

Workplace Health and Safety Queensland

Ministerial Reference Group

Recreational Dive and Snorkelling Industry

Reference Group

Report to Minister for Education and Industrial Relations

November 2011

Recreational Dive and Snorkelling Industry Reference Group

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Contents

Abbreviations	4
Chair’s foreword.....	5
1. Summary of recommendations and findings.....	6
2. Introduction.....	10
2.1 <i>The role of the reference group.....</i>	<i>10</i>
2.2 <i>The reference group’s process</i>	<i>10</i>
2.3 <i>The Queensland dive and snorkel industry.....</i>	<i>11</i>
2.3 <i>The existing Queensland legislative framework.....</i>	<i>13</i>
3. Counts of person on board a vessel.....	15
4. Identified missing diver.....	17
5. Resort diver separation.....	22
6. Snorkeller safety.....	26
7. Compulsory dive medicals	29
8. General	36

Appendices

- Appendix 1 Ministerial media statement
- Appendix 2 Information paper
- Appendix 3 Written submissions
- Appendix 4 Examples of available signalling devices

Abbreviations

JAG Operator	Department of Justice and Attorney-General a Person Conducting a Business or Undertaking providing a recreational water activity
Reference Group	Recreational Dive and Snorkelling Industry Reference Group
SPUMS The code of practice	South Pacific Underwater Medical Society the Recreational Diving, Recreational Technical Diving and Snorkelling Code of Practice 2010
The SRWA Act The SRWA Regulation	the Safety in Recreational Water Activities Act 2011 the Safety in Recreational Water Activities Regulation 2011
The WHS Act The WHS Regulation	the Workplace Health and Safety Act 1996 the Workplace Health and Safety Regulation 2008
WHSQ	Workplace Health and Safety Queensland

Chair's foreword

I am pleased to present the summary of the enquiry into the safety standards of Queensland's recreational dive and snorkel industry. The inquiry was commissioned by the Queensland Government and composed by the Recreational Dive and Snorkelling Industry Reference Group which consisted of leading industry stakeholders and experts. The intention of the reference group was to provide the government with possible ways to improve Queensland's already industry leading standards and ensure that its reputation as a world leader in recreational dive and snorkelling safety standards continue.

On 18 August 2011, The Hon. Cameron Dick Minister for Education and Industrial Relations announced the establishment of a Dive Safety Reference Group to ensure Queensland continues to have Australia's most comprehensive industry safety regime.

The report is informed by the fifteen written submissions the reference group received, the evidence of persons who appeared at a public forums, advice provided by officers of the Department of Justice and Attorney-General and research conducted by the reference group's secretariat.

The majority of the content of submissions related to matters identified by the reference group in the form of an information paper posted to industry operators. This paper included head counts to ensure all people are on board, systems to retrieve unguided certified divers surfacing at unexpected locations, cardiac risks for snorkellers and resort diver separation from instructors. In addition many submissions, both written and verbal at the public forums, identified the issue of compulsory dive medical certificates for person seeking to undertake an entry-level dive course.

There was a high degree of consistency presented in the submissions made to the reference group on all matters raised, regardless of the scope of the operator's business or location.

Submissions made indicate that the industry is pleased with the current level of regulation applicable to the industry and believe that it has positively contributed to making the Queensland recreational dive and snorkel industry the world leader in safety. However the majority of the industry agrees that some minor amendment to the Safety in Recreational Water Activity Regulation and the code of practice will ensure that Queensland continues to be the world leader.

The industry also supports the work conducted by the WHSQ dive unit and supports the dive unit increasing its education and compliance activities to ensure that WSHQ continues to act as a portal for shared learning's within the industry.

The reference group unanimously endorses all the recommendations made in this report to the Minister.

Steve Wettenhall MP Chair
November 2011

1. Summary of recommendations and findings

Counts of person on board a vessel

Information presented to the reference group indicates that manual counts of persons on vessels have been unsuccessful in some cases due to a lack of attention and a lack of cross checking procedures.

Public forums participants indicated that while they did not believe there was any systemic count failure within the industry there was consensus that it would be beneficial for the regulation to be amended to include a requirement for counts to be conducted independently by at least two crew members with a cross checking procedure.

The reference group considers that requiring increased rigour in counts will further minimise the risk of a failed counts and will further minimise the risk of a person being left behind.

Recommendation 1: Amend the SRWA Regulation to require an operator to ensure at least two persons conduct independent counts of persons on board whenever a count is required to be conducted. Where there is only one person representing the operator on the vessel then the count must be conducted using both a passive and active count.

Identified missing diver

An identified missing diver event is an incident not involving a failed count and where the operator is aware the diver is missing but is unable to locate the diver.

Information presented to the reference group indicates that an identified missing diver event is generally associated with pairs of unguided certificated divers undertaking a dive in poor environmental conditions becoming lost or disorientated whilst underwater and surfacing away from the designated dive area.

To minimise the risks associated with unguided certified dives, it is suggested that whilst current checks and balances are deemed largely sufficient, it would be beneficial to consider additional information directed specifically at operators conducting unguided certified dives be provided in the code of practice. Operators indicated support for amendment to the code to provide additional guidance to industry.

Recommendation 2: Amend the code of practice to include information on how to determine the most appropriate emergency signalling equipment relevant for unguided certified dives, information on how to ensure a certificated diver understands how and when to use the emergency signalling equipment and information on maintaining and testing emergency signalling equipment.

Recommendation 3: The Minister should write to the relevant Commonwealth Minister requesting the development of a standard or other mechanism to assist in the development, evaluation and uptake of appropriate diver emergency signalling equipment.

Resort diver separation

Resort, or introductory diving, accounts for approximately half of all diving that takes place in Queensland.

Information presented to the reference group indicates that fatalities involving resort divers commence with the separation of the resort diver from their supervising dive instructor. Incidents of resort diver separation generally involve dives conducted at the maximum ratio of divers to instructor and in poor environmental conditions. The two most significant environmental conditions are strong current and poor visibility

Other factors contributing to resort diver separation include a combination of a lack of competence, experience and understanding from the dive instructors, pressure to maximise ratios from the operator and vessel masters unwillingness to change the dive location.

Operators generally agree that the maximum ratio of divers to instructor is appropriate for good environmental conditions and that the regulation could be changed to mandate a reduced maximum ratio for resort dives undertaken in poor environmental conditions.

As resort diver participants have no more than an absolute minimum of training and no experience in diving, the degree of responsibility and control required by operators is extremely high.

Recommendation 4: Amend the SRWA Regulation to:

- set the maximum ratio of resort divers to dive instructor at 2 to 1 (4 to 2 if the dive instructor is assisted by a certified assistant)
- allow the maximum ratio of resort divers to dive instructor to be increased to 4 to 1 (6 to 2 if the dive instructor is assisted by a certified assistant) if, after a documented risk assessment is undertaken by a competent person authorised by the operator, the competent person reasonably believes that, having regard to the environmental conditions at the dive location and the abilities, fitness and confidence levels of divers, it is safe in all the circumstances to increase the dive ratio.

Recommendation 5: Amend the SRWA Regulation to re-define the following terms:

- 'dive instructor' as a person who has a certificate issued by a training organisation that mentions the subject areas covered in AS/NZS 4005.4:2000 and has been assessed as competent by the operator
- 'certified assistant' as a person who has a certificate issued by a training organisation, that mentions the subject areas covered in AS/NZS 4005.3:2000 or AS/NZS 4005.2:2000 and has been assessed as competent by the operator.

Recommendation 6: Amend the code of practice to include more detailed information on how:

- an operator should assess the competency of a resort dive instructor
- to conduct and document a resort diver ratio risk assessment

- to assess environmental conditions and resort diver abilities, fitness and confidence levels.

