Findings of the inquest into the death of Rodney Joseph Fiechtner

The Coroners Act 1958 provides in s43(1) that after considering all of the evidence given before a coroner at an inquest, the coroner shall give his or her findings in open court. What follows are my findings in the inquest held into the death of Rodney Joseph Fiechtner.

Introduction

On the morning of 7 April 2003, the drilling crew working on the Myall Creek No.8 well in the Surat Basin, were nearing the end of their task. The well, which was begun on 22 March, had been drilled to total depth, the casing had been cemented in place and the production tubing through which the gas would flow had been inserted in the well. The final job was to install the production tubing hanger which would seal the well until it was connected to the distribution system. The crew could then install a device called a Christmas tree, dismantle their rig, and move on to the next well.

The hanger installation was completed without any apparent problems and the dismantling of the rig, or "*nippling down*" as it is called in the industry, commenced. Suddenly, and without any warning, an uncontrolled release of natural gas enveloped the lower part of the rig in a white cloud. Seconds later, a fiery explosion engulfed the area. When the initial fireball subsided, three men were found to have been badly injured. One of them, Rodney Fiechtner, died later that day. These findings seek to explain how the accident occurred and recommend changes to industry practice aimed at reducing the likelihood of similar incidents occurring in future.

The Coroner's jurisdiction

Before turning to the evidence, I will say something about the nature of the coronial jurisdiction.

The basis of the jurisdiction

Although the inquest was held in 2004, as the death being investigated occurred before 1 December 2003, the date on which the *Coroners Act 2003* was proclaimed, it is a "*pre-commencement death*" within the terms of s100 of that Act and the provisions of the *Coroners Act 1958* (the Act) are therefore preserved in relation to it.

Because the police officer who attended the accident scene considered the death to be "*a violent or unnatural death"* within the terms of s7(1)(a)(i) of the Act, he was obliged by s12(1) to report it to a coroner. Section 7(1) confers jurisdiction on a coroner to investigate such a death and s7B authorises the holding of an inquest into it.

The scope of the Coroner's inquiry and findings

A coroner has jurisdiction to inquire into the cause and the circumstances of a reportable death.

The Act, in s24, provides that where an inquest is held, it shall be for the purpose of establishing as far as practicable:-

- the fact that a person has died,
- the identity of the deceased,
- when, where and how the death occurred, and
- whether anyone should be charged with a criminal offence alleging he/she caused the death.

After considering all of the evidence presented at the inquest, findings must be given in relation to each of those matters to the extent that they are able to be proved.

An inquest is not a trial between opposing parties but an inquiry into the death. In a leading English case it was described in this way:-

> *It is an inquisitorial process, a process of investigation quite unlike a criminal trial where the prosecutor accuses and the accused defends… The function of an inquest is to seek out and record as many of the facts concerning the death as the public interest requires.* [1]

The focus is on discovering what happened, not on ascribing guilt, attributing blame or apportioning liability. The purpose is to inform the family and the public of how the death occurred with a view to reducing the likelihood of similar deaths. As a result, the Act authorises a coroner to make preventive recommendations[2], referred to as "*riders*" but prohibits findings being framed in a way that appears to determine questions of civil liability or suggests a person is guilty of any criminal offence.[3]

The admissibility of evidence and the standard of proof

Proceedings in a coroner's court are not bound by the rules of evidence because s34 of the Act provides that "*the coroner may admit any evidence the coroner thinks fit"* provided the coroner considers it necessary to establish any of the matters within the scope of the inquest.

This flexibility has been explained as a consequence of an inquest being a fact-finding exercise rather than a means of apportioning guilt: an inquiry rather than a trial.[4]

A coroner should apply the civil standard of proof, namely the balance of probabilities, but the approach referred to as the *Briginshaw sliding scale* is

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[1] *R v South London Coroner; ex parte Thompson* (1982) 126 S.J. 625
[2] s43(5)
[3] s43(6)
[4] *R v South London Coroner; ex parte Thompson* per Lord Lane CJ, (1982) 126 S.J. 625

applicable.[5] This means that the more significant the issue to be determined, the more serious an allegation or the more inherently unlikely an occurrence, the clearer and more persuasive the evidence needed for the trier of fact to be sufficiently satisfied that it has been proven to the civil standard.[6]

It is also clear that a coroner is obliged to comply with the rules of natural justice and to act judicially.[7]This means that no findings adverse to the interest of any party may be made without that party first being given a right to be heard in opposition to that finding. As *Annetts v McCann*[8] makes clear that includes being given an opportunity to make submissions against findings that might be damaging to the reputation of any individual or organisation.

