

IN THE CORONERS COURT  
HELD AT HAMILTON CSU-2008-ROT-000636

IN THE MATTER of the Coroners Act 2006  
AND  
IN THE MATTER of an Inquiry into the Death of CATHERINE ELIZABETH KELLS

Before: Coroner JP Ryan  
Date(s) of Hearing: 4 June 2010  
Date of Finding: 13 December 2010

FINDINGS OF CORONER

INTRODUCTION

[1] On 28 December 2007, Catherine Elizabeth Kells met up with a party of friends to go underwater diving off Motiti Island in the Bay of Plenty. In the diving party on that day with Ms Kells was her very good friend Jodi Patricia Mary Carter, Samuel de Malmanche, and his cousin Thomas de Malmanche.

[2] The group were transported to the planned dive site by Samuel's father, Clarke Ernest de Malmanche, in his 6.5 metre Ramco Kingfisher boat. Also in the boat was Jeffrey Peter de Malmanche, the brother of Clarke de Malmanche. The divers entered the water together, and spent approximately 25 minutes on the ocean floor. They left the bottom as a group to begin their ascent. During the ascent, Ms Carter suddenly kicked for the surface. Once on the surface, Ms Carter was not in a good condition and was assisted onto the boat. It then became apparent that Ms Kells had not surfaced.

[3] Samuel immediately changed his air cylinder and returned to the water to search for Ms Kells. He was unable to locate her. On 30 December 2007, Ms Kells was located floating on the surface of the sea by a fisherman. She was clearly deceased.

FACTS

[4] All of the divers in the party that day were experienced to some degree. Samuel was the most experienced in the group, and he considered the other members to be novices. Ms Kells and Ms Carter both completed a PADI dive course in Egypt in 2004. A few days after gaining this qualification, Ms Kells also completed an advanced course. Ms Carter and Ms Kells' parents all believe that Ms Kells probably had completed up to 15 dives before this fatal dive. However, it is unlikely that she had dived to a depth of 29 metres in her previous dives, except possibly during her advanced diving course.

[5] The weather conditions for the dive were good. The dive plan was to gather scallops from the sea bed, and then to ascend when the air gauge on anyone's gear showed 50Bar or less. The depth of the sea bed at the point of the planned dive was 29 metres, and the

intended length of the dive was approximately 25 minutes.

[6] At a certain point in time during the dive, Samuel checked Ms Carter's and Thomas's air gauges and found them both showing around 50Bar. The divers then assembled together and left the bottom of the sea as a group. During the ascent, Samuel and Thomas were above Ms Kells and Ms Carter. About halfway to the surface, Ms Kells grabbed Ms Carter's regulator from her mouth and they began to buddy breathe. Ms Carter believes they did this for approximately 2 minutes. During this time, it appears that Ms Carter and Ms Kells were slowly descending without realising it.

[7] Ms Carter was suddenly overwhelmed with an urgent need to get to the surface. She therefore inflated her buoyancy compensator device ("BCD") and kicked for the surface, rising as fast as she could. She did not make a decompression stop at 5 metres below the surface, which had been part of the dive plan. She passed both Thomas and Samuel during her fast ascent. Thomas and Samuel looked down at Ms Kells and believed that she was fine. They both continued their controlled ascent, including the planned decompression stop.

[8] Upon reaching the surface, Thomas and Samuel found Ms Carter in a distressed condition. They all returned to the boat and then noticed that Ms Kells had not surfaced. Samuel changed his cylinder and returned to the water to search for Ms Kells. He spent approximately 20 minutes looking for her, but could not locate her. As a result of the alarm being raised, other boats in the area began a search and two other divers entered the water as part of the search. Ms Kells was not located until 30 December 2007, when she was discovered floating on the surface by a fisherman.

## ISSUES

[9] There are a number of issues to be looked at in this inquiry. The first issue is the condition of the equipment hired by Ms Kells for this dive. All of those in the diving party hired their equipment from the Tauranga Underwater Centre, with the exception of Samuel de Malmanche who had his own equipment. A comprehensive report has been provided to me by the Police National Dive Squad ("PNDS"). A detailed examination was carried out by the PNDS on the equipment used by Ms Kells, and some faults were found with the equipment.

[10] The contents of the cylinder worn by Ms Kells failed to conform to NZS 2299.1:1999 for compressed breathing air, with respect to moisture content. The report notes, however, that the moisture content was within the parameters of the British Standard (BS) 4001. Mr Geoffrey Cooper, who is experienced in investigating diving deaths and also a very experienced diver himself, gave evidence that the air used to fill cylinders in New Zealand usually has higher moisture content because of the prevailing atmospheric conditions. The PNDS report concludes that this level of moisture was not considered to be a contributing factor in Ms Kells' death. I accept the conclusion in the report with regard to this issue.