Snorkeller safety

Information presented to the reference group indicates that the most common cause of death for recreational snorkellers is after suffering a cardiac event involving men aged over 50 years.

Many operators in the recreational snorkelling industry already have well developed and mature safety systems for identifying at risk snorkellers and controlling the risks. However, failure of the client to properly declare relevant medical conditions has the potential to compromise the operator's safety system.

Work should be undertaken to encourage clients' to declare relevant medical conditions and for operators to share experiences and safety knowledge for the benefit of the industry.

Recommendation 7: Amend the code to include guidance on how to identify at risk snorkellers prior to them entering the water, additional briefing to be given to at risk snorkellers and how to supervise at risk snorkellers in the water.

Recommendation 8: WHSQ should work with industry to:

- develop information products that operators can use to inform persons intending to undertake snorkelling of the potential risks associated with snorkelling and that they will not be refused the opportunity to snorkel if they identify as being an at risk snorkeller
- encourage operators to share experiences and safety systems of identifying at risk snorkellers and controlling the risks associated with at risk snorkellers.

Compulsory dive medicals

Currently, WHS Regulation does not mandate a medical certificate for all candidates involved in entry-level recreational diving certificate training. However, the code of practice does recommend that operators require all candidates involved in entry-level recreational diving certificate training possess a medical certificate prior to participation.

No jurisdiction in Australia or in the Asia Pacific region mandates that a candidate have a medical certificate issued by a doctor prior to undertaking an entry-level certificate dive.

Submissions made at the public forums questioned why there is a different standard required for entry-level certificate divers, whether a system requiring a medical certificate issued by a doctor provides a safer system than the self assessed medical declaration required by resort divers, and if the current system unnecessarily restricts operators in Queensland from competing in the entry-level certificate diver market.

The reference group concluded that the current guidance contained in the code of practice regarding medical fitness for entry-level certificate divers has reduced the

opportunity for Queensland dive operators to compete in this market, particularly for operators in south east Queensland and those in remote or isolated locations.

The reference group also considers that there is value in face to face medical assessment for candidates who have medical conditions that may put their safety at risk if allowed to dive. However it is unreasonable to require all candidates to obtain a medical certificate for what is a recreational activity.

The reference group consider that a combination of self assessment with a mandated requirement for identified candidates to have a medical certificate declaring them fit to dive prior to being allowed to participate in an entry-level dive course achieves a safe outcome for persons wanting to engage in a recreational activity without unnecessary regulatory burden on operators.

Recommendation 9: Amend the SRWA Regulation to require an operator to obtain a medical declaration (in a form approved by the regulator) from all entry-level dive candidates prior to allowing them to dive and require the operator to view a fitness to dive medical certificate for the dive candidate if the person:

- Identifies they have an at risk condition; or
- Is over 45 years old; or
- Has a BMI over 30 and a waist circumference greater than 102 cm for males and 88 cm for females.

Recommendation 10: Delete the guidance contained in section 2.3.1.2 of the code of practice and replace with guidance on how to comply with the new SRWA Regulation detailed in recommendation 8.

General comments

Industry supports current regulation and the work being conducted by WHSQ, but wants more engagement with industry to ensure all persons understand the current regulations and how to maintain a safe and productive industry.

Recommendation 11: Amend the SRWA Regulation to include additional notification requirements for incidents involving failed head counts, resort diver separation and unplanned diver retrieval.

Recommendation 12: WHSQ to:

- ensure all notifications relevant to the recreational dive and snorkel industry are forwarded to the WHSQ dive unit
- continue to liaise with industry to develop further information products that assist in clarifying the roles and responsibilities of businesses, workers and certificated dive customers, such as developing an industry 'Dive esafe' newsletter.

2. Introduction

2.1 *The role of the reference group*

The reference group was established to enquire into how to ensure Queensland continues to have Australia's most comprehensive recreational diving and snorkelling industry safety regime and strives for a zero harm recreational diving and snorkelling industry.

The terms of reference for the review were:

- Examine and report on the adequacy of the current regulatory framework covering recreational diving and snorkelling
- Identify and consider contemporary responses including legislative responses, to ensure Queensland's recreational diving and snorkelling industry continues to be world's best practice
- Identify strategies to increase public awareness of risks associated with recreational diving and snorkelling and how the public can assist in ensuring safety.

The reference group is required to report on the adequacy of the current regulatory framework for the industry, including the recreational diving industry code of practice, and look at how it is being implemented to determine whether further regulation or guidance material is required. It was also to identify strategies to raise public awareness of recreational dive and snorkel safety to ensure participants, workers and businesses understand their responsibilities when it comes to safety.

2.2 *The reference group's process*

Referral

On 18 August 2011, The Hon. Cameron Dick Minister for Education and Industrial Relations announced the establishment of a Dive Safety reference group to ensure Queensland continues to have Australia's most comprehensive industry safety regime. A copy of the Ministerial Media Statement is provided in Appendix 1.

The reference group's consideration included providing an information paper to industry operators, attending public forums, accepting written submissions and considering advice provided by JAG.

The reference group was required to report its finds to the Minister by 31 December 2011.

Information paper

The reference group endorsed an information paper and letter inviting submissions that was posted to over 230 known operators providing recreational dive and snorkel services. The information paper and letter inviting then to public forums used to inform industry of the activity of the reference group, including information regarding the public forums and how to make a written submission, and to stimulate thought and discussion on how Queensland can continue to have Australia's safest recreational dive and snorkelling industry. A copy of the information paper and letter is provided in Appendix 2.

Public forum

The reference group held public forums to allow industry participants and interested persons to directly address the reference group and to be part of an open forum discussion on topics relevant to the reference group.

Public forums were held in Cairns (3 October), Townsville (4 October), Airlie Beach (6 October), Gold Coast (7 October) and Sunshine Coast (20 October).

Forty-three (43) persons attended the public forums. Attendees were provided with an overview of safety and legislative issues identified by WHSQ, given the opportunity to address the reference group and the forum and encouraged to engage in an open discussion about any safety and legislative issues relevant to the industry.

Written submissions

Written submissions were requested from all interested parties by Friday 21 October 2011. A template submission document was provided by the reference group to assist interested persons make a written submission.

A total of 15 written submissions were received and a copy of each submission is provided in Appendix 3.

2.3 The Queensland dive and snorkel industry

Participation

There are approximately 1.2 million diving trips and 2.3 million snorkelling trips undertaken in Queensland each year, with approximately half undertaken by overseas visitors.

Queensland's recreational diving and snorkelling sector contributes approximately \$1.4 billion to the Queensland economy every year and it is a major driver in the state's tourism sector.

Incidents on recreational diving and snorkelling trips can have deadly consequences which are deeply tragic for everyone involved, as well as seriously damaging to the image of diving in Queensland. However, the rate of incidents in Queensland is already extremely low.

The article "Review of scuba diving fatalities and decompression illness in Australia" in the *Diving and Hyperbaric Medicine Journal* in 2008 estimated Queensland scuba diver fatality rate at about 0.49 per 100 000 dives, significantly lower than 2.5 per 100 000 cited for Victoria and lower than five other international studies quoted.

WHSQ provided the reference group with the data about diving and snorkelling participation in Queensland. The data indicates that the majority of persons undertaking recreational dive or snorkelling activities in Queensland are under the age of 35, participate in the activity once, have not previously participated in the activity and do not have any recognised competency. The majority of activity is conducted in far north Queensland and the Whitsundays.