The investigation

Soon after the explosion occurred and Mr Fiechtner and the other injured workers had been taken to the Surat Hospital, the accident was reported to police. An officer attended the scene but did little more than secure the site before handing over responsibility for the investigation to the Department of Natural Resources and Mines (the DNR&M). The Department's Regional Inspector – Petroleum and Gas, Mr Brendan Galloway, went immediately to the site and took control of the emergency response aimed at rendering the site safe.

The next day the investigation commenced. The investigation included all of those at the rig at the time of the accident being interviewed along with relevant drilling rig company employees and leaseholder employees involved in the planning of the well. Expert opinions were obtained from various mining and metallurgy specialists and the distributors of key components of the wellhead. These inquiries culminated in the production of an investigation report dated 28 November 2003 which contained 13 recommendations aimed at reducing the likelihood of similar accidents occurring in future.

The inquest

A directions hearing was held on 2 June 2004. Mr Tate of Crown Law was appointed counsel assisting. Leave to appear was granted to the family of Rodney Fiechtner, Century Resources - a division of Downer EDI Group Limited, and Origin Energy Limited, formerly Oil Company of Australia, at the time of the accident. A view of a rig similar to that used to drill well number 8 was undertaken by the court on 19 August 2004 to assist it gain an understanding of how this equipment operated and an appreciation of the lay out of a lease. Hearings were then held over 5 consecutive days commencing on 6 September 2004 during which 22 people gave evidence and 79 exhibits were tendered – a further 4 were tendered today.

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[5] *Anderson v Blashki* [1993] 2 VR 89 at 96 per Gobbo J
[6] Briginshaw v Briginshaw (1938) 60 CLR 336 at 361 per Sir Owen Dixon J
[7] *Harmsworth v State Coroner* [1989] VR 989 at 994 and see a useful discussion of the issue in Freckelton I., "Inquest Law" in *The inquest handbook*, Selby H., Federation Press, 1998 at 13
[8] (1990) 65 ALJR 167 at 168

At the conclusion of the evidence, those granted leave to appear were invited to make submissions concerning recommendations aimed at reducing the likelihood of similar accidents. I understand the representatives of OCA and Century Resources met with officers from the regulator – the DNR&M – and the three parties came to a consensus on the suggested recommendations that were tendered as exhibit 80 this afternoon. I'll indicate my response to the substance of those recommendations in due course but at this stage I want to acknowledge the merits of the process which seems to me to be consistent with the new regulatory approach contained in the recently enacted *Petroleum and Gas (Production and Safety) Act 2004.* That Act, when dealing with safety, moves away from the punitive, prescriptive approach that has been shown in a number of intrinsically dangerous industries to be not particularly effective and instead seeks to provide a framework based around safety management plans custom designed for each workplace. Self regulation has also had its critics. The new Act seems to contain a hybrid regime with a combination of broad mandatory safety obligations combined with hazard identification and reduction regulations and a risk management approach that requires operators to demonstrate how they will address those hazards. All parties are to be congratulated for embracing this new approach in an effort to address the deficiencies identified by this investigation

The evidence

I turn now to the evidence. I can not, of course, even summarise all of the information contained in the exhibits and transcript but I consider it appropriate to record in these reasons the evidence I believe is necessary to understand the findings I have made.

The well was commenced on 22 March 2003. Although approximately 5 days were lost when a piece of equipment was accidentally dropped into the bore hole, this seems to have had no impact on the course of events and drilling proceeded without further incident until the desired depth was reached on 6 April 2003. The crew then had a number of jobs to do before they could quit the site.

First, they had to run to the bottom of the well the tubing that would carry the gas to the surface when the well was connected to the gas-gathering network. This is called production tubing. While it is being run into the hole, the gas is allowed to escape around the outside of the tubing and through a line connected to the well head structure - a blooey line via a device called a rams blow out preventer (BOP) that has valves that can regulate sudden surges in gas pressure.

