnesses as there was a handrail around the perimeter of the tank, guarding against a fall and the control being used in relation to hatches was to replace the lids.

104. Mr Hepburn's evidence was that safety harnesses had never been used during his time with the company on the top of the settler tanks. He had been trained in their use, held a ticket and had actually used harnesses while using a JLG in a confined space. He explained that a JLG is a machine that whisks you to heights inside a tank and you work from a small cage. Harnesses and safety restraints were located in the TIS workshop on site and would have been able to be accessed on the night of the incident if requested.

105. Wearing a harness would have made the job a lot more difficult but not impossible. Mr Hepburn was of the opinion that there were no arrest points on the top of that tank. Certainly none were marked. During the

QAL investigation of the incident, an engineer did identify suitable anchorage points which would be available for use. As they were not permanent anchorage points, it would be necessary for workers to approach QAL Area Engineer and ask for the points to be indicated to them prior to using harnesses or safety restraints. Such information would be available on application 24 hours a day according to Mr Greenhalgh.

ROSTERING ARRANGEMENTS AND FATIGUE

106. Mr Hepburn was a permanent employee at the time of the incident whereas Mr Greaves was a casual. The permanent employee shift at that time was 12 hour shifts (7-7), on a four/four roster (4 days on day shift, 4 days off, 4 days night shift, 4 days off). Mr Hepburn gave evidence that the casual staff were advised by Mr Skipper of the days they were working. If a casual was required to work on the following day then he would be notified to come in. Whilst the money was better than permanent, the certainty of shifts was not. Consequently, most worked whatever shifts they were given.

107. Mr Skipper was responsible for the rostering of casuals for TIS. He gave evidence that there was no formal system for the rostering of casuals. He had about a dozen casuals to call on and rostered them when needed. It was a matter of personal choice for him who he used and how often based on his judgment of the work needs at the time. He denied that there was any favouritism involved, as they were a tight knit group. Mr Greaves was regarded as a good worker, a good bloke and was able to get a shift if one was available.

108. Mr Middleton, who was a casual, gave evidence that he no longer needed to wait for a phone call to obtain a shift but was able to just come in every day and get a shift. He further stated that it had taken him 6 years of working as a casual to obtain a permanent position at TIS. His opinion was that TIS preferred to have a lot of casuals on call, as QAL had requirements in relation to the number of permanent crews and roster restrictions on them.

109. Mr Hepburn gave evidence that some years prior, there was concern amongst the workers about the manner in which the Fatigue Policy was being used, and how work was being allocated. He, as a Union representative at the time, took to the General Manager the concerns of the men that some were being favoured with many consecutive shifts while others were struggling for any, with choice being dependant on the whim or favour of the Shift Supervisor. About 12 months before this incident, a policy was approved by the General Manager that 2 days off had to be taken after 14 shifts but Mr Hepburn said that the policy was never used.

110. Mr Hepburn admitted that he did not have a good understanding of the safe hours of work policy. He was not formally aware of the policy on

Safe Work Hours, despite Mr Boyer's evidence that it had been sent to him some months before the incident (an email to this effect was produced). Mr Skipper was generally aware that workers could not work more than 16 hours in one shift. He said that this issue was discussed with the crews before the time of the incident. He did not consider that any such rules applied to supervisors but was a matter for the workers only. In fact, both before and after this incident, Mr Skipper was in breach of the standard procedures covering hours of work.

111. Mr Skipper's own roster was 12 days on, 2 days off. He considered that the rules within the company were not working more than 16 hours in one shift and not working more than 14 days straight.

112. The evidence of the Workplace Health and Safety Inspector was that Mr Greaves had worked 26 consecutive 12 hour shifts at the time of the incident, 10 day shifts followed by 16 night shifts.

113. The QAL site had a Cardex system on the front gate which records the entry and exit of all personnel and visitors to site by way of a swipe card. The movement of personnel was therefore able to be monitored. The primary purpose of the system was to manage emergency evacuations. There was, at the time of the incident, an automatic report sent from the Cardex plant entry monitoring system. That report was generated if a person had been on site for more than 14 hours continuously. The report was used to identify the issue which could then be investigated and safety assessments completed around the issue. There was not a flag for consecutive days on site. This may have been due to the fact that QAL had no official restriction on the number of consecutive shifts that could be worked by their staff. The Cardex system referred to by QAL indicated his attendance at the plant for shifts on 25 consecutive days. This was generally confirmed by the TIS records which were produced during the Inquest. Further, it was shown that in a 40 odd day period, Mr Greaves had 9 days off. Mr Boyer considered the work hours were surprising and excessive.

114. Mr Skipper did not accept this and found it hard to believe that Mr Greaves had worked so many shifts without a break and, in fact, was adamant that he would have had a break between the night and day shifts. He contended that the TIS timesheets and pay documents would support this and that he had the break between shifts confirmed from management after the incident. In fact they did not confirm this.

115. Mr Hepburn commented that the extent of such a shift cycle was not unusual. There was no evidence that Mr Greaves needed money for any reason but would take whatever shifts were offered to him. Mr Middleton gave evidence that he had done 20 night shifts straight in the past. He regularly worked 5 or 6 days per week, sometimes 7-8 days, as there was plenty of work on around the time of this incident. Mr McDonald gave evidence that he regularly worked up to 18 hour days,

and has worked up to 3 months without a day off. He had worked up to 15 nights straight. He found that he was very susceptible to fatigue in these circumstances.

116. Mr Skipper had not had any training in fatigue management. He stated that he would be reliant on workers telling him that they were fatigued and could not work, rather than being able to rely on any awareness that he might have of the issue, or raising it with the workers from time to time. He always let the staff know that if they needed a day off they could take it. Mr Middleton, on the other hand, gave evidence that he had to ask for days off and was regularly told by Mr Skipper that he wanted him to continue working as he was experienced, and regularly delayed his days off.

FATIGUE

117. Mr Hale gave evidence that his roster was 2 day shifts, 2 night shifts and 4 days off. He felt quite fatigued by the end of the second night shift, especially if he had bad sleep at any stage during the cycle. He could not imagine, he said, how fatigued someone would be working many consecutive night shifts. He said the way that fatigue affected him was that later in the shift he would be a little bit forgetful, overlook things and generally feel fatigued.

118. Dr Buxton, the forensic pathologist who performed the autopsy on Mr Greaves, gave evidence that there are no possible physical findings at autopsy which would rule fatigue, tiredness or exhaustion in or out. He explained that the typical effects of fatigue include: a loss of concentration, not feeling hungry, feeling tired, judgment being off, and making mistakes.