International visitor country of origin (%)

	UK	Japan	USA	Ger	Other Eur	Other
Dive	20	17	15	6	8	34
Snorkel	21	21	14	7	8	29

Age (%)

	0-34	35-49	50+
Dive	73	17	10
Snorkel	59	21	20

Dive snorkel locations (%)

	TNQ	Whit	Other	Unknown
Dive	55	25	13	27
Snorkel	55	22	11	25

How many times did they participate? (%)

	x1	x2	x3-5	x6+
Dive	49	18	15	17
Snorkel	62	20	13	5

Previous experience (%)

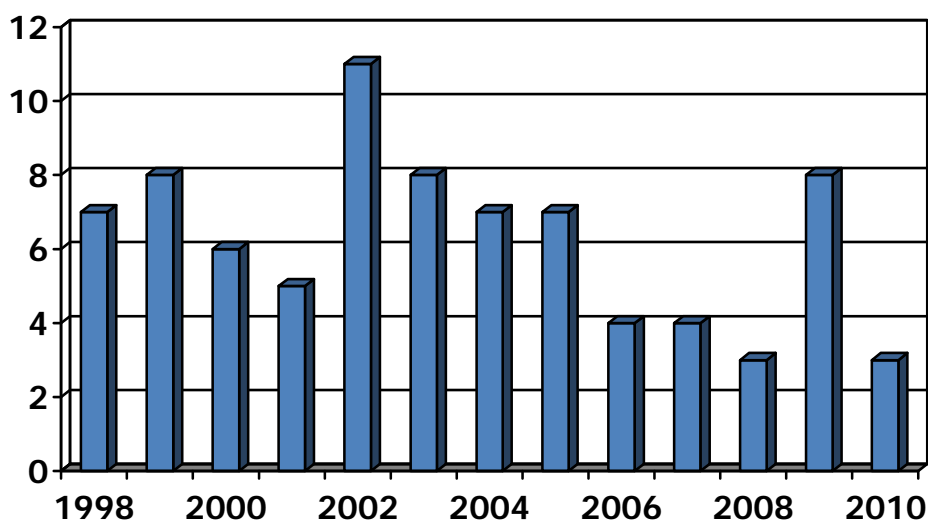
	0	x1-2	x3-10	x11+
Dive	50	15	15	20
Snorkel	39	22	21	18

Diver certification (%)

Uncertified	other	OW	AOW
53	6	30	13

Risks and fatalities

Between 1998 and 2010 there have been 81 recreational diving and snorkelling fatalities occurring during an operator organised activity.



The risks associated with diving and snorkelling activities are varied and include drowning, pressure related injuries such as gas embolism, medical conditions exacerbated by the activities and trauma. Contributory factors include medical fitness, lack of experience, panic and environmental conditions.

WHSQ provided the reference group with the data about recreational diving and snorkelling fatalities in Queensland. The data indicates that the most at risk persons are males aged over 50 participating in a snorkelling activity, and the most significant cause of death is a cardiac event or an event associated with an underlying coronary condition. The following is data about the recreational diving and snorkelling deaths that occurred between 2006 and 2010.

Activity

Snorkeller	Diver
16	5

Gender

	Male	Female
Dive	4	1
Snorkel	12	4

Cause of death

	Cardiac	Drowning	Cerebral arterial gas embolism	Other
Dive	0	2 ¹	3 ³	0
Snorkel	10	5 ²	0	1

¹ Both incidents associated with underlying coronary conditions

² Two incidents associated with underlying coronary conditions

³ One incident associated with underlying coronary conditions

Nationality

	Aust	USA	GB	Eur	Asia
Dive	1	2	0	1	1
Snorkel	4	3	3	3	3

Age

	15-34	35-49	50+
Dive	2	0	3
Snorkel	2	1	13

2.3 The existing Queensland legislative framework

Legislation

Queensland has comprehensive regulations and a code of practice for the recreational dive and snorkelling industry, made under the *Workplace Health and Safety Act 1995* (the WHS Act). These have been developed collaboratively with the dive industry and refined over a number of years.

As a part of the harmonisation of national work health and safety laws, specific regulation directed to ensuring the safety of customers of recreational dive and snorkelling providers was considered “out of scope” by Safe Work Australia for the national model Work Health and Safety Regulations.

In order to retain the existing regulatory protection for the recreational dive and snorkelling industry, and with the support of the industry, specific stand-alone *Safety in Recreational Water Activities Act 2011* (the SRWA Act) has been introduced. The WHS Regulations and the code of practice relevant to the safety of clients of recreational dive and snorkelling operators will transfer to the SRWA Act from 1 January 2012.

The health and safety of workers engaged in the recreational diving and snorkelling industry will be covered under the nationally harmonised work health and safety laws, including specific dive regulations and code of practice. These regulations have been finalised and there will be no significant changes for the recreational diving industry in Queensland.

Compliance and enforcement

To support the regulatory framework WHSQ undertakes a range of activities to assist industry to comply with the relevant regulatory provisions.

The establishment of the WHSQ Diving Unit in January 2009 increased WHSQ's ability to provide enhanced services to the recreational dive and snorkel industry by:

- working with the diving industry to develop industry specific education initiatives and information resources
- developing partnerships with diving industry groups to develop and promote solutions for WHS issues
- providing consistent and high quality advice on diving related matters for both internal and external stakeholders
- proposing regulatory reform where necessary
- undertaking targeted work to minimise the risk to divers in each coastal region in accordance with an annual plan consisting of:
 - workplace assessments
 - education and advisory activities for industry
 - information and training for WHSQ staff
- assisting with enforcement work in each coastal region on an 'as needs' basis by either undertaking investigations directly or assisting regional inspectors to undertake their investigations.

Awareness and engagement

WHSQ has developed an extensive range of information products to support the recreational diving and snorkelling industry. These include a website and online information, checklists, fact sheets, non-English publications, presentations, alerts, posters and prosecution outcomes.

WHSQ has recently developed additional awareness and engagement 'tools' to assist the diving and snorkelling industry aimed specifically at the risk of cardiac related incidents amongst snorkellers:

- Development of a short (2-3 min) DVD presentation able to be shown to prospective snorkellers to highlight risk factors and control measures
- Initiating an annual competition and award where dive businesses are given a rescue scenario and asked to film and submit their rescue systems in action. The entries are then reviewed and a winner recognised.

3. Counts of persons on board a vessel

The WHS Regulation requires an operator to ensure a crew member conducts and records a count of all persons on board a vessel prior to that vessel departing any site and to compare the count to any previous counts conducted. The advice in the code of practice provides a range of ways in which counts can be undertaken to prevent any person being left behind after diving or snorkelling.

There is no current requirement in the regulation, and guidance provided in the code of practice, for the count system to involve a cross check involving two separate crew persons independently verifying that everyone is on board.

The reference group was provided with information on the number of incidents where vessels have left a dive or snorkel site without properly counting all persons on board and leaving persons behind.

Incidents involving failed count of persons on board a vessel include:

- 25 January 1998 - an American couple were left behind by their dive boat after the counting procedure failed. A major search was initiated but the couple were never found.
- 26 December 2001 - a crew member undertaking underwater photography was left behind after a failed headcount and dive safety log. The diver was recovered by the vessel after his absence was noted approximately 30 minutes later.
- 25 June 2011 - a snorkeller was left behind after a failed headcount undertaken by a crew member. The snorkeller was picked up by another vessel and returned to his original vessel.

There has not been a fatality in the Queensland industry connected with a failed count since 1998.

Analysis of the incidents by WHSQ indicates that manual counts of persons on vessels have failed due to a lack of attention and a lack of cross checking procedures.

At the public forums participants consistently noted that although there were limited incidents of failed counts, whenever an event occurred there was significant media coverage that had the potential to damage the reputation of Queensland as a safe dive and snorkel location.

Public forums participants indicated that while they did not believe there was any systemic count failure within the industry and that current regulation was appropriate, there was consensus that it would be beneficial for the regulation to be amended to include a requirement for counts to be conducted independently by at least two crew members with a cross checking procedure. Many participants indicated that their current count systems already meet or exceed this.