Next, when sufficient production tubing is run into the well it needs to be secured in place and another system of valves that will enable the well to be connected to the gas-gathering network – a Christmas tree - is installed in place of the BOPs.

The production tubing is suspended in the well bore from a device that is screwed to the upper most end of it – the production tubing hanger. The hanger fits snugly in a tapered bowl or spool in the well head. Six tie down

bolts or locking screws prevent the tubing and hanger from lifting out of the well head and activate a seal on the hanger which closes the gap between the hanger and the well head leaving the aperture of the production tubing as the only route for gas to exit the well. However, at this stage of the process, that passage is also blocked by a plug fitted to the bottom of the production tubing, meaning that from the time the production tubing hanger is landed, the pressure in the well is shut in and begins to rise.

I am persuaded by the evidence of Mr Davis from SIMTARS and the report from ETRS that none of the six tie down bolts was fully engaged, that only three were engaged to any extent and that none of them was wound in more than 50% of the required distance. This allowed the production tubing hanger and the tubing connected to it to be forced up out of the well head when the gas pressure built up sufficiently to overcome the weight of the production tubing string and the limited effect of the partly engaged bolts, resulting in the sudden, uncontrolled escape of gas from the well. It came into contact with sufficient heat to ignite and the explosion occurred.

The crucial questions for this inquiry are how was the gas allowed to escape and what was the source of the ignition. The search for the answers requires a more detailed examination of the events leading up to the explosion.

The shift on which the accident occurred commenced at midnight on 6 April. Just prior to the crew commencing work, there was the usual safety meeting at which the men discussed the work that was scheduled to be undertaken on that shift. Directions in relation to this work were given to them by Mr Seaton Porter, the rig supervisor, who is also referred to as the drilling supervisor or the company man because he is employed by the leaseholder company to ensure that the operations are undertaken in accordance with the drilling agreement. Also present was the rig manager or tool pusher, Mr Fiechtner who was the senior person from the drilling company.

Mr Porter told the crew that they were to continue inserting the production tubing into the well and that he was to be called just before that process was completed so that he could oversee in the installation of the tubing hanger. There are no records of what else was told to the men on this occasion because the minutes of the meeting were destroyed by the accident but the witnesses recall being told such things as the need to ensure that they kept their hands away from the hydraulic clamps – tongs – that were to be used to screw together the lengths of tubing, the need to wear ear muffs and how to minimise the risk of injury while lifting the slips etcetera. These safety instructions were given with reference to Job Safety Analyses that had been developed prior to the well being commenced. None of the participants recalls any mention being made of any particular risks associated with the installation of the production tubing hanger and/or the engaging of the tie down bolts, which is consistent with there being no Job Safety Analysis for those particular tasks.

At about 5.00am, Mr Porter was called to the rig floor in accordance with his request that he be there when it came time to land the hanger. Mr Fiechtner was also present supervising the work.

Evidence was given that there was some disagreement between Mr Fiechtner and Mr Porter as to the appropriate procedure to fit the hanger to the production tubing and how to cause it to pass through the equipment above its eventual seat in the wellhead spool. There was also departure from the planned installation when it was discovered the back pressure value that was to be fitted into the top of the production tubing string was of the wrong size. None was therefore fitted. It is clear that this did not contribute to the accident. It is less clear whether it says anything about the management of the project.

Three indicators were used to confirm that the tubing hanger was correctly seated in the well head spool:-

- A measurement was taken of the distance from the hanger seat to the rig floor head before the last length of tubing was run into the hole. That distance is marked on the tubing screwed in above the hanger. The hanger is known to be seated when the marking corresponds with the rig floor.

- When the tubing string is suspended by the derrick that is used to run it into the hole, its weight can be seen on a weight gauge on the drillers console on the rig floor. When the hanger is seated, the reading on the gauge drops by the weight of the production tubing string.

- Until the tubing hanger is landed, the gas passes through the vent in the BOPS to a flare line. When the hanger fits into the spool in the wellhead, the flow of gas is blocked and the flame at the end of the flare line is extinguished.

The landing of the hanger appeared to proceed uneventfully and two of the rig workers were told to screw in the tie down bolts that would secure the hanger and tubing in place. There was some disagreement in the evidence about how and/or by whom this direction was given but in my view nothing turns on that.