119. This statement accords in general with the features of fatigue described in the Workplace Health and Safety ***Fatigue Management Guide*** which states at page 5: "*Fatigue has an adverse effect on every aspect of human performance. High levels of fatigue cause reduced performance and productivity in the workplace, and increase the risk of accidents and injuries occurring. Fatigue affects the ability to think clearly, which is vital when making safety related decisions and judgements. People who are fatigued are unable to gauge their own level of impairment. As a result, fatigued people are unaware that they are not functioning as well or as safely as they would be if they were not fatigued.*" (http://www.deir.qld.gov.au/publications/type/guides/index.htm#g).

TRAINING

120. Mr Boyer who was the Safety and Health Manager for TIS visited job sites from time to time to conduct safety observations of work in progress, and conduct training and inductions. He would correct unsafe practices in workers when he saw them occurring. Mr Skipper

gave evidence that Mr Boyer fairly regularly delivered updates on safety issues to the staff. Mr Hepburn could not identify any standard work procedures in relation to hydroblasting, saying that they did the work the way they had always done it. Training in hydroblasting, according to the operators who gave evidence, came from a mentoring system and practical hands on experience on the job. The TIS staff were generally trained in using harnesses or restraints and working at heights.

121. Copies of the work policies were kept in the office. TIS policies and documents may have been available to workers to access, but none of those who gave evidence were aware of their location.

122. Mr Skipper stated that he had never been formally told of his duties and responsibilities as a supervisor within the company, despite evidence that there was a position description which was discussed with him.

123. In relation to document completion, Mr Hepburn's training on JSAs was really only the initial induction, and relied on experience of the workers to know how to complete the forms. There appears to have been a practice for at least some of the forms to be partially completed by the supervisor and then photocopied for the next day. This could cause hazards to go unnoticed if the circumstances, or environment, changed between shifts. It also encourages laziness in the completion of such documents. Mr Skipper was not concerned with this practice as the JSAs had to be conducted on each shift and he considered that they would pick up anything missed by the housekeeping report. There are serious flaws in this approach.

124. At QAL, housekeeping forms and JSAs were completed as a matter of routine but according to Mr Hale there was no specific training other than initial induction on those forms. As they were completed each shift, they became a routine part of the job and operators became well versed with the forms. As most tasks were performed in the same way on each occasion, it was only if there was a feature out of the ordinary that the forms prompted workers to consider various issues not usually under consideration.

SAFETY CULTURE

TIS

125. Mr Vidugiris, the General Manager of TIS at the time of the incident, gave evidence that all policies and procedures were on an intranet system and hard copies were available in the office on each site. Following an incident on another site, the safe hours of work policy was forwarded to supervisors on each site. The policy was primarily in relation to transport workers within the division but did have some general application. Its immediate relevance to the QAL site may have been ambiguous. It referred to working excessive hours, but there was

not a particular focus on fatigue management in the policy. At the time of this incident there was no follow up to ensure implementation of the policy but since this incident, this has occurred through senior management monitoring payroll records. There were no TIS safety audits on the work methods relating to working at heights. It was put to Mr Vidugiris that Mr Greaves had a literacy problem. He was unable to confirm this. He did confirm, however, that there was no process in place to manage employees who had literacy problems in relation to their understanding of instructions and policies.

126. Mr Middleton stated in evidence that the safety culture of TIS was based on the experience of many of the hydroblasting operators. Most of the experienced operators were well and truly aware of the dangers of operating the high pressure water equipment. Those experienced operators would use their mentoring position to quite stridently explain safety issues to more inexperienced workers. Mr McDonald gave evidence that as a casual, if "you buck the system", then you missed out on work for 2-3 weeks to be taught a lesson. As a result, on a lot of occasions, casuals kept their opinions to themselves. This situation also applied to permanents in Mr McDonald's view trying to get overtime.

127. Mr McDonald said that if there was a substantial safety issue then he would identify it, and find a way to work around it, that is, rather than rectifying the hazard and finding a safe method of work, he would find a way to do the job that may have still been dangerous.

128. Any safety issues arising on jobs would be referred to Mr Skipper who would take those issues up with QAL to have them resolved for work to take place. In the event that the issue could not be rectified, Mr Middleton gave evidence that Mr Skipper had called jobs off.

129. Mr Hepburn gave evidence that QAL "rams down your throat" that nothing will be done unless it's done safely. However, he was quite concerned that at TIS there had not been a safety committee meeting for two years before the accident. He had brought that issue to the attention of Stephen Boyer, who was the TIS representative for the company on the QAL Safety Committee, on many occasions.

130. Mr Hepburn gave evidence that there were no regular toolbox meetings despite the fact that "toolbox meeting" is noted on the pre-start form by Mr Skipper. The talk at the start of the shift is by way of handover only. Health and Safety matters were not discussed but Mr Hepburn did agree that Mr Skipper gave the message to workers that the job needed to be done safely and to take what time was needed for safety reasons. Mr Middleton also gave evidence that toolbox meetings were rare.

131. Further, Mr Hepburn gave evidence that immediately after this incident safety increased quite markedly within TIS, harnesses were being used

etc but within 6 months things had gone back to the same as before the fatality and the focus was on getting the job done quickly.

132. Mr Skipper gave evidence that there were regular safety discussions with the operators and that he would speak about safety on virtually every shift.

133. Mr Middleton gave evidence that casuals did not find it easy to speak up about safety issues due to the impermanence of their position. Once experience and confidence improves, however, it was more likely that workers would speak up.

134. From the evidence before me it seems that TIS demonstrates a bottom up, and top down, safety culture but there was a problem in the company in the middle ranks at the QAL site. In some regards, there appeared to be a degree of disconnect between policy documents and practices on site. Mr Vidugiris gave evidence that the systems in place at the time in TIS should have worked to prevent this incident but did not. He stated that Mr Skipper gave all of the signs of being a competent manager, but after the event it came to light that he was not enforcing various policies of the company. The extent of supervision of Mr Skipper, and the lack of double checks on the processes being implemented, were not sufficient to identify the deficiencies in his practices against the company expectations.

135. Mr Craig Beikoff, the Group Compliance and Operational Risk Manager for TIS, conducted an internal investigation of the incident. His aim was to look at the immediate incident but, also, at the wider range of issues in the company's work processes and the interaction with QAL (as their client). His immediate response within a week of the incident was to issue a safety alert to all of the TIS operations in Australia and New Zealand. The safety alert required immediate notification to supervisors of the identification of a risk of fall from height to ensure that adequate control measures were put in place. A further safety alert was issued regarding the safe hours of work policy. A report including recommendations was prepared for the Board of Directors of TIS. He expressed dismay that QAL locked TIS out of their internal investigation, shortly after the incident, on legal advice. He felt that both organisations could have advanced matters together.