It was noted at the public forums that although the majority of operators would have two or more crew members on their vessels they are some small operators that would only have one crew member available to conduct the count. In these

circumstances there was consensus that the count system should include a combination of both a passive count and an active count.

Nine written submissions addressed the issue of failed counts and all submitted that there should be a requirement for the count to be conducted independently by two crew members with a cross checking procedure and/or that the count system should include a combination of both a passive count and an active count. The remaining written submissions either did not address the issue of counts or did not oppose an amendment to the regulation.

The reference group considers that it is essential to maintain public confidence in the accuracy of the counts undertaken. A regulation amendment requiring increased rigour in counts as described above will further minimise the risk of a failed counts and will further minimise the risk of a person being left behind. As most operators at the forums indicated that their systems already meet or exceed this proposed amendment there will be no increased cost to most operators and only a nominal increase for the other operators.

Recommendation 1: Amend the SRWA Regulation to require an operator to ensure at least two (2) persons conduct independent counts of persons on board whenever a count is required to be conducted. Where there is only one (1) person representing the operator on the vessel then the count must be conducted using both a passive and active count.

4. Identified missing diver

An identified missing diver event is an incident not involving a failed count and where the operator is aware the diver is missing but is unable to locate the diver.

The WHS Regulation requires an operator to ensure at least one person has been appointed and is acting as a lookout whenever a person is diving. The regulation specifies that the lookout must be positioned out of the water and be able to see the whole area diving is taking place, must be solely engaged in being the lookout and be able to recognise relevant hazards and divers in difficulty.

The code of practice provides additional detailed information on open water supervision to assist an operator. The code of practice includes guidance on requirements for lookouts and dive site supervision, how to conduct a dive site risk assessment, how to determine the number and location of supervisory personnel, how to assess a certificated divers competency and advice that should be provided to certificated divers regarding the dive site and risks.

The code of practice further advises that a certificated diver should be required to have as part of their dive equipment emergency signalling equipment, including a high visibility signalling device (for example, a safety sausage), an audible signalling device (for example, a whistle), and a lighted signalling device (for example, a glow stick) if diving is to take place close to dusk or after dark.

There is no current requirement in the regulation or guidance provided in the code of practice on how to determine the most appropriate emergency signalling equipment relevant for the dive, or information on how to ensure a certificated diver understands how and when to use the emergency signalling equipment, or information on maintaining or testing the emergency signalling equipment.

The reference group was provided with information on the number of incidents where divers have gone missing on the surface after a dive requiring search and rescue by Emergency Services. Incidents involving identified missing diver include:

- 17 September 2005 - two divers failed to return to their dive boat following a dive. The divers were identified as missing and were unable to be located by the vessel. The divers were located 5-6 hours later by the diving vessel during an extensive sea and air search;
- 8 September 2006 - an American couple failed to return to their dive vessel following a late afternoon dive. The divers were identified as missing and were unable to be located by the vessel. The couple were found by rescue helicopter three hours later; and
- 23 May 2008 - two divers failed to return to their dive vessel following a dive. The divers were identified as missing and were unable to be located by the vessel. They were located by an Emergency Services helicopter the following day approximately 15 km from the dive site.
- 6 February 2009 - two divers failed to return to their dive vessel. The divers were identified as missing and were unable to be located by the vessel. A major sea and air search was initiated with the divers being found seven hours later approximately eight kilometres from the dive site.

- 7 February 2009 - a similar incident occurred involving two divers failing to return to a dive vessel. The divers were identified as missing and were unable to be located by the vessel. The two divers were located by an Emergency Services helicopter within two hours of the incident.

Analysis of the incidents by WHSQ identified the following trends:

- all incidents of persons going missing after dives involved pairs of certificated divers
- certificated divers of all levels of experience have become lost or disorientated whilst underwater and surfaced away from the designated dive area
- none of the missing divers were supervised by a dive worker during the dive
- all incidents of persons going missing after dives were associated with currents
- all of the incidents occurred at offshore reefs. In some cases this delayed or limited the response by Emergency Services
- approaching dusk and nightfall exacerbated the difficulties of some searches
- most divers were equipped with simple signalling devices such as safety sausages and whistles. None were equipped with electronic signalling devices. The simple signalling devices did not allow the divers to be spotted by lookouts

Searches for missing divers undertaken by the Emergency Services (Queensland Police Service, Emergency Management Queensland and Australian Maritime Safety Authority) are costly, resource intensive and create considerable risk for the searching parties. Currently the cost of search and rescue is borne by the Queensland Government with no cost to dive industry operators. Missing diver incidents also attract intense media interest creating ongoing costs and negative perceptions of the recreational diving and broader Queensland tourism industry.

The reference group was presented with submissions that electronic location devices may be an appropriate system to eliminate or minimise the risks associated with identified missing divers.

Information was provided to the reference group of electronic location devices that are currently available to allow persons in the water to alert their vessel or other authorities of an emergency. The cost of electronic signalling devices is in the \$300-\$500 range per unit. Examples of available signalling devices are listed on Appendix 4. Some systems require separate tracking or location devices located on the vessel, valued at about \$1500-\$2000 per unit. There are likely to be significant ongoing maintenance and replacement costs.

It is estimated that the recreational diving industry would have to purchase approximately 500 devices (maximum 20 per relevant vessel) if it was mandated that certified divers diving without in-water supervision at offshore reefs each carry a device.

Except for a small number of specialised dive operators working with certified divers in remote locations are currently trialling the use of electronic location devices, the use of such devices has not been widely adopted in the Queensland dive industry.

The use of such devices has recently been mandated in Egypt for live-aboard dives involving experienced certified divers in remote locations.

At the public forums attendees did not support any amendment to regulation or the code of practice that would mandate the use of an electronic location device. The general consensus of forum attendees was that the Queensland dive industry does not support the use of such devices at present due to concerns with their cost, durability and application. However, at the Gold Coast forum Mr Lee Waters of SeaSafe Pty Ltd submitted that he did not believe that electronic location device should be mandated however the code of practice should include information on such devices and the circumstances when they may be an appropriate control.

The attendees were supportive of amendment to the code to provide additional guidance to industry on how to determine what types of emergency signalling equipment are appropriate for different types of environmental conditions or dive locations, how to maintain and test equipment, and how to ensure divers understand how to use the equipment and the circumstances that it should be used.

The submissions made at the public forums are supported by many of the written submissions made to the reference group.

Lee Waters of SeaSafe submitted that *'the value of diver tracking technologies is the ability to trace, locate and recover the victim as vessel level without invoking national maritime search and rescue resources. Obviously there is a cost consideration and not all dive operators may be able to afford technology of this nature. The government should consider some form of incentive or subsidy to assist the operators to install technology. The cost of such a subsidy to the government or the taxpayer would be completely negligible compared to the millions of dollars expended each year by search and rescue services during the course of searching for missing divers. The negative international publicity would be avoided which in turn would improve tourist numbers – in short – millions of dollars and lives would be saved.'* In addition Mr Waters has previously written to JAG regarding the issue of electronic location device, a copy of this correspondence has been included in Mr Waters written submission.

John Rumney of Eye to Eye Marine Encounters submitted that his operation uses the ENOS system that allows individuals in distress on the surface to signal their GPS location directly to the boat, providing for a quick and efficient recovery.

Keith Cardwell of FNQ Dive submitted that *'I think that they are an unnecessary expense especially so for those operating at inner reef destinations taking large numbers of customers in what are usually shallow, calm(ish), no, or little current locations. However, they could be of value to operations where drift diving is part of what they offer in more remote locations.'*

Rod Punshon of Pro Dive Cairns submitted that *'I believe that it's not necessary to go to this extreme but I think there could be an argument for using these types of devices when diving in remote locations like the Coral Sea or when strong currents*

or other adverse situations may exist (risk assessment based) where the likelihood of divers drifting away or getting separated from their dive vessel is greater.'