The suppliers of the hanger gave limited directions in their trade brochure as to how this process was to be done. The instructions were simply to "*run in all the tubing head lockscrews in an alternating cross pattern to refusal."* However, there is no evidence that any of the workers on this rig had seen that material.

Indeed, neither of the workers detailed to undertake that task in this case had been given any specific instructions on how this was to be done and one of them had done it only once before. The other worker had installed hangers on previous occasions but always on wells using a different drilling system and, he said, using a hanger that looked different for the one used in this case. There was no JSA or standard operating procedure for this task and none of

the witnesses recalled the process or its risks being discussed at the safety meeting before the shift commenced.

However both workers gave evidence that they believed that they had screwed in all the bolts as far as they could go. There were no special spanners or tools used for this task and they merely used what was to hand. One of those workers said they used a spanner that was about six inches long to adjust the tie down bolts. They appear to have recognised that the packing or locking nuts had to be unscrewed before the tie down bolts could be adequately advanced but they did not measure or in any other way systematically gauge how far the tie down bolts were advanced as a result of their actions, although the more experienced of the two said he had a look at the three tie downs bolts worked on by his colleague, compared them to the ones he'd tightened and considered that all of the bolts appeared to be wound all the way in. As we now know, none of the tie down bolts was more then half way in and so these observations could not have provided any useful information.

There was some evidence before the inquest as to how this fatal error came about but none of it is in my view conclusive. For example, the SIMTARS report and video indicates that when the relevant components were examined under the supervision of Mr Davis all of the locking screws could be advanced to some extent, although none to the full extent. This led Mr Davis to conclude that the tie down bolts had not been sufficiently tightened simply due to a lack of the application of appropriate force by the workers who undertook this task. The fact that none of them was fully wound in led him to suggest that the fault was unlikely to have been caused by cuttings and debris clogging the thread. The difficulty with this evidence is that these tests were conducted after the components had been subjected to the very high temperatures of the prolonged well fire, exposed to the caustic effects of the chemicals used to bring the fire under control and then left to sit for a number of months.

Various witnesses who have a collective experience of many decades in the industry and a rudimentary survey undertaken by the investigator failed to identify any previous occasion when this failure had occurred. The distributor of the components said that the same or a similar system had been successfully used in the drilling industry for nearly 100 years. The initially high probative value of this evidence is reduced when it is recognised that the fault is unlikely to have been identified unless it caused a problem and that in almost all cases (including this one) the tie down bolts are only crucial to the integrity of the well until the adaptor flange to which the Christmas tree is bolted is fixed to the well head. Even in this case, with none of the bolts properly engaged, the shut in pressure was maintained for approximately 5 hours. The sad irony (so typical of so many coroners' cases) is that had it not been for a meal break and the delay caused by splitting the two BOPs, it is unlikely that the fault would have manifested itself in this case.

Before the section of the well head in which the tie down bolts fit was installed, it was checked and seemed to be in order, although this checking did not involve the tie down bolts being run all the way in. Before the

production tubing was run into the well the bolts were screwed out so as to avoid damage to them, the tubing or hanger seal. While this suggests that the threads were functional it doesn't necessarily demonstrate that the bolts could be wound all the way in. On the other hand it seems inherently unlikely that there was some flaw to the thread of all six bolts that allowed them to be screwed out but not in.

While it is possible that the tie down bolts were inadvertently unwound during the rigging down process, when it is realised that most of that work was done by at least one of the workers who had just previously wound them in and that much of it occurred under the watch of other senior workers, I am of the view that this possibility can be discounted.

By using a small spanner the rig workers who attempted to tie in the hanger very significantly reduced their ability to overcome any resistance to the screws being advanced "*to refusal*" – the subjective and qualitative, imprecise object of their task. The use of such a small tool is in stark contrast to the example provided by a technician employed by the distributor who, during a view at the company's premises demonstrated how, when he did the same job, he habitually used a 24 inch ratchet socket that would obviously bring far greater force to bear on the screws. Coupled with their relative inexperience and lack of appreciation of the significance of their task, it may be that the workers simply failed to apply sufficient force to the tie down screws to result in them overcoming any grit that was in the thread and properly engaging with the tapered shoulder of the production tubing hanger. However, having regard to the significance of such a finding, I consider I have insufficient evidence to be satisfied to the required standard to enable me to decide the point and therefore, somewhat unsatisfactorily, I leave it open.