QAL

136. QAL conducted safety inductions for all workers every 2 years, including contractors. In contrast to the arrangements regarding toolbox meetings and shift briefings on safety in place at TIS, QAL had a rather more structured system with a toolbox meeting on each shift where the supervisor read out details of incidents that had occurred at the plant – blow-outs, near misses, accidents – to inform the operators and discuss the relevant safety issues.

137. However, there are obviously shortcomings in some people. Mr Hale demonstrated a very vague and poor understanding of the processes of the safety health management system, responsibilities of acting supervisors, and general issues such as each workers power to intervene when witnessing an unsafe practice by QAL staff and contractors. On the other hand, Mr Dennien, a much more experienced employee and supervisor, explained that it is the responsibility and power of each worker on site, irrespective of their position, to correct safety breaches in others. This is particularly part of the role of supervisors and applies to all staff including contractors. The system described here is part of the QSafe system.

138. It appeared from the evidence of Mr Greenhalgh that there is an appropriate and structured training program in place at QAL, but it seems that there is no training for acting supervisors such as Mr Hale. He gave evidence that operators work their way up to team leader and then may be called upon to be an acting supervisor from time to time. Mr Hale had been in a position of being available to act as supervisor for about 18 months but had only been called upon on 2 occasions to act in that capacity. It is fair to say that he was unable to detail what the role was responsible for, or its obligations apart from job allocation for the nine men in the crew.

139. QAL conducted safety audits on various procedures via its 100-120 WPHS officers on staff, particularly in relation to high risk activities such as those undertaken by TIS. The QAL systems were also audited by WPHS Division inspectors who looked at legislative compliance and provided ideas on improving compliance.

140. Mr Evans, the Chief Engineer at QAL 18 months prior to the incident, gave evidence in relation to QAL's safety culture and policies and was very complimentary about those issues when comparing QAL's performance to industry practice.

QAL SAFETY HEALTH MANAGEMENT SYSTEM

Hazard Log

141. Mr Ross Greenhalgh, the Health Safety Environment Communities Manager at QAL, gave evidence of the hazard control log procedure which was designed to manage hazards in respect of which adequate control measures cannot be put in place. A hazard of this nature and the corrective actions to be undertaken are entered into the log via computer for rectification at a future date. The log is administered in the SAP business information system. The corrective actions are tracked over time and when all actions are complete, the hazard is closed off and signed off by the person who entered the item on the log. The SAP system came into operation during the course of the safety meeting deliberations on the hatch issue. Once introduced, the computerised hazard log system monitored the matter to finalisation.

Mapping

142. There is a general requirement in the legislation that the safety and health management systems of contractors must be on a level with that of the company operating the site. Whilst there was evidence that the TIS system was mapped against the QAL system by QAL, not all procedures were on par. The strict control of fall from height hazards was compatible, the fatigue management policy of TIS was not consistent with QAL's. This disconnect, in part, permitted the situation of the breach of the Safe Hours of Work Policy to occur in part.

Contract Management

143. A QAL Contract Supervisor is appointed for each Contractor with QAL. The role of that position is to develop work plans and work method statements for the contractor in line with the scope of work in the contract, and to audit compliance with the contractual arrangements. The role does not include a practical supervision of the contractor's work, as such would be impractical given the large number of contracts at QAL (around 100). Mr Duff was the Contract Manager for the TIS contract at the time of the incident. He had the administrative supervision of the contract. He confirmed with the contractors their work schedule which he took off the planning schedules.

144. Mr Duff gave evidence that the usual arrangement with the Settler tank was Plant Production would hand the tank over to the Descale Section (that Mr Duff supervised) who would then advise TIS when they would hydroblast. As the tank was passed from one section to the other, the group working on it would be responsible for the site during their time of working on the tank. On this occasion, the Descale crew could not attend to their usual task in that order due to the breakdown, and TIS were required to work on the tank following the Production Section. There was a change to the sequence of work on the tank as a result. Mr Duff gave evidence that when his section is ready to take over the tank, they inspect the vessel prior to their activities starting. He had inspected the tank top 2 days before the incident. He did not note any irregularities. The hatch lids were closed, including Hatch A. If some lids were open he would have checked that bars were in place.

145. It seems that there may have been some difficulties associated with the change in the usual sequence process. No safety audit was built into the handover system when the tank was on turnaround and there was almost complete reliance on the JSA procedure to ensure a safe workplace. When the situation was as per normal, the procedures in place would suffice but the use of the JSA did not pick up the additional hazards occasioned by the fact that this was out of the ordinary and those hazards were not managed in an effective way.

THE WORKPLACE HEALTH AND SAFETY DIVISION INVESTIGATION

145. Mark Brown was the investigating inspector for this incident. He had investigated 40-50 incidents including 8-10 fatalities during his time with the Division. He left the employ of the Division before the Inquest hearing.

146. He arrived at the QAL plant at around 1.30am on the 18th July 2005. He spoke to Police and Ian King, the Health and Safety Manager from QAL, who took him to the scene. He gave evidence that the Police had control of the scene at the time of his attendance. Upon satisfying themselves that the incident should be investigated further by WPHS, the scene is released by Police to the inspector as it was on this occasion.

147. The purpose of the WPHS investigation was to determine what happened in the incident and look at any measures that could be put in place to prevent a reoccurrence of the incident in the future. Further, a purpose of the investigation is to look at any breaches of the legislation with a view to prosecuting any breach and determine if there needs to be any immediate action by way of improvement or prohibition notices, to be issued. Both such notices were issued in this matter.

Who is the Investigator?

148. Mr Brown gave evidence that he did not appreciate that from the Police point of view he became the lead investigator for the purposes of reporting to the Coroner. In fact, he was of the opinion that the Police remained, at all times, the lead investigator for the purposes of the coronial aspect of the matter. He was aware, he said, that the Coroner may conduct an Inquest into the death and would require any information gathered by him through the provision of a report. He was unaware, however, what use the report might be put to by the Coroner. From the Police perspective coronials are very much shared investigations, relying on the strengths of the Departments with expertise in particular areas.

149. Whilst he had received training in investigating for breach proceedings and the preparation of breach reports, he had received no similar training in relation to coronial investigations or reports. Further, he was unaware of the requirements a Coroner may have in relation to the information needed to be produced. No policy that he was aware of existed within the Division in relation to Coronial matters, other than a very brief template consisting of headings to be used in a report. In reality, the document is of very little practical assistance or guidance to inspectors. The Department of Mines inspectors are guided in their investigations by a process manual which could well be of assistance to WPHS.