Heather Batrick of Yongala Dive Pty Ltd submitted that electronic location devices were not required for a number of reasons included that it *'could also take the responsibility away from divers for their own safety, with the attitude 'well if I get lost they can find me'. I think MORE responsibility needs to be placed on divers to listen properly to briefings, be aware of currents and exit points', and that 'Perhaps better briefing for divers to include putting safety sausages up immediately if they ascend in an unexpected spot and do not think the surface watch has seen them would be better.'*

Scott Cappellani of Down Under Dive submitted that *'It is an un-necessary cost and may promote a relaxed attitude towards diver safety by crew and operators. The current guidelines in the code of practice are adequate to define the duty of care required by operators. Operators may choose to acquire the technology through their own risk assessment process, but this should be the decision of the operator.'*

The reference group consider that the risks associated with an identified missing dive are currently controlled as far as reasonably practicable where a diver is undertaking a dive with a guide provided by the operator.

The reference group consider that the greatest risk associated with an identified missing dive are limited to unguided certified divers undertaking a dive in poor environmental conditions particularly associated with currents. This type of diving is undertaken by a small number of operators conducting dives at varying locations – from shallow calm locations with minimal currents close to shore and ready access to emergency service providers, to adventure dives conducted in remote off shore locations in challenging environments. It is considered that a one size fits all requirement to provide electronic location devices for all of these types of dives is not appropriate and will result in unnecessary regulatory burden on the industry.

Section 16(2) of the SRWA Act requires an operator to, as far as is reasonably practicable, provide information, instruction, training and supervision required to ensure the health and safety of persons utilising their services, and to monitor the conditions at the dive location. An operator would undertake a risk assessment of each dive to determine how they will comply with this duty.

The reference group consider that a properly conducted risk assessment completed by the operator, in conjunction with the requirement in the regulation to conduct a count of persons on board and provide a lookout and rescuer, will minimise the risks associated with unguided certified dives.

To assist operators conducting this risk assessment the reference group consider that additional information directed specifically at operators conducting unguided certified dives should be provided in the code of practice. This information should address how to determine the most appropriate emergency signalling equipment relevant for unguided certified dives, information on how to ensure a certificated

diver understands how and when to use the emergency signalling equipment, and information on maintaining and testing emergency signalling equipment.

Recommendation 2: Amend the code of practice to include information on how to determine the most appropriate emergency signalling equipment relevant for unguided certified dives, information on how to ensure a certificated diver understands how and when to use the emergency signalling equipment and information on maintaining and testing emergency signalling equipment.

Recommendation 3: the Minister should write to the relevant Commonwealth Minister requesting the development of a standard or other mechanism to assist in the development, evaluation and uptake of appropriate diver emergency signalling equipment.

5. Resort diver separation

Resort diver separation occurs when the dive instructor (or certified assistance where relevant) cannot make immediate physical contact with, and render assistance to, any resort diver.

The WHS Regulation:

- defines resort diving as ‘an introductory scuba experience, or introductory educational diving program, conducted according to a recreational scuba training organisation’s program, or a recreational technical scuba training organisation’s program, whether or not the person is being photographed, filmed or videoed while diving’
- requires an operator to ensure that any person undertaking a resort dive is supervised in water by a dive instructor. In addition the operator must ensure that the dive instructor complies with their duty not to exceed the maximum number of resort divers under their supervision.
- require the dive supervisor to not supervise more than 4 resort divers at a time or 6 resort diver if the dive instructor is assisted by a certified assistant
- does not specify the competency required to be held by the dive instructor or the certified assistant.

The code of practice provides guidance to an operator regarding the in-water supervision of resort divers. It specifies the maximum ratios of instructors to resort divers and then provides that in some instances, the number of resort divers being supervised may need to be lowered. The code of practice states that ‘if a risk assessment shows that the abilities, fitness and confidence levels of divers, or environmental conditions at the dive site put the health and safety of workers or resort divers at an unacceptable risk, then the ratios should be reviewed.’

The reference group was provided with information about incidents involving resort diver separation from instructor. Incidents involving resort diver separation from instructor include:

- 30 November 2003 - A British resort diver suffered cardiac arrest after becoming separated from the instructor during the dive.
- 16 June 2004 - A US resort diver died on the surface snorkelling back alone to the vessel following a dive.
- 15 April 2009 - A Chinese resort diver became separated from the instructor while diving in a group of four in poor visibility. The diver surfaced briefly but was located on the seabed following a search.
- 18 April 2011 - An Irish resort diver became separated from the instructor while diving in a group of three in restricted visibility. The diver was located unconscious on the seabed after about five minutes.

Analysis of resort diver incidents identified the following trends:

- All incidents commenced with a separation between the resort diver and dive instructor.
- At the time of separation, most instructors were swimming in front of and facing away from the resort divers.
- Most incidents involved dives conducted at maximum (4:1) student to instructor ratio.

- Several incidents involved poor environmental conditions, particularly poor visibility (<4 m), currents, swell or choppy surface conditions.
- No dives were conducted using assistants.
- Hand holding or tethering was not used.
- Some divers were overweighted.
- Some divers surfaced but were unable to maintain positive buoyancy at the surface.

The general consensus from the dive forums was that the current maximum ratio for dive instructor to resort diver, and the guidance contained in the code of practice, is appropriate. The issue is not the regulation, it is a combination of a lack of competence, experience and understanding from the dive instructors, pressure to maximise ratios from the operator, and vessel masters not willing to change the dive location.

At the Airlie Beach forum a submission was made that some boats include a resort dive in the ticket price and that once persons were on board and at location there was great pressure to conduct the resort dives at maximum ratio regardless of environmental conditions to minimise cost to the operator.

All public forums agreed that the maximum ratio was appropriate for good environmental conditions and that the regulation could be changed to mandate a reduced maximum ratio for resort dives undertaken in poor environmental conditions. A verbal submission made at the Cairns public forum proposed that risk assessments should be performed on a daily basis to protect clients wishing to do resort dives.

When discussing what 'poor environmental conditions' are most participants submitted that the two most significant environmental conditions are strong current and poor visibility. However, most participants agreed that assigning a threshold for what constitutes a 'strong current' or 'poor visibility' would be difficult, and determining what the conditions were post an incident would be reliant on the subjective recollections of person involved.

The Townsville public forum raised the issue of dive instructor competency. This issue was subsequently discussed at all following public forums. Concern was raised that resort dive instruction was generally viewed as unrewarding to dive instructors who prefer to conduct certified diver guides. This resulted in generally new and inexperienced dive instructors being allocated to resort dives.

It was recognised by participants that resort diving was a higher risk than certified diving as the participants have no more than an absolute minimum of training and no experience in diving and are completely reliant on the operator and dive instructor. It was therefore recognised that placing resort divers with inexperienced dive instructors increased the risks of resort diver separation.

There was strong consensus at the public forums that resort dive instructors should be required to have a qualification relevant to resort dive instructor work and that the instructor undertake an annual review to ensure that their skills, knowledge and competency remain relevant to the work. Submissions at the public forums regarding competency were varied with some submitting that WHSQ

should develop material to determine competency and others submitting that recreational dive training organisations should develop the material.