[11] At the time the PNDS report was written, it was not appreciated that Ms Kells suffered from exertion-induced asthma. Ms Carter stated that Ms Kells had only recently begun to display symptoms of asthma after intensive rowing sessions, around August 2007. This was supported by Ms Kells' parents, who informed that Ms Kells had not suffered from asthma during her childhood. There is no evidence before me as to whether or not Ms Kells was aware that asthma can have very serious consequences for underwater divers; but it is a reasonable assumption to make that, had she been aware, then she would not have undertaken a dive without seeking medical advice. There is a caveat to that: it is possible that Ms Kells was in denial that she had asthma. She may have been minimising her condition, and even avoiding seeking medical advice, in case it jeopardised her diving. I have no evidence before me on this issue, and therefore cannot make a definitive finding on the point.

[12] The matter of Ms Kells' asthma assumes enormous significance in light of the PNDS report concluding that Ms Kells was most likely ingesting and therefore aspirating salt water during this dive. This is known as "breathing wet". It is accepted that asthma symptoms can be induced by breathing in seawater due to the salt content in the water. The examination of Ms Kells' diving equipment by the PNDS revealed that the equipment was generally in good condition, but a small vacuum leak was noted in the second stage regulator - primary ("the regulator"). A plastic zip tie was used to secure the mouthpiece to the regulator, and when examined by the PNDS it was noted that the zip tie was loose. This would probably have allowed seawater into the regulator, and the report states that "*...if this leak was evident during diving it may have caused the regulator to [breathe] wet*"<sup>2</sup>.

[13] A further defect was found in the mouthpiece, where the bite tabs had been ripped or torn. The PNDS report concluded that this damage was likely to have been caused by excessive biting by Ms Kells rather than being present when the equipment was uplifted from the dive shop. Given that the bite tabs would have been within Ms Kells' mouth, it is questionable whether the rips would have allowed seawater to enter the regulator. In my view, the rips to the mouthpiece were not a contributing factor in this death.

[14] The second issue of concern was the amount of weights that Ms Kells was carrying in her weight belt during this dive. Mr Cooper considers that Ms Kells had approximately 4 kilograms of weight beyond what she should have been carrying. As a result, Ms Kells would have been negatively buoyant and would sink underwater without taking any measures to maintain buoyancy. The additional weight would also have caused Ms Kells to exert more energy while swimming, thus increasing the risk of asthma being induced.

[15] Ms Carter picked up Ms Kells' diving equipment from the hire centre the day before the dive. The hire centre provided the amount of weights for Ms Kells based on Ms Carter's information to them of Ms Kells' body weight. I have no evidence before me as to how the amount of weights for Ms Kells was calculated by the hire centre staff. In any event, Ms Kells should have done her own calculation as to the amount of weights she should carry, when preparing for the dive. As a final check, when she first got into the water, she should have assessed whether her buoyancy was positive, negative or neutral

and adjusted her weights accordingly. Regardless of how scientific the weight calculation may be, the ultimate test has to be the buoyancy of the diver in the water. In my view, the excess amount of weights being carried by Ms Kells during this dive was a contributing factor to her death, as it would have increased the exertion needed to swim underwater and therefore may have contributed to the onset of asthmatic symptoms.

[16] The third issue is the depth of the dive in relation to the experience of the diver. Ms Carter gave evidence that, although she had dived to a depth of 29 metres on one previous occasion during PADI advanced diver training, she had never dived to that depth without a diving instructor present, and she did not believe that Ms Kells had either. Mr Cooper and Mr and Mrs Kells all believe that a diver with Ms Kells' level of experience should not have been diving to that depth. All divers are subject to nitrogen narcosis to varying degrees. Mr Cooper helpfully gave an informal scale as to the effects of nitrogen narcosis, saying that every ten metres of depth produced a similar effect to drinking one martini. At 29 metres, Ms Kells would have been affected to the same degree as if she had drunk three martinis if Mr Cooper's scale was adopted. It is reasonable to assume that Ms Kells' judgement, perception and cognitive ability would all have been affected by nitrogen narcosis. This may well explain why Ms Kells suddenly grabbed Ms Carter's regulator as they were ascending. There is no indication that Ms Kells' breathing equipment failed, and there was air still in her cylinder. Yet she behaved as if she had suddenly lost her air supply. This in turn caused Ms Carter to panic after approximately two minutes of buddy breathing, and induced in her an overwhelming need to get to the surface urgently. She may also have been subject to the effects of nitrogen narcosis. As a result, Ms Carter kicked for the surface and inflated her BCD rapidly to assist her ascent, leaving Ms Kells alone.

[17] The fourth issue is whether Samuel and Thomas could have done more to prevent Ms Kells' death. Samuel was under the impression that it was Ms Carter who was in distress because of her rapid ascent. He stated that he looked at Ms Kells and she seemed to be okay. When the two men arrived at the surface they were concerned for Ms Carter's condition, and it took some time for them to appreciate that Ms Kells had not surfaced.