Capability to Investigate Systems

150. The Inspector had received no training from the Division regarding root cause analysis methods, other than a course that he had undertaken himself privately which provided a very brief overview of a number of different analysis methods. Such methods are used by the Australian Transport Safety Bureau, Department of Mines (Qld) and large mining companies such as BHP. Department of Mines Inspectors routinely conduct such analyses of incidents as part of their investigation in order to establish the cause of incidents, and the failings of the systems in place, which contributed to the incident.

151. Through reference to information of this nature, a Coroner is able to identify areas where recommendations might need to be made in order to prevent a reoccurrence of a death or, more generally, to protect the health and safety of the public. There is a considerable amount of expertise existing in the Department of Mines in this area and regular training is undertaken, particularly in the ICAM procedure. Inspector Brown did not conduct a root cause analysis of this incident and it appears that such an examination is not within the current practices or capabilities of the Division.

152. A primary consideration for a Coroner is the nature and cause of the death. Inspector Brown gave evidence that an inspector's capability to conduct such an investigation would be heavily dependant on the particular area of expertise of the investigator given the very wide span of the nature of workplaces which come within the province of the Division. For instance, some inspectors are experienced in the construction area while others may have particular knowledge of the diving industry.

153. Inspector Brown's background and primary experience was in construction. He had little knowledge of the industrial site at which he was conducting the investigation into this death. In the present matter, the Inspector showed in his report and evidence that he had little understanding of the industry, or its processes, which took place at the site. For instance, he was of the opinion that it would be perfectly safe to weld hatches closed during the settler tanks being in operation. He assumed this, rather than making enquiries which would have indicated this belief to be quite wrong. The narrow focus of his enquiries limited his understanding of the circumstances surrounding the death.

Internal Procedures and the Coroner

154. He gave evidence that once a report is prepared, it must be sent to the legal unit. As the prosecution had not proceeded to Court when the report to the Coroner was furnished, and the Coroner is considered an external entity for the purposes of the investigation, the information which can be released to the Coroner is restricted by the Division.

155. It is interesting to note that the Queensland Police Service who regularly prosecute criminal matters related to coronial enquiries, manage to provide the Coroner with the full brief of evidence and a coronial report prior to prosecutions as a regular practice. Prudence must then be applied by the Coroner regarding the release of the information to other parties. Ordinarily, the practice of Coroners (in both criminal and WPHS prosecutions) is to await the outcome of the prosecution, prior to determining whether to convene an Inquest. It is not until such a decision is taken and interested parties are permitted to appear in the matter that information is released to the parties. The exception to this would be the release of medical information regarding the cause of death to the next of kin which happens early in the matter. It is evident from the longstanding practice of Coroners in this regard that prosecutions for more serious offences than those pursued by WPHS are not jeopardised by the release of information to Coroners.

156. During the investigation, the Coronial issues were not high on the Department's "list of importance" according to Inspector Brown. Further, given the demands on his time, he attended to obtaining sufficient information for the prosecution and not for any other purpose. In this matter, there was effectively no real focus in the Division on assisting the Coroner in any but a perfunctory fashion.

157. Once the prosecution had been conducted, the Inspector considered that the Division's task was completed. He was given no instruction to go and conduct an investigation on behalf of the Coroner. Further, he conceded that it would appear from the Division's attitude that, despite the aims of the Coroners Act, the Coronial system does not have a significant role to play in safety.

158. Unfortunately in this case, the report released to the Coroner was not complete and was not updated despite the investigation continuing after its provision. A much more extensive report was located by Inspector Brown during his evidence which had never been forwarded to the Coroner, even after the prosecution was complete. The Inspector had not thought to send the complete report to the Coroner. It was evident from the way that the Division conducted itself during this matter that it requires requests to be made for all information in order to consider supplying the material. There is no automatic process for the provision of information to Coroners. A point in fact is the provision of letters which Mr Watson undertook to provide during the Inquest. A further undertaking was given in the submissions tendered by the Division. Despite those two undertakings, 2 months later my office had to request the provision of the material as these findings were being prepared.

159. The attitude of the Division goes beyond a lack of interest in the Coronial process and could only be construed as being so desultory as to be disrespectful to the process. Further, the text of the WPHS report

described Mr Greaves merely as Greaves, which from a coronial point of view, is not sufficiently respectful.

160. The lack of completeness of the report required numerous requests from my office to the Division for the material referred to in the abridged report which caused many months delay in the coronial investigation. Pursuant to those requests, the release of documents was considered under the administrative release to an outside entity process, and the documents were released in dribs and drabs over a period of weeks. There was no appreciation that the material was within the coronial system and not an "outside" process.

Additional Needs of Coronial Investigation

161. There were a number of important issues from a coronial viewpoint that were not pursued, documents not obtained and witness statements not taken by the Inspector during his investigation. The explanation given for these issues not being pursued was that the information was not needed for the prosecution matters and was therefore not of any interest to the Division.

162. Those issues and incomplete investigations include, but are not limited to:

(i) the workers on the day shift that preceded the incident shift, who set up the job were not spoken to nor statements taken;

(ii) the opening of Hatch A by breaking the welds, when that happened, by whom, and why, virtually none of the workers who might have done that, or known who did, were spoken to nor statements taken;

(iii) inquiry as to whether this hatch was used previously in hydroblasting;

(iv) incomplete examination of the bars located in, or missing from, hatches on Settler 6;

(v) failure to identify the difference in evidence regarding the completion of the housekeeping list by Mr Kehoe;

(vi) no investigation of the history of the work done on Settler 6 and the security of hatches;

(vii) no investigation of the availability in either company of harnesses and operator training in their use;

(viii) no investigation of the scheduling change in relation to work on Settler 6;

(ix) no knowledge or investigations of change management regarding the change in scheduling of the work to be done on the settler tank;

(x) safety meetings and the persons holding responsibility for actioning the repairs to hatch lids and whether the hatches referred to in those minutes related to the hatch involved in this matter;

(xi) hazard log detailing the need for the repairs to hatch lids and showing the completion of that task was not accessed or obtained;

(xii) the timing of the attendance to the outstanding action was not interrogated as to its reason – the tanks are not able to be worked on in such a fashion while in operation and the turnaround was required for the work to be done;

(xiii) contributing factor of fatigue in Mr Greaves, the number of shifts worked consecutively and the time sheets and pay slips for the deceased man which evidence WAS NOT available at the time of the Inquest;

(xiv) primary documentation to establish the hours and days of work of Mr Greaves from TIS;

(xv) interrogation of the safety and health management systems of TIS in relation to monitoring of safe hours of work policy;

(xvi) investigation of the training on and application of the safe hours of work policy by TIS supervisor Mr Skipper in relation to Mr Greaves and others including himself, both before and after the incident;

(xvii) flagging option in the Cardex system relating to entry to the QAL plant;

(xviii) incorrect identification that both companies were aware of Mr Greaves working in excess of the hours of work at the time of the incident;

(xix) no interviewing of witnesses regarding the issue of fatigue;

(xx) the rescue process was not investigated and so the important safety issues of access to the person inside the tank, the confined space procedures adopted in the rescue, the control of the rescue site in relation to the movement of personnel and the injury to the ambulance officer were not investigated or known of by the Department at all;

(xxi) determination of who the CEO of QAL was at the time of the incident and the organisational responsibility structure for contractor management.