Rod Punshon of Pro Dive Cairns submits that the WHS Regulation provided is *'clear and specific already but unfortunately commercialisation sometimes clouds people judgement. If the advice provided is going to be beefed up I would suggest that it actually say that the ratio of Instructor to student be cut from 4:1 to 2:1 if the risk assessment done indicates visibility of less than 5 metres and/or other adverse conditions apply.'*

With respect to instructor competency Mr Punshon submits that *'it's up to the employer to make sure that the Instructor (or any other staff member for that matter) is capable of performing the task/job required before they put the person into the role and then conducting ongoing training and/or assessment of the staff member's performance in the role.'*

Richard Evans of PADI Asia Pacific submits that the *'Training standards for the PADI Discover Scuba Diving program (referred to in Queensland as the resort program) are quite specific in respect to the level of control required of the instructor.'*

Heather Batrick of Yongala Dive Pty Ltd submits that *'A written risk assessment should be made in bad conditions and kept with the dive log to document reasoning for continuing dives and numbers reduced.'*

With respect to instructor competency Ms Batrick submits that *'skills and knowledge should be re-assessed regularly (could be in the annual on-line assessment for WPH&S) and also need to re-enforce responsibility of instructor to make decision if bad conditions to move dive locations or reduce numbers. Too often Skipper's over-rule Instructor's on decisions on where they dive and Instructor's do not feel comfortable standing up to them or refusing to dive in a certain location.'*

Scott Cappellani of Down Under Dive submits that resort dive instructor competency is *'the domain of the certifying agency. Although all operators should have a documented induction program for instructors covering dive site familiarisation, correct procedures, company protocol, and performance evaluations.'*

Evidence presented to the reference group indicate that resort, or introductory diving, accounts for approximately half of all diving that takes place in Queensland.

In nearly all cases of fatalities involving resort divers, the incident has commenced with the separation of the resort diver from their supervising dive instructor.

The WHS Regulation and the advice in the code of practice provide a range of ways in which resort divers should be supervised while underwater. Despite the advice about reducing ratios in poor conditions these do not appear to be common industry practices.

The reference group consider that as resort diver participants have no more than an absolute minimum of training and no experience in diving, the degree of responsibility and control required by operators is extremely high.

Training and supervision of resort dive instructors to ensure that they are competent and are using correct supervision techniques also appears to be a common concern. To minimise the risks to resort divers and to maintain public confidence that Queensland has safe systems for conducting resort diving, the industry needs to provide ways in which the supervision of all resort divers can be ensured on all dives.

Recommendation 4: Amend the SRWA Regulation to:

- set the maximum ratio of resort divers to dive instructor at 2 to 1 (4 to 2 if the dive instructor is assisted by a certified assistant);
- allow the maximum ratio of resort divers to dive instructor to be increased to 4 to 1 (6 to 2 if the dive instructor is assisted by a certified assistant) if, after a documented risk assessment is undertaken by a competent person authorised by the operator, the competent person reasonably believes that, having regard to the environmental conditions at the dive location and the abilities, fitness and confidence levels of divers, it is safe in all the circumstances to increase the dive ratio.

Recommendation 5: Amend the SRWA Regulation to re-define the following terms:

- 'dive instructor' as a person who has a certificate issued by a training organisation that mentions the subject areas covered in AS/NZS 4005.4:2000 and has been assessed as competent by the operator; and
- 'certified assistant' as a person who has a certificate issued by a training organisation, that mentions the subject areas covered in AS/NZS 4005.3:2000 or AS/NZS 4005.2:2000 and has been assessed as competent by the operator.

Recommendation 6: Amend the code of practice to include more detailed information on how:

- an operator should assess the competency of a resort dive instructor;
- to conduct and document a resort diver ratio risk assessment; and
- to assess environmental conditions and resort diver abilities, fitness and confidence levels.

6. Snorkeller safety

The WHS Regulation addresses counts of person on board a vessel, advice about medical conditions, and lookouts, guides and rescuers.

The code of practice provides guidance to an operator about medical risks, lookouts, guides, buddies, flotation devices, environmental assessment, provision of appropriate equipment and emergency preparedness.

In addition WHSQ has a range of information products to increase public awareness and the ability of snorkelling operators to identify, inform and respond to at-risk snorkellers.

WHSQ advised that they are currently developing a handbook for workers undertaking recreational snorkelling duties to highlight incident data, risk factors, relevant legislation, case studies and show examples of best practice, and are in the process of publishing case studies on their website highlighting examples of innovation and best practice of snorkelling businesses.

The reference group was provided with information about incidents involving cardiac risk and snorkeller. Examples of recent cardiac death involving snorkellers include:

- 17 January 2009 - A 56 year old Australian male with high blood pressure suffered myocardial ischaemia due to coronary artery stenosis and atherosclerosis. The incident occurred in calm conditions close to the snorkelling vessel.
- 20 February 2009 - A 61 year old German female with high blood pressure suffered myocardial ischemia, right coronary stenosis and atherosclerosis. The incident occurred while snorkelling from a beach in a strong current.
- 08 March 2009 - A 76 year old Japanese male suffering high blood pressure and who was known to be a weak swimmer drowned in waist deep water. The person was found to be suffering atherosclerotic cardiovascular disease and hypertension.

Analysis of snorkellers death identified the following trends:

- The most common cause of death for recreational snorkellers is after suffering a cardiac event.
- Some drowning events also involved cardiac events.
- Most events involved men aged over 50 years.
- In approximately half of these cases, the person exhibited cardiac risk factors, such as obesity, smoking or high blood pressure, even if they were not diagnosed with a cardiac disease.

Submissions made at the public forums were consistent across all locations. It was recognised that it is possible to identify persons who are at a greater risk of suffering a cardiac event and to have systems in place to respond to an emergency and provide first aid.

Many operators identified that they already have mature safety systems that:

- identify at risk snorkellers prior to them entering the water

- provide additional briefings on risks and controls for identified at risk snorkellers
- provide the lookouts with an easy visual identification of at risk snorkellers while they are in the water (e.g. different coloured snorkels, or noddles, or floatation jackets);
- include procedures to respond to potential incidents involving an at risk snorkeller (e.g. physical check of a snorkeller who has not moved for a period of time)
- include emergency rescue procedures and first aid provision that are regularly tested.

A key concern expressed by participants was that clients often failed to identify known medical or fitness issues on the medical declaration form due to a concern that they will not be allowed to participate in the snorkelling. This failure of the client to properly declare relevant medical conditions had the potential to compromise the operator's safety system.

Rod Punshon of Pro Dive Cairns submits that *'the key issue is how we inform all snorkelers of the potential risks associated with going snorkelling and then training staff to manage what they can see and staying diligent at all times as far as their supervision goes.'*

Richard Evans of PADI Asia Pacific submits that *'it is well known that males 45 and above are at increased risk of a cardiac event, whether taking part in diving activities, or any other activity that increases the heart rate. Scuba diving activities and snorkelling are no different than any other activity, except for the possibility of a cardiac event on or under the water. The advice currently given should be sufficient as it is impossible to exclude this age group from taking part in water related activities.'*

Ray Crampton of Dive World submits that safety for snorkellers could be improved with better medical statements and that liability releases should be included with the medical statement.

Heather Batrick of Yongala Dive Pty Ltd submits that *'companies cannot safeguard against conditions which even the passenger does not know exist. There are risks to every form of exercise. Advise every passenger to fill out a small disclaimer/waiver regarding their health but this again could become onerous and costly. Crew should talk to EVERY passenger prior to them getting in the water to find out about conditions and note people who could be at risk and watch them more carefully.'*

Jo Harris of Tusa Dive/Spirit of Freedom submitted that *'any better identification should not require non-medically trained tourism industry staff to take responsibility for the assessment of medical fitness to snorkel above current guidelines, much like cabin crew of a commercial aircraft being expected to better identify at risk air passengers of the risk of DVT or other medical conditions exacerbated by flying.'*

Travis Clarke of Quicksilver Connections submits that *'passengers not divulging all relevant medical information to crew will increase the risk. This is usually done in*

fear of being precluded from participating in the activity after travelling from abroad to do so. Short of sending everyone for a medical, current practises as outlined in the Code of Practice and Regulations are adequate so long as adequate training is provided by employers in identifying such persons is conducted.'