In his statements to the investigator Mr Porter said that no one told him that there had been any difficulty in engaging these tie down bolts so he assumed it had been done correctly. In evidence at the inquest he said he was told by one of the drillers that it had been done. Neither Mr Porter nor Mr Fiechtner checked to see whether the tie down bolts were properly engaged.

This could have been done by measuring the distance the stubs of the tie down bolts protruded from the well head before and after tightening, counting the number of times each bolt was turned during tightening or looking down from the rig floor through the annular preventer and the rams BOP to sight the ends of the tied down bolts on the tapered shoulder of the tubing hanger.

Mr Porter gave evidence that he did not consider it his job to supervise the installation of the tie down bolts although he conceded that it was his practice to check that they were properly engaged before the Christmas tree was put on the stack after the BOPs were removed when access to that part of the well head was easier. However, in this case that stage was not reached before the explosion.

Considerable evidence was received about the division of management responsibility between the leaseholder's representative on site and the drilling

contractor's senior employee on site. Whose job was it to ensure that the tie down bolts were properly engaged?

On one analysis, it can be argued that as the driller contracts to drill and complete the well and supply employees sufficiently experienced and competent to do so "*in a good and workman like manner"*, its senior person is legally responsible for ensuring that all of the components are properly assembled. Further, Century's HS&E Manual specifies that the rig manager is responsible for "*(E)nsuring the health and safety of all personnel under his control is never compromised.*", and for the "*(P)rovision of ongoing training on sites to ensure all employees have the skills and knowledge to carry out assigned tasks in a safe and productive manner.*"[9]

On the other hand the contract between the leaseholder and the rig supervisor stipulates that it is the rig supervisor's "*responsibility to ensure all personnel engaged in the drilling operations do so in a safe and cost efficient manner."* The rig supervisor is also responsible for adherence to the safety management plan and the execution of the approved drilling programme. All but one of the witnesses who had experience working as a company man gave evidence that they considered the person in that role was responsible for ensuring the hanger was properly landed and secured. Mr Porter also indicated that it was his practice to check that this had occurred. However he didn't do this as or immediately after the hanger was landed, but later in proceedings when there was more room around the well head.

The situation might best be summed up by a reference in the SMP which says it is the responsibility of the rig manger to work with the rig supervisor to ensure all aspects of the SMP are carried out.[10] In this case it seems that neither took sufficient steps to ensure that:-

- the crew was aware of the safety ramifications of the locking screws;
- the crew was given the appropriate tools to use;
- the crew was adequately supervised while the job was being done; or
- adequate checks were made after it had been done.

It would be wrong, however, to conclude that all responsibility for these failures should rest with Messrs Porter and Fiechtner. Other senior officers of both companies had ample earlier opportunities to detect the potential for a problem to arise in this aspect of the project. The drilling contractor agreed to adhere to the leaseholder's safety management plan when undertaking the work stipulated in the leaseholders drilling program. In compliance with this obligation, the driller's JSAs were appended to the SMP. The landing of the hanger and the running in of the tie down bolts were listed in the drilling program as tasks to be undertaken by the driller. [11] Yet, while the list of JSAs indicates such innocuous jobs as "How to fill a grease gun" have been analysed to address and identify risks, no mention is made of the landing and securing of the hanger.[12]

[9] Century Resources HS&E Manual section 1.5
[10] exhibit 66 p10
[11] see exhibit 65 p21
[12] exhibit 66 appendix 4

After the hanger was landed at about 6.00am the crew went to breakfast.

After breakfast the dismantling of the rig commenced. The rotating head, and various flare lines were removed. Next, the annular preventer was removed from the well head stack by unbolting it from the rams BOP. There was some inconsistency in the evidence as to whether these two items were usually separately removed from the well head, or whether this happened on this occasion because the annular preventer needed work or was to be transferred to another rig. Whatever the reason, the splitting of the two components delayed the installation of the Christmas tree which would have prevented the uncontrolled release of gas. However, the rigging crew, being unaware that the tie down bolts were not properly engaged, had no reason to be concerned by any such delay.