Fatigue

163. In general, the approach of WPHS in relation to seeking expert advice is well established (for instance an engineering or machinery design issue) but was not considered necessary in this case as "fatigue is hard to prove" and it was not needed for the prosecution. WPHS Guidelines indicate that the Division does place some priority on this issue and there is some understanding within the Division of the issue of fatigue and its importance in workplace safety. The Inspector considered the issue of fatigue to be a contributing factor to the death of Mr Greaves.

164. The Inspector's impression was that in order to investigate the issue of fatigue in this matter that an expert would need to be engaged by the Department but the Department was unwilling to do that. So he did very little in relation to the fatigue issue at all. That effectively placed the coronial investigation in the position of having to advance the issue from a very low base of information and at a time remote from the incident. This was a very time consuming task to undertake.

165. Mr Beikoff who conducted the internal investigation for TIS was of the opinion that the investigation by WPHS was "lack lustre" and didn't explore as many avenues as it should have. He co-operated with the investigation and not only provided, but offered, various documentation to assist the Inspector. If a broader net had been cast over the deficiencies in procedures, Mr Beikoff thought that the Division could have provided recommendations to the company on areas for improvement. He questioned the level of knowledge in the Division regarding integrated safety management systems and risk management practices and highlighted the impact this lack of knowledge has on the quality of the investigations.

Results of Division's Approach

166. Inspector Brown conceded that the manner in which the investigation was undertaken and presented to the Coroner made it very difficult for the Coroner to conduct an appropriate inquiry. In fact, it is particularly difficult to have to attempt to reconstruct the matters that the investigation did not cover some years down the track, particularly in relation to witnesses trying to remember events with no statement from the time to refresh their memory.

167. In relation to the WPHS investigation and its role in safety, a number of issues arise. Inspector Brown gave evidence that a prosecution had an effect on safety by providing a general deterrence to industry as a whole in relation to breaching the legislation. It is interesting to note, however, that no safety alerts or notices to industry seem to have been

issued following the incident as would be the practice in other Departments (such as Mines) with a focus on safety. Safety Alerts or similar notices to industry as a whole help to keep issues such as falls from height in front of mind and to stimulate discussion on continuing to strive towards solutions of the issue.

168. Persons conducting investigation reports for the Coroner have a role in making recommendations for the consideration of the Coroner in relation to actions or approaches which might militate against similar deaths occurring in the future, or concerning matters which may affect public safety. Queensland Police Service investigators perform this function as a matter of course and, in general, such an approach is of significant assistance to Coroners. The WPHS Inspector in this matter did not make any recommendations of this nature. His evidence was that Departmental policy precludes him from expressing any opinion in his report or evidence.

169. One wonders at this approach given the unique position of the investigator and the insights which they might be able to offer to the Coronial process.

170. The Inspector gave evidence that Departmental policy also intruded on his ability to give complete evidence to Coroner's inquests. He told of being instructed by the legal section not to take all information to an Inquest before another Coroner in Rockhampton. Instead, he was provided with a brief letter to take to court by way of the report of WPHS to the Coroner. He did not feel comfortable with this situation and on questioning the policy was told that the information did not belong to him but the Department. He stated that the result of this situation was that it was very difficult to give complete and truthful evidence when all of the information relevant to the investigation is not able to be produced or, I infer, discussed. However, he never misled the Coroner, answering questions as fully as he could, and was forthright in notifying him of the position. This situation, if Mr Brown's version is correct, very unfairly places investigating inspectors in the situation that their competence and professionalism would be subject to substantial question through no fault of their own. The inspector further gave evidence that in that matter, a diving death, the Department did not consider or action the recommendations of the Coroner.

171. Witnesses were not immune to detriment by the Division's policies regarding the release of document. Following the interviewing on tape of various witnesses by the Inspector, the witnesses were not provided with a copy of the tape recording or transcript of the conversation. Inspector Brown gave evidence that the transcription of the interviews was outsourced. Once prepared, the expectation was that the inspectors would compare the transcript with the recording to ensure accuracy in the transcript. However, in practice, with many investigations ongoing at any one time, there was very little time for the inspector to do that. As a result, the transcripts in this matter were

quite flawed when presented to court in that they contained many inaccuracies, some of which were reasonably crucial. Mr Skipper applied to the Division for a copy of his statement prior to giving evidence. When he telephoned the Division, he was informed that the Division was refusing to release to him a copy of the transcript of his interview. He was advised that he needed to make an FOI application which would take 45 days to process. He was not given a copy of the recording following the interview. Had no opportunity to proof the transcript. The Division advised that the transcript should have been available by administrative release but a failure in the appropriate section to acknowledge this led to the present situation.

172. **That position is unacceptable.** A person giving an interview is, and should be, entitled to a copy of that interview. A copy should have been provided as matter of course to the witness without a request having to be made in the same fashion as other prosecuting authorities do.

173. The WPHS approach extended to the conduct of the Inquest. Despite various requests during Directions Hearings and in correspondence for WPHS to be present during the Inquest, the Division did not want to appear. There was a need for them to do so as the investigating authority, to provide assistance to the Coroner and to make submissions on recommendations, particularly as regards their own processes. Mr Jeha, a solicitor in the Rockhampton office, informed the court on the first day of the Inquest that "*The Director's position is at the moment is that he's of the view that there isn't a lot that the division can add during the course of the inquest itself so far as attending to, whether it be to cross-examine any of the witnesses or to add anything further in that sense as far as an appearance goes. He is - had indicated that if there's some other way that we can contribute to the inquest, he thought that - whether it be by way of submissions or some other way that we could address the issues of concern that are raised or if any issues of concern are raised during the investigation. His view of the ICAM report was that it didn't really add anything further than what the departmental investigation or conclusions".* (Transcript p31 lines 15-35) Further, Mr Jeha stated that "*certainly, resources are very tight with the division. However, it's been made clear by the Director that we will attend if there was any further issue for us, that meant that we should and what your Honour has said, fits within the categories of what I discussed with the Director this morning. It really was simply an attempt, if at all possible, to avoid the cost of appearing simply because resoursing is a really critical issue with the division at the moment and there may be those types of things that really impact upon the investigations that we conduct"* (Transcript Day 1 pages 28-43).