The reference group consider that the current regulation with respect to recreational snorkelling is adequate and does not support any changes that would require operators to deny a person the opportunity to participate in recreational snorkelling.

Any attempt to require a person to prove their fitness to snorkel or any requirement by on the operator to refuse a person the opportunity to snorkel if they are not convinced the person is free from cardiac risk will only encourage a person to deliberately deceive the operator of known health risks, will discourage tourists from visiting Queensland, and will damage the recreational dive and snorkel industry.

The reference group consider that if persons seeking to undertake recreational snorkelling know that they will not be denied the opportunity regardless of any health issues then they are more likely to volunteer any known health risks. This would in turn ensure that operators are able to properly identify at risk snorkellers and provide them with specific briefings on the risks and how the risks will be controlled.

Many operators in the recreational snorkelling industry already have well developed and mature safety systems for identifying at risk snorkellers and controlling the risks. The reference group believe that work should be undertaken to encourage operators to share experiences and safety knowledge for the benefit of the industry.

The recreational snorkelling industry needs to be encouraged to continue to develop innovative ways to advise at-risk snorkellers of the relevant risks and then manage these risks in ways which allow the safe participation by all customer groups.

Recommendation 7: Amend the code to include guidance on how to identify at risk snorkellers prior to them entering the water, additional briefing to be given to at risk snorkellers and how to supervise at risk snorkellers in the water

Recommendation 8: WHSQ should work with industry to:

- develop information products that operators can use to inform persons intending to undertake snorkelling of the potential risks associated with snorkelling and that they will not be refused the opportunity to snorkel if they identify as being an at risk snorkeller
- encourage operators to share experiences and safety systems of identifying at risk snorkellers and controlling the risks associated with at risk snorkellers.

7. Compulsory dive medicals

An issue that was consistently raised at all public forums was the guidance provided in the code of practice for medical fitness of entry-level certificate divers.

Section 2.3.1.2 of the code of practice states the following:

'The person conducting the business or undertaking should ensure that any person training for an entry-level recreational diving certificate is certified as being medically fit for diving in accordance with Appendices A and B of Australian Standard 4005.1 – 2000 Training and certification of recreational divers - Part 1: Minimum entry level SCUBA diving.'

The two appendices, that is A and B, give medical information and show the medical form which should be used for a pre-diving medical examination for prospective recreational divers. The medical certification should be provided in English, preferably by a medical practitioner with experience in diving medicine, within 90 days prior to the commencement of training.

The person conducting the business or undertaking should ensure that persons undertaking training for an entry level recreational diving certificate are at least a minimum of 12 years of age. Due regard should be had to the other requirements in AS 4005.1 – 2000. If the diver is under the age of 18 years, parental or guardian consent is required for the diver to undertake training for an entry level recreational diving certificate.'

To be certified as being medically fit for diving requires the candidate to attend a medical examination conducted by a doctor who has diving medicine knowledge.

This guidance in the code of practice is provided as best industry practice that should be followed by operators providing entry-level recreational diving certificate training (entry-level training). There is no requirement contained within the WHS Regulation requiring an operator to ensure a candidate has obtained a medical certificate prior to allowing them to participate in entry-level training. However, to ensure they are not exposed to potential prosecution or civil action the Queensland recreational dive industry has determined that they must require a dive medical prior to allowing a candidate to participate in entry-level training.

No other jurisdiction Australia or in the Asia Pacific region requires a potential participant to have a medical certificate issued by a doctor prior to undertaking an entry-level certificate dive.

The WHS Regulation does not require any person undertaking recreational diving or snorkelling to obtain a medical certificate prior to allowing them to participate. Although it does require the operator to obtain a medical declaration from any person seeking to undertake resort diving prior to allowing them to participate, and requires the operator to assess the person's fitness to dive having regard to the medical declaration. There is no requirement for the person to attend a medical examination. The WHS Regulation also requires an operator to provide advice about medical conditions to persons intending to participate in recreational snorkelling.

The code of practice provides guidance on medical fitness for diving workers, resort divers, certificated divers and for snorkellers.

The medical fitness of resort divers' guidance builds on the requirements contained in the WHS Regulation and states that:

'Any medical advice received in relation to resort divers should be recorded. If the information on the approved form indicates the prospective diver has consumed alcohol within eight hours prior to the diving, he or she should not dive.'

An example of a medical declaration for resort diving is attached at Appendix 1

The person conducting the business or undertaking should ensure that persons undertaking resort dives are at least a minimum of 12 years of age. If the resort diver is under the age of 18 years, parental or guardian consent is required for that diver to undertake a resort dive. The parent or guardian should sign the medical declaration as witness.'

The medical fitness of certificated divers provides that:

'The person conducting the business or undertaking should assess the diver's current medical fitness to dive.'

A. Concerns regarding the medical fitness of a potential diver

If the person conducting the business or undertaking has concerns regarding the medical fitness of a potential diver, they should not conduct diving for that person, unless:

- (a) the diver seeks medical advice which advises diving can be undertaken;*
- or*
- (b) a dive instructor or certified assistant accompanies the diver on a dive.*

B. Example questions to assess current medical fitness to dive

The following questions are an example of questions that may be asked of the diver to assess his or her current medical fitness to dive:

- (a) Since completing your last dive medical assessment, have you suffered any illness or injury that may affect your ability to dive safely?*
- (b) Are you currently suffering any illness or injury?*
- (c) Are you currently taking any prescription medication, other than the contraceptive pill?*

A summary of the medical fitness requirements currently observed by industry for recreational diving is:

- Resort diver: must complete an approved self assessed medical declaration which the operator must use to determine if the person can participate;
- Entry-level certificate diver: must have a medical certificate issued by a doctor certifying the candidate as being medically fit for diving;
- Certificated diver: must self assess medical fitness which the operator uses to determine if the person can participate.

The current industry practice for assessing resort diver and certificated dive medical fitness is essentially the same, with only entry-level certificate candidates requiring a medical certificate issued by a doctor.

Submissions made at the public forums questioned why there is a different standard required for entry-level certificate divers, does a system requiring a medical certificate issued by a doctor provide a safer system than the self assessed medical declaration required by resort divers, and is the current system unnecessarily restricting operators in Queensland from competing in the entry-level certificate diver market?

The general consensus of operators at the public forums was that they did not agree with the requirement for all candidates seeking to undertake an entry-level course to have a medical certificate issued by a doctor. Operators sought an amendment that would require them to obtain a self assessed medical declaration from a candidate and requirement that any candidate who self identified as have an at risk medical condition being referred to a doctor to obtain a medical certificate clearing them to dive.

Submissions made at public forums included numerous examples of how the current requirement for a medical certificate issued by a doctor restricted business and resulted in candidates going elsewhere to undertake the course. Examples include:

- Operators on Fitzroy island and Magnetic island do not have access on the island to a doctor able to issue a dive medical certificate, if a candidate presents on the island and wants to undertake an entry-level course the operator must refer them to a mainland doctor – inevitably this results in the operator losing the business;
- A candidate seeking to undertake an entry-level course in Coolangatta can use an operator in Tweed Heads without the need for a medical certificate issued by a doctor, this saves the candidate money and restricts the Queensland based operators business;
- There are limited doctors available to issue dive medical certificates resulting in long wait times to see a doctor, visiting tourists seeking to undertake an entry-level course will often not have the time to wait to attend a doctor resulting in the potential business being lost to Queensland operators.

Of the written submission received two are particularly relevant to this matter, these being the submission from Richard Evans of PADI Asia Pacific and Catherine Meehan – a dive doctor for McLeod St Medical in Cairns.