Two workers then commenced to unbolt the rams BOP from the well head. This required them to climb down into the cellar, a pit about a metre and half deep and a metre and half square, in which the well head is situated. As they were proceeding to undo the numerous bolts connecting the rams to the well head the gas release occurred at about 11.15am.

One of those workers, Matthew Boyle described it this way:-

> *"(F)rom what I recall there was just a massive explosion. One minute I was hitting the spanner and the next minute the gas coming out of the well hit me in the left side of the head. By explosion I mean that there was a very loud noise which was the release of gas from the well. I remember I held my breath because I was being engulfed by gas. I remember being knocked backwards first and then trying to go forward. I realised that I couldn't go forward so I turned to my left. I couldn't go forward because that's where the gas was. I then tried to climb out of the cellar but I couldn't. While trying to get out of the cellar my shirt was blown completely off my body over my head."*[13]

Mr Boyle managed to clamber out of the cellar and ran from the well head. He managed to cover about 30 metres before the gas ignited. He described that aspect of the disaster this way:-

> *'I managed to walk or run about 30 metres before the gas erupted into flames. I was thrown to the ground when it erupted from the shock wave. I felt my left arm snap even more when I went to the ground and I felt the flames go over my back. I felt a massive burning sensation over my back. I screamed at the pain… I was laying on the ground for 3 or 4 seconds and after the fireball had gone past me I looked around and saw a massive fireball and I thought, what the hell was going on."*[14]

[13] exhibit 12 para 27 and 28
[14] exhibit 12 para 30 and 31

The other rigger who was working on the well head when the gas release occurred, Matthew Browne, also gave a graphic description of the incident. He said:-

> *"I would describe the gas as deafening, thick, roaring, it was unbelievable. There was no warning or smell or rattling before the explosion. I immediately tried to get out of the cellar which was about my shoulder height. After a couple of attempts, the third attempt I was getting really dizzy. It was white everywhere. I couldn't see anything*."[15]

When Mr Brown managed to get out of the cellar he also ran and estimates he had travelled only about 10 metres when the explosion occurred. He described it this way:-

> *The force of this explosion knocked me to the ground and burnt my back. When I was lying on the ground I could see all the flames above me. They were travelling down towards the mud tanks. The flames would have travelled at least five metres past me and then lifted straight up.*[16]

I have quoted these descriptions to help those of us who spend our working lives in air-conditioned offices to better appreciate that this inquiry is not an academic exercise but an attempt to explain a real life tragedy that left one man dead and two badly injured. Having listened to their accounts of the accident it is easy to understand why some of those on site on the day in question no longer work in the industry.

It also gives us a better basis to appreciate the actions of Mr Fiechtner. There is some conflict in the evidence about his exact location when the gas leak occurred but it is accepted by all that he was not on the rig floor or under it. It is most likely that he was on the lease midway between the rig and the demountable huts used for meal breaks, the managers' accommodation and communication equipment.

He was in a position of relative safety and could easily have made himself safer by moving further from the rig when the gas blow-out occurred. Instead he ran to the rig carrier to try and switch off the diesel engines. Everyone there knew that the gas leak meant an explosion was likely. Shutting down the diesel engines on the rig carrier reduced the risk that the gas would be sucked into the engine and cause it to over run and fly apart or blow flames through its exhaust that could ignite the gas cloud. It also eliminated other possible sources of ignition. Rodney Fiechtner didn't run for cover. He knew that members of his drilling crew were closer to the point where the explosion was likely to occur than he was and he ran towards the danger in an effort to reduce it.

[15] exhibit 13 para 8 and 9
[16] exhibit 13 para 10

People who find themselves in a dangerous situation, who remain in control of their actions and attempt to resolve the danger are rightly called courageous. In my view that is what all of the rig workers involved in this accident did. People, who knowingly place themselves in danger in order to try and reduce the risk to others, are called heroes. In my view that is what Rodney Fiechtner did.

The investigation was not able to establish the ignition source, although a number of possibilities were identified by the DNR&M officers who examined the remains of the rig looking for possible electrical and mechanical sources of ignition. Those inspections also identified non compliance with aspects of the Australian Standards dealing with electrical equipment for explosive atmospheres and spark emission control devices on internal combustion engines. The effectiveness of these inspections was compromised by the delay in their being undertaken and their limited nature. However, in view of the damage done to the equipment by the explosion and ensuing fire, it is unlikely that a more timely and exhaustive inspection program would have enabled the source of the ignition to be ascertained.