174. It is essential that the primary investigator be very involved in the Inquest process. In this case, the investigator had left the employ of the Division. In light of the issues at hand, there was consequently no means by which the Inquest could be informed of current policy or advancements in the area other than through representation of the

Division at the Inquest. Such a course would not have been necessary if the Division had co-operated in the process. Mr Jeha was very helpful during the coronial process within the confines of the policies of the Division. The helpfulness did not extend far beyond him. **The position of the Division was obstructive to the Coronial process, disrespectful to family of the deceased and did not honour their position as investigating authority in the matter.**

175. It could be argued that there is a need for transparency and independence in the coronial process which are critical for public confidence in the system and its goals. The proper and complete investigation processes accompanied by appropriate use of compulsive powers under the Coroner's Act are the means by which the legislature intended that the community be served in this process. The investigator is an essential element of the process.

176. In the present case, due to the shortcomings of the WPHS investigation and the failure of the Division to provide all documents in their possession, the Coroner was required to engage an independent expert in safety and health management systems in order to ascertain the extent of the systemic and organisational issues in the incident. This occasioned significant expense to the State Coroner's budget which would not have been necessary if a reasonable coronial investigation had taken place. If this situation was to continue then a funding arrangement including billing the Department charged with the responsibility to conduct the investigation may well have to be considered by the State Coroner.

177. As a result of the need for a more thorough analysis of the underlying issues in the matter, the Coroner required the parties by way of Notice to Produce under the Act, to provide all of the relevant documentation relating to all issues in the matter. Further, they were put to the task of preparation of statements for a number of witnesses who should have had statements taken by WPHS investigators during the course of the investigation. This put the parties to great expense and significantly delayed the Inquest due to the extensive nature of the documentation required to be produced, analysed by the independent expert and considered by the Coroner.

178. The initial information provided in the WPHS report left more questions opened than it answered in the view of Mr Reece, the Court Appointed Safety Management Expert. There is a need to ensure that inspectors have a degree of competence, and are trained in appropriate investigation techniques. The WPHS report indicated a lack of finishing off or questioning the import of the evidence gathered. There was a need to close the gaps in the information to give a complete picture of the incident. WPHS should have reference to the comments in David Reece's evidence on p95 of the transcript of Day 7 (line 20-60) as to what a nature and cause investigation should include.

179. It should be noted that Inspector Brown attempted to conduct a reasonable investigation within the policy constraints of the Division and taking into account the training, guidance and resources that were provided to him. It would have been virtually impossible for him to conduct a complete investigation from a coronial viewpoint within the Division's present culture.

180. If the Division is to maintain the curious position that the Police remain the primary investigators for the Coroner, then more senior QPS officers (trained investigators) are going to be needed to be allocated to coronial investigations. This approach would probably substantially delay, perhaps for some months, the release of the scene to WPHS in order for the Police to gather all relevant information in a timely fashion.

181. In relation to the present investigation, the Division of WPHS has demonstrated by its policies, particularly as they relate to the Coroner, its complete lack of placing any importance on the coronial system and the important role in safety played by the Coroner. **The approach of the Division to date is completely unacceptable and difficult to understand.**

Coronial Liaison Officer

182. However, the Division has moved in this area in an embryonic way by creating a position called Coronial Liaison Officer, effective from 1 October 2007. The position is not yet according any assistance to the coronial system and certainly had no impact on this matter. Mr Watson, for the Division, indicated at the Inquest that "the Department has come to realise that there needs to be a more expansive exploration of materials that a Coroner may wish to take into account" and the new position is the action taken to attempt to achieve this. It would seem that the position may have been created as a result of the recommendations recently made by the Queensland Ombudsman.

183. Mr Geraghty who presently acts in the position of the WPHS CLO gave evidence at the Inquest. He had at that time been in the position for 8 weeks. It had been held by two other people prior to him. Mr Geraghty holds the position of CLO due to his position as Manager of the Regional Service Branch in the Division. At the time of the inquest, Mr Geraghty was not allocating any time to the position of CLO. He advised that in an ideal situation of full staffing, he would expect to give 20-25 percent of his time to the role of CLO.

184. Mr Geraghty reflected the already detailed Divisional attitude to the role of the Division's inspectors in the investigation process, preferring the view that the Police retain the role of primary investigators in this setting. He relied heavily on the Memorandum of Understanding (MOU) between the QPS and the Division as delineating the responsibilities in the investigation. My understanding of the MOU is rather that it provides for the sharing of information between the

services and does not extend into demarcation of responsibilities between the agencies in relation to the Coroner. The document would certainly have greater utility if it did.

185. It is fair to say that the position had not been developed at the time of the Inquest in any practical way at all. Mr Geraghty had very little accurate understanding of the coronial process. He had no training on the Coroners Act and was virtually totally unfamiliar with the Act. I find this a quite extraordinary situation. Significant training and or familiarisation with the Act is necessary for the person in that role.

186. He advised that a new principal adviser was coming to his section in the week following the Inquest who would assist in conducting a comprehensive review of reports already delivered to Coroners to ensure that they were sufficient for purpose. There was to be no focus in that review on the investigations presently underway to ensure that they were completed in an appropriate way for coronial purposes. As has been seen in the present matter, it may be too late to attempt to boost the quality of the investigation after the event. There will hopefully be significant consultation with the State Coroner on this issue.

ACCIDENT INVESTIGATION METHODOLOGY

187. Mr Reece, a Safety Systems expert, gave evidence during the Inquest. He particularly commented on the importance of using an accident investigation methodology in an investigation such as this. Those factors include discovering the connection between the deeper contributing factors that caused the failure which led to the incident through focusing on the nature and cause of the incident. Looking at fault, he said, was a separate issue. The use of such investigation methods lead to identifying appropriate corrective actions to avoid a similar incident in the future across industry. When an incident occurs within a complex organisational structure with safety and health management systems, such an investigation is vital in identifying all contributing factors of the incident.

INDUSTRY WIDE ISSUES

188. There is a difficulty which has arisen in relation to the application of fatigue management policies to a mobile workforce. Where contractor companies work across sites broader fatigue management issues arise with workers working across a number of sites in industry. Mr Reece acknowledged this issue in his evidence. I will detail shortly the way in which QAL are dealing with this matter.