[18] Thomas states in his evidence that the dive plan was for all four to keep together as a group. When they left the sea bed at the end of the dive they were all grouped together. However, during the ascent, the two men were above the two women by about three or four metres. He also states that when they reached about 12 metres he looked back and could see the bubbles from the two women below but could not make out any shapes. At that point they both began to descend towards the two women. That was when Ms Carter passed them heading for the surface, which caused them to be concerned for her well-being. It appears that at this point they were both distracted by Ms Carter's rapid ascent and they did not consider it necessary to attend to Ms Kells.

[19] Both men stopped at approximately 5 metres below the surface for a decompression stop which lasted between 2 and 3 minutes. During that period I would have expected that Samuel and Thomas would have been anticipating Ms Kells joining them. There is no evidence as to what the two men were thinking at this point; they may still have been

distracted with Ms Carter's behaviour. If either of the two men had noticed that Ms Kells had not joined them, and immediately swum down to her, they may have been able to bring her to the surface. However, this is pure speculation. Ms Kells may well have been unconscious by this time, which would explain why she did not kick for the surface when Ms Carter did.

[20] In my view, Ms Kells death was the result of several factors combining to produce a tragic result:

(a) Ms Kells was either unaware of, or chose to ignore, the inherent dangers in underwater diving for a person who suffers any form of breathing difficulty such as asthma.

(b) Ms Kells most likely began to suffer symptoms of asthma. This was probably induced by the aspiration of seawater coming in through an insecure seal in the regulator, and the exertion of spending 25 minutes swimming underwater with a greater amount of weight than may have been appropriate.

(c) Ms Kells was also most likely suffering the effects of nitrogen narcosis. Therefore her ability to think rationally and make appropriate decisions would have been impaired. As a result, she appears to have believed that her air supply was running out, prompting her to grab Ms Carter's regulator in panic rather than her secondary device. This may also have been contributed to by the development of asthmatic symptoms.

(d) This action has in turn panicked Ms Carter, who also was probably suffering some effects from nitrogen narcosis. Ms Carter has then reacted irrationally by kicking away from Ms Kells and shooting to the surface. Such an action would have been contrary to all of the training that Ms Carter would have received during her diving course. It would also have been contrary to her natural instinct to remain with and assist her very close friend.

(e) The other two members of the diving party were distracted by Ms Carter's irrational behaviour, and believed she was in distress rather than Ms Kells. As a result, they were focusing on Ms Carter and did not go to assist Ms Kells until they were on the surface. They may also have been affected by nitrogen narcosis.

#### FORMAL FINDING

[21] I find that Catherine Elizabeth Kells, of 124C Nixon Street, Hamilton, Occupational Therapist, died in the sea off Motiti Island, Bay of Plenty, on 28 December 2007.

[22] The cause of death was drowning as a result of an underwater diving accident.

[23] The circumstances of the death are as set out above.

## COMMENTS/RECOMMENDATIONS

[24] When considering the issues raised by Ms Kells' death, I have looked at whether or not I should make a recommendation to tighten the regulation of recreational divers in an effort to reduce the number of deaths occurring. The New Zealand Underwater Association ("NZUA") is strongly opposed to any tightening of regulations, particularly in relation to the current medical surveillance system, for a number of reasons. NZUA does recognise that an issue exists where divers may be medically cleared to begin their dive training but may then develop medical conditions subsequent to obtaining a course qualification. In my view this is exactly what has happened in Ms Kells' case. NZUA believes that this issue is best addressed by educating divers of the need for medical review at any time there are significant health changes.

[25] I have also elicited the view of the Police National Dive Squad on the matter of the regulations governing recreational diving. The view expressed to me is that any regulatory imposition on recreational diving would be very difficult to police, and would be seen as restricting individuals rights to undertake an internationally recognised recreational activity. I have accepted that it would be very difficult to regulate recreational diving to the extent necessary to prevent further deaths occurring in similar circumstances to those in this case.

[26] I do, however, endorse the proposal suggested by NZUA, and make the following recommendations in the hope that this will lend weight to the proposal:

(a) That all organisations involved in the training or operation of recreational underwater divers increase their efforts to educate all divers of the need to monitor their medical conditions and to seek medical advice concerning any medical conditions that arise to determine whether they should still continue to dive.

(b) That all such organisations referred to above make greater efforts to educate divers of the particular dangers applicable to divers who have breathingrelated medical conditions such as asthma.

These recommendations are directed to NZUA, and I hope that this organisation will disseminate these recommendations to all other organisations involved in recreational diving.

## CONCLUSION

[27] I acknowledge the assistance provided to me by the Police National Dive Squad, Mr Cooper and NZUA, as well as all of the witnesses.

Signed, Coroner JP Ryan

(1 Contributing factor: A factor that has contributed to the death occurring but one which, if eliminated, would not have revented the death. There may be more than one

contributing factor.

2 Police National Dive Squad Report on the Examination of Diving Equipment used during the Death of Catherine Elizabeth Kells, page 19.)