Mr Evans was of the view that the requirement for dive medicals in Queensland *'creates an increase cost to the Queensland dive operators without any statistical evidence to support any increased level of safety that dive medicals may provide. As we all know, dive medicals are not required under any current or pending regulations in any other state or territory in Australia. We urge the Committee to remove this requirement from the regulations or COP.'*

Mr Evans also included in his submission an article titled *'The RSTC Medical Statement and Candidate Screening Model'* by Drew Richardson and published in

the SPUMS Journal Vol 30 No 4 December 2000, a copy of the '*UK Sport Diver Medical Form*', a copy of the Recreational SCUBA Training Organisation (RSTC) Medical Statement form, and a copy of a PowerPoint presentation titled '*Training Scuba Divers: A Fatality and Risk Analysis*' made by Dr Drew Richardson (President of PADI) at the DAN Diving Fatality Workshop held 8-10 April 2010 at the Durham Hotel North Carolina USA.

The article 'The RSTC Medical Statement and Candidate Screening Model' by Drew Richardson provides an overview and assessment of the RSTC Medical Statement that PADI have been using world wide since 1989.

The article states that '*Most dive training organisations do not require every student to undergo a medical examination, by a medical practitioner, before enrolling in a scuba course. They do, however, require some type of medical and health screening as a prerequisite to scuba diving activity.*'

With respect to use of the RSTC medical statement the article states that '*if a candidate answers in the affirmative for any question, they are advised to contact a medical practitioner for an opinion, a consultation or physical examination as required.*'

The article then outlines the role of a dive candidate, a medical practitioner and the dive instructor. In the section detailing the dive instructor role the articles states that '*ultimately, the scuba instructor must make the final decision as to whom will be permitted to take a scuba course. Scuba instruction is not a right to which all persons are entitled.*'

The PowerPoint presentation contains an extensive set of data collected by PADI worldwide. Table 9 of the PowerPoint contains training fatality by cause of death for the years 1989-1998 and the years 1999-2008. The data indicates that cardiac events are the single most significant factor causing the death of a person undertaking dive training (31.5% for the years 1989-1998 and 31.6% for the years 1999-2008). The other two significant factors are drowning and unknown causes. Table 34 includes data on the fatality rate per 100 000 dives for entry-level diver training world wide indicating that for the 1999-2008 period the fatality rate was approximately 0.4 fatalities per 100 000 dives. This fatality rate is lower than the 2008 estimated Queensland scuba diver fatality rate at about 0.49 per 100 000 dives. Table 27 of the PowerPoint lists the median age of a person who has died undertaking dive training and the table detailing cardiac related fatality by diver age listed the median age as 51.5 years.

Ms Meehan's written submission consisted of an article titled '*Medical assessment of fitness to dive – comparing a questionnaire and medical interview-based approach*' by Catherine Meehan and Michael Bennett and published in the *Diving and Hyperbaric Medicine* Vol 40 No 3 September 2010, and a copy of the South Pacific Underwater Medical Society (SPUMS) *guidelines on medical risk assessment for recreational diving*.

The article '*Medical assessment of fitness to dive – comparing a questionnaire and medical interview-based approach*' by Catherine Meehan and Michael Bennett evaluates the performance of the self assessment dive declaration (the RSTC

Medical Statement) compared to a medical interview. The article's introduction details that only Queensland, by the code of practice, requires all would-be recreational dives to have a medical consultation with a medical practitioner that has experience in dive medicine. In many other countries only a self-declaration health questionnaire is required with the candidate required to have a medical assessment if they identify as having an at-risk condition. The article identifies that there is ongoing discussion in Australia and within SPUMS as to whether the Australian Standard 4005.1 should adopt the ISO standard of a self-declaration questionnaire or retain the compulsory face-to-face dive medical.

The article makes reference that the United Kingdom, until March 2000, required a diving candidate to attend medical consultation. However, this system was changed to a self-assessment system after a study that reviewed information found on the medical forms of the Scottish Sub-Aqua Club concluded that face-to-face medical examination was of little added value. A subsequent review concluded that self-administered questionnaires were an effective screening tool for the detection of divers requiring further detailed assessment.

The article concludes that 'approximately 1% of all diving candidates 'passed' the RSTC screening questionnaire but were subsequently found on medical consultation to be 'unfit to dive'. The impact on the morbidity or mortality remains unknown. Evidence exists both in favour of face-to-face medical assessment before undertaking scuba training and that such consultations add little value to the prospective diver. More work is needed in this area. At this time, we recommend caution before implementing changes to the current system of assessment in Australia, and the inclusion of a valid and meaningful assessment of the impact of any such change.'

The introduction in the SPUMS guidelines on medical risk assessment for recreational diving states that 'All candidates for diving should have a medical assessment and this assessment should be repeated after any significant illness or change in health status. Divers with chronic medical conditions may require more frequent assessment. SPUMS recommends that divers should be re-assessed at the age of 45 years and then at intervals of no more than five years.'

The reference group has carefully considered the information available and has concluded that the current guidance contained in the code of practice regarding medical fitness for entry-level certificate divers has reduced the opportunity for Queensland dive operators to compete in this market, particularly for operators in south-east Queensland and those in remote or isolated locations.

Queensland operators are operating in a competitive market with a client base made predominantly from transient tourists who can choose to undertake the course in other locations, and the largest population base is in South East Queensland who can choose to undertake the course in northern NSW.

If all other Australian States required a medical fitness for entry-level certificate divers then these factors would not be as relevant. However, there is no indication that any other States have any intention of moving to require this standard.

However the impact of this standard needs to be weighed against the potential safety benefits to clients.

The reference group considered that there is value in face to face medical assessment for candidates who have medical conditions that may put their safety at risk if allowed to dive. However it is unreasonable to require all candidates to obtain a medical certificate for what is a recreational activity.

The reference group was reminded regularly at the public forums that persons undertaking these activities are doing so on their own free will for recreational purpose as opposed to persons engaged in occupational diving.

The information available to the reference group indicated that the fatality rate for PADI entry-level diver training world wide is approximately 0.4 fatalities per 100 000 dives, a rate lower than the estimated Queensland scuba diver fatality rate at about 0.49 per 100 000 dives.

The United Kingdom moved away from compulsory dive medicals in 2000 and a review conducted three years later concluded that self-administered questionnaires were an effective assessment.

The Diving and Hyperbaric Medicine article by Catherine Meehan and Michael Bennett determined that approximately one per cent of all diving candidates 'passed' the RSTC screening questionnaire but were subsequently found on medical consultation to be 'unfit to dive'. The impact on the morbidity or mortality remains unknown.

Cardiac and underlying coronary conditions are the most significant health issue for persons undertaking diving as identified by the PADI PowerPoint and the WHSQ fatality data. In addition persons aged over 45 are also at an increased risk as identified by the PADI PowerPoint, the WHSQ fatality data and the SPUMS guidelines on medical risk assessment.

From this information the reference group concludes that self-administered questionnaires for entry-level dive candidates, that requires a candidate who has identified that they have an at risk condition to have a medical certificate declaring them fit to dive prior to being allowed to participate in an entry-level dive course is an effective fitness to dive assessment, except for candidates over the age of 45 and persons with cardiac and underlying coronary conditions.

It is a simple process for an operator to determine a candidate's age and on this basis the reference group considers that all candidates over the age of 45 must be required to have a medical certificate declaring them fit to dive prior to being allowed to participate in an entry-level dive course.

With respect to cardiac and underlying coronary conditions the reference group is mindful that operators are not medical professionals and should not be required to make a medical determination if an entry-level dive candidate has a cardiac or underlying coronary condition. Any determination required by the operator to identify a person with an increased risk of a cardiac or underlying coronary condition must be made using a non-subjective test.

Information found on the Australian Government's 'Measure up' campaign website (www.measureup.gov.au) provides two measures to help determine if a