REECE REPORT CONCLUSIONS AND RECOMMENDATIONS

189. Mr Reece's evidence and determination and examination of the contributing factors to this incident was of great assistance in my

deliberations. His recommendations were confined to four distinct areas:

(a) the design of the settler tanks regarding hatches which open;

(b) barriers and barricades around voids;

(c) workplace management particularly in relation to multiple organisations operating on the one site;

(d) a lack of consistency across documentation and policy between those organisations which could be addressed through a single consistent safety management system;

(e) fatigue management which can be addressed through hours of work planning and monitoring;

(f) consistent fatigue management practices and systems.

I consider all of these issues highly relevant in examining how to prevent similar occurrences in the future.

CHANGES SINCE THE INCIDENT

190. There have been many remedial actions taken by both companies involved in this incident which are to be commended. To the extent that issues arising from this incident have been adequately dealt with by remedial action, I do not intend to make recommendations on those issues.

Hatch Security

191. Following the incident, QAL conducted an audit of all hatches on tanks and those that were not secured and had bars inserted as fall protection were fully welded shut. Further, a review of all hatches on site was conducted to ensure compliance with the engineering hatch standard. The standard also governs design of future hatches.

Barricades

192. Mr Dennien gave evidence that since this incident there is a much greater emphasis on barricading holes, not only physically but in a cultural sense of making people aware of the hazard of fall from height when opening up holes on tanks. Scaffold cordons are used routinely on the tanks. Mr Dennien highlighted the need for the barricades to be erected before the hole was created to protect those performing that function as well as others who may later work in the area.

Clear Access to Tanks

193. At the time of the incident, there was no policy or practice to regularly clear the tank doors of scale and mud. They would be cleared if a blockage was noted during the descale process but not otherwise. Since the incident, when the de-scaling operation is in process, bobcats are used on a regular basis to clear away the build up at the doors at the bottom of the tanks although no formal policy exists to this effect.

Management of Hours of Work – Fatigue

194. The Cardex system has been adjusted to send a report if a person is on site for 13 consecutive days. This number of days was arrived at after consultation with the unions who are involved in the QAL Gladstone site.

195. Fatigue research indicates that "*in order to minimise the overall risk on a shift system (of fatigue in workers) we need to consider the number of consecutive night shifts, the length of the night shifts and the provision of breaks within them*". The study by Folkard and Tucker from the University of Wales titled ***"Shift Work , safety and productivity"*** in the Oxford Journal of Occupational Medicine 2003 Volume 53 pp 95-101 analysed seven other study findings and reported "*consistent trends in risk (of both accident and injuries) over successive shifts…On average, risk was 6% higher on the second night, 17% higher on the third night and 36% higher on the fourth night than on the first night.*" A similar although smaller trend has been noted in relation to day shifts. The study found that "*on average risk was 2% higher on the second day, 7% higher on the third day, and 17% higher on the fourth day than on the first shift*."

196. The issue of the mandatory allocation of 13 consecutive day's attendance recorded in Cardex triggering further investigation requires further attention in my view. QAL employees are not subject to rosters of this duration and the issue would relate mainly to contractors. In the circumstances of this matter where, despite apparent policies being in place in the contractor company, there was effectively no monitoring of the number of consecutive shifts allocated to any workers. In such circumstances, QAL needs to guard against incompetence or poor policies in contractor companies and provide the appropriate protections in this regard in their own systems.

Contractor Management

197. Since the incident the Contractor Management System has been revamped to develop a new process of managing contracts including the implementation of an audit program. An upfront (during the tender process) identification of high risk activities was a critical part of the change to that process according to Mr Greenhalgh. A number of

contractors, particularly those performing high risk tasks, have also adopted and implemented the QSafe program used by QAL which is a behaviour based safety program which they implemented in 2000. This was the program referred to earlier described by Mr Dennien relating to the peer on peer safety observations.

198. QAL have, since the incident, changed the safe access permit. The work area owners (the relevant operating section) must inspect the area for work with the contractor and through a pre-task risk assessment, identify the hazards and appropriate controls which are then incorporated into the work permit. This regularises the procedure previously covered by the housekeeping procedure.

Work at Heights Incidents

199. QAL and contractors have significantly decreased work-at-height incidents on site through early identification of hazards and putting controls in place before work commences and documenting those processes in a very detailed manner. Strong disciplinary consequences for breaches of the procedures have also been put in place. WPHS have audited the new process and have commented positively on it.

Audits

200. QAL submits itself to invited audits from WPHS in order to gain feedback on the systems in place.

Worker Mobility and Hours of Work

201. QAL is collaborating with other major industries in Gladstone to establish a contractor induction centre for the region with a view to a nationally recognised accreditation by way of a pre-qualification (including tickets and inductions) being established before working on a participating site. This excellent initiative seeks to address the issues related to problems of monitoring fatigue and work hours in contractors working on multiple sites. **I consider this a major initiative and applaud QAL and its partners for their endeavours.**

Consistency of Procedures with Contractors

202. Whilst TIS was still on site at QAL, both companies adopted a new JSA procedure at commencement of all shifts. Mr McDonald gave evidence that the new procedure had resulted in the identification of additional risks not previously identified. Further, TIS implemented a computerised system to ensure hazard identification on job tasks and to monitor rectification of those hazards. The system stores and ensures regular updates on the SOPs and other policies.

TIS Systemic Issues

203. TIS introduced a number of initiatives to improve safety, particularly the Client Risk Assessment Management Plan (CRAMP) and the National Integrated Management System (NIMS), workplace inspection checklists, competency based training on work procedures for workers and supervisors and improved supervision of supervisors. There has been an increased focus on the importance of toolbox meetings which are not documented, signed off on by workers and audited. A fatigue management safe operating procedure has bee introduced. They have also worked on the safety culture within the organisation. All extreme or high risk potential incidents in the company are investigated using the ICAM method. A Business Unit Risk Register has also been introduced which records all risks and control measures.

204. TIS now have temporary barricades and harness systems available on site which can be used by all workers as a matter of course.

205. The Safe Hours of Work procedure was reviewed during or following the Inquest. In relation to 12 hour shift rosters, it requires no more than 6 shifts in a 7 day period. Consider that this policy in full should be reviewed with the assistance of a fatigue expert to ensure that safety is a primary focus in the policy. The review is a good sign that the policy is being moved forward since this incident but coming off a low base, the company needs to be careful that some improvement is not seen as the best improvement.