After the explosion and the initial fire ball had subsided into a raging well fire all those on the lease site assisted the injured. It was recognised that Mr Fiechtner's injuries were the most serious and he was driven immediately to the Surat hospital. The medical superintendent met them on the way there and followed them to town. Doctors from hospitals in the surrounding towns came to Surat to assist. Mr Fiechtner was conscious and was able to communicate with the doctors. The work mates who accompanied him confirmed his identity and provided personal information to the hospital that was passed on to police.

That afternoon, the Royal Flying Doctor Service flew a specialist from the Royal Brisbane Hospital to Surat and after undertaking some emergency procedures Mr Fiechtner was flown back to Brisbane. He died in the intensive care ward at the Royal Brisbane Hospital later than night, approximately 12 hours after the explosion.

An autopsy conducted the next day at the John Tonge Centre found that he had burns to 95% of his body.

Findings required by s43(2)

I am required to find, so far as has been proved, who the deceased was and when, where and how he came by his death. As mentioned earlier, these are not criminal proceedings and I am therefore to apply the civil standard of proof when considering these issues. I am also required to consider whether any persons should be committed to stand trial in connection with having caused the death.

Having regard to all of the evidence presented to the inquest I make the following findings:-

Identity of the deceased – Rodney Joseph Fiechtner.

Place of death – He died at the Royal Brisbane Hospital in Herston, Queensland.

Date of death – He died on 7 April 2003.

Cause of death – Burns received in a gas explosion on a drilling rig.

Criminal charges – No person should be committed to stand trial on any of the charges listed in s41(1)(a) of the Act.

Riders

Pursuant to s43(5) of the Act I am authorised to make riders or recommendations designed to reduce the occurrence of similar deaths to the one investigated by this inquest.

Obviously I have no independent knowledge of matters impacting on safety in the gas drilling industry. I must base my recommendations on the expert reports put before me, the evidence of the witnesses who do have experience in the industry and the reports prepared by the departmental officers who investigated this fatality.

I was greatly assisted in this regard by the fault tree analysis and the incident causal analysis method chart which helped me focus on the relationship between possible contributing factors and the need to build in multiple safety barriers in recognition of the impossibility of completely eliminating human error and equipment failure.

I was also assisted by Professor Cliff's report that was tendered today. His experience and expertise in a related field might enable the parties to refect on what they have proposed by way of changes to procedures from a slightly different perspective. I do not accept that because Professor Cliff is not experienced in the petroleum drilling industry his views are not valid. One need only consider the benefits that are now being realised in the health care sector as a result of medical administrators embracing the safety lessons learnt in the aeronautical industry to recognise the potential advantages of cross pollination of this kind, especially in industries that consider they are unique.

It is also important to acknowledge that many changes that will impact on the likelihood of a similar accident occurring in future have already been made. Most significantly, the legislation under which the industry operates has been very substantially changed by the introduction of the *Petroleum and Gas (Production and Safety) Act 2004*. which incorporates an entirely different approach to regulating safety in the industry. Other changes, such as the re-design of the thread on the tied down screws and the painting of their stubs are indications that lessons have been learnt from this tragedy. This inquest has been an opportunity for all those involved in what is an intrinsically dangerous activity to again consider how the risk can be best managed in this context. Before turning to what the parties have suggested as specific

remedies for the deficiencies that have been identified by these proceedings, I want to say something about the general issues that seem to me to be most important.

Issues of concern

Division of responsibility

The right to extract the gas was vested in the leaseholder, OCA. It engaged Century Resources to supply the drilling rig and rig personnel to drill the well. However the division of responsibility for the undertaking of those tasks is not so clearly defined as that statement might suggest.

The details of what each of those parties was obliged to do were set out in a number of documents; namely the Onshore Drilling Agreement, the OCA Drilling Program and the OCA Safety Management Plan. While these documents may regulate legal relations between the parties and may be dispositive of issues of civil liability, evidence given by experienced petroleum industry operatives indicates that customary practice in the industry may diverge from these legal arrangements. Unless there is consistency between what is agreed to between the parties at head office and what happens in the field, changes to policies and procedures are unlikely to be effective. Clarity in the theory and practice of the division of responsibly for safety, supervision and training are therefore in my view essential.