Training

206. TIS have sought national recognition for their hydroblasting training program as no formal mandated program presently exists. National recognition of an appropriate competency based intensive training program would move safety forward in this high risk area of work.

FINDINGS AS TO THE DEATH

207. The immediate cause of the fatality of Mr Greaves was a fall from height at the Queensland Alumina Ltd plant in Gladstone whilst he was employed by Transpacific Industrial Services. The root cause of the incident was a failure to secure Hatch A on Settler tank no. 6 and the absence of use of barricades, harnesses or restraints in order to protect Mr Greaves against a risk of a fall from height through the void of the open hatch. The fact that the incident occurred at night in a minimal lighting situation which was compounded by shadowy areas on the tank top should be noted.

208. It is fair to say that at the time of the incident, Transpacific Industrial Services workers thought that adequate controls were in place for the hazard arising from open hatches. The primary controls that were used were that the area was flagged off to prevent any outside persons

entering the area and the hatch lids were replaced when work was completed and before a crew left the area. There seemed little appreciation that the hole was a hazard for the workers specifically as they felt that their knowledge that the hole was there was sufficient to guard against them succumbing to the risk. The difficulties with the lids staying on during blasting and the need to access the tank on this particular job meant that the hatches were left open from time to time. In that circumstance, the only realistic controls would have been hard barricades or harness restraint for the workers.

209. Fatigue was, on the balance of probabilities, certainly a contributing factor in this incident. Mr Greaves had, by any standard, worked an excessive amount of consecutive 12 hour shifts (25 or 26). He was permitted or requested to do this by a Supervisor at TIS who either ignored or was unaware of the Safe Hours of Work policy the company had in place. This working regime would certainly have placed Mr Greaves at greater and significant risk of fatigue at work. The effects of fatigue are well documented. It is apparent from the facts that it is likely that Mr Greaves either tripped near the hatch or merely forgot that the open hatch was there and fell into it. Such inattention to detail or loss of concentration is typical of the effects of fatigue. The fall to the base of the tank was 12 metres and the injuries sustained were fatal.

210. The rescue of Mr Greaves highlighted various deficiencies or potential issues which would have impacted more heavily on this matter in the event that Mr Greaves had survived the fall. The risks to rescue workers were real, particularly in relation to the entry of a confined space and the nature of the contents of the tank.

211. ***I FIND that the deceased man was Colin Arthur GREAVES who died on 17th July 2005 from multiple injuries sustained when he fell through an open hatch on the top of Settler tank 6 at the Queensland Alumina Ltd plant at Gladstone.***

RECOMMENDATIONS

212. I make the following comments by way of recommendations pursuant to section 46 of the Coroners' Act to prevent a similar occurrence in the future and in the interests of public safety. To the extent that the parties have already taken remedial action, the court expects that those actions are bona fide and implemented long term.

Recommendation 1

That Queensland Alumina Ltd perform regular and proactive monitoring of the level of lighting on tanks and implement a maintenance regime to ensure optimum lighting, particularly at night.

Recommendation 2

That Queensland Alumina Ltd consult with fatigue expert/s regarding the safe and optimal length of shifts/rosters and the number of consecutive shifts for the purposes of identifying the marker which should be fixed in the Cardex system to show incidents of excessive shift performance and to ensure that the fatigue management system provides for safe working hours.

Recommendation 3

That Queensland Alumina Ltd implement a formal policy regarding the clearing of scale and mud from doors on Settler tanks in order to provide clear access to the base of the settler tanks.

Recommendation 4

That Queensland Alumina Ltd conduct a thorough review of risk assessment procedures involved in emergency response, especially in regard to entering confined spaces.

Recommendation 5

That Queensland Alumina Ltd ensure that all workers are able to quickly and efficiently enter items on the hazard log and that workers be trained in that process.

Recommendation 6

That Transpacific Industrial Services review the Safe Hours of Work and Fatigue Management policies with the assistance of a fatigue expert to ensure that safe and optimal length and number of consecutive shifts are implemented having proper regard to safety.

Recommendation 7

That Industry Training Bodies develop or certify an appropriate competency based, specific and detailed hydroblasting training course.

Recommendation 8

That Industry Training Bodies consider initiating a requirement that managers charged with the responsibility of developing or implementing safety and health management systems undertake competency based training regarding such systems.

Recommendation 9

That Industry in Gladstone consult and implement a process to monitor contract workers' shifts from site to site with a view to ensuring that fatigue

management policies regarding safe work hours are complied with in the environment of worker mobility.

Recommendation 10

That the Division of Workplace Health and Safety in conjunction with the State Coroner expeditiously review the role of the Division in the coronial process with a view to consolidation of the Division's responsibilities as primary investigators for Coroners.

Recommendation 11

The State Coroner give consideration to recommending amendments to the *Workplace Heath and Safety Act 1995* and the *Coroners Act 2003* to formalise the responsibility of the Workplace Health and Safety Division to conduct coronial investigations in a similar way that the Queensland Police Service and other regulatory investigators have such a responsibility.

Recommendation 12

That the Division of Workplace Health and Safety in conjunction with the State Coroner expeditiously establish requirements for Division Inspectors in a fatality investigation for a Coroner including the matters to be addressed in investigation reports and ensure that appropriate training of inspectors be provided in those issues. Consideration should be given to the approval of inspectors to make recommendations relevant to matters under section 46 of the Coroners Act in their reports.

Recommendation 13

That the Division of Workplace Health and Safety in conjunction with the State Coroner expeditiously develop a protocol for communication between the Investigator and the Coroner early and during the course of the investigation to identify the scope of the investigation including a commitment by the Division to compliance with the appropriate requests of the Coroner where that might exceed the parameters of a prosecution investigation.

Recommendation 14

That the Division of Workplace Health and Safety provide or facilitate training for all investigators in safety management systems, risk management practices, and root cause analysis methods such as the ICAM process to enable investigators to include such an analysis in appropriate investigation reports.

Recommendation 15

That the Division of Workplace Health and Safety give consideration to the experience of inspectors in the industry in which an investigation takes place when allocating investigations to inspectors.

Recommendation 16

That the Division of Workplace Health and Safety in promotion of its role in community safety ensure substantial communication by the Division of the relevant issues resulting from investigations to industry and encourage industry organisations and employers to implement controls in relation to such issues.

Recommendation 17

That the Division of Workplace Health and Safety and the Queensland Police Service, in consultation with the State Coroner, ensure that the Memorandum of Understanding relating to coronial investigations clearly delineates the responsibilities of each organisation for various elements of the investigation.

Delivered by:

A M Hennessy
Coroner
14/8/08