Training

According to figures quoted in Parliament during debate on the new legislation, the value of the oil and gas produced in Australia each year exceeds $15 billion. The employment opportunities the industry creates as well as the down stream benefits to engineering, transport and catering sectors are obviously considerable. It is apparent that drilling rig workers operate industry specific equipment that is becoming increasingly automated. There is a defined hierarchy of positions on the rig with a fair degree of separation of functions. In these circumstances I find it surprising that so few have any formal qualifications, education or training in the field.

Witnesses in this matter repeatedly told of how the only training they had received was from watching someone else do the job that they were then themselves required to later perform. Nothing demonstrated the vulnerability of this approach more graphically than the situation of the men who undertook the crucial task of securing the hanger; neither of them had ever before done that job on a live well and neither of them had been given any formal training in how to do it or the significance of it. Suggestions were made during the hearing that as the process is the same when drilling with mud, the inexperience of almost all of the crew, from the drilling supervisor down, in well completions when drilling with nitrogen, was of little or no consequence. In my view, that approach fails to have sufficient regard for the need for the rig workers to understand the possible ramifications of their actions. This is only likely to come via education and training, in my view.

I am therefore heartened to read that the new Act seems to require all drilling rigs to have safety management plans that include a skills assessment,

training and supervision program. I recommend that the regulator and the industry give consideration to the adoption of the competency standards for drillers that have, according to Professor Cliff, already been developed

Necessity of multiple barriers
As the fault tree analysis chart makes clear, this accident only occurred because a number of failings coincided. Throughout the hearing we heard reference to “hard” and “soft” barriers – mechanical and human safe guards. This evidence convinced me that to be effective, a risk management system must have multiple barriers of both kinds for all key risks.

Recommendations

I have obviously given careful consideration to the recommendations contained in exhibit 80. I have already commended the parties for the process by which they were developed; I now add my compliments for their content. They seem to me to address all areas of concern.

I note Professor Cliff’s concern that more urgent action is not suggested to remove ignition sources. I note also that he indicates that the underground mining industry has managed to prevent exhaust manifold surface temperate presenting such a risk. I accept the response from the DNR&M that the elimination of ignition sources is more critical in an underground setting where the presence of gas can often not be avoided. I accept also that it might not be reasonably practical to move all diesel engines outside the hazardous zones.

However, it would seem appropriate to transfer to the gas drilling industry that technology that has been developed to address the same risk in the coal mining industry wherever possible. It will obviously be futile to install remote engine shut-off devices on drilling rigs if manifold temperature continues to pose an ignition risk.

I note the frequency of this hazard materialising has been low. That is a valid factor when considering the extent of the response to it. However, so are the consequences that flow when it does eventuate and, as this matter demonstrates, they will usually be fatal. I therefore consider something more urgent and focussed than “a *government and industry review*” is necessary to respond to the issue of ignition sources on drilling rigs.

I strongly support the thrust of recommendation 7 - that senior people on the rig have appropriate knowledge, skills and experience - but suggest the industry needs to stipulate what compromises that expertise, and take action to enable its acquisition and assessment. A vocational education qualification would seem appropriate for such responsible positions.

The other issue which needs to be addressed is how these recommendations should be actioned. I anticipate that many of them can be, with some re-framing, incorporated into the safety management plans that the new legislation requires to be developed for all drilling operations but others are

more wide ranging. In both cases the Gas and Petroleum Inspectorate would seem the appropriate agency to devise an implementation plan and to monitor its execution.

Recommendation
Accordingly I recommend that the Inspectorate liaise with appropriate industry bodies or representatives to develop a plan to implement the recommendations contained in exhibit 80 and to give consideration to whether those recommendations should be refined to take into account my suggestions concerning ignition sources and qualifications of rig staff.

I look forward to being apprised of the outcomes of those endeavours.

Finally, I would like to express my appreciation for the assistance provided to the court by all of those invovled in the investigation and the inquest. In particular, the efforts of Mr Brendan Galloway to make the esoteric world of gas drilling accessible to my most unscientific mind are appreciated.

Michael Barnes
State Coroner
20 December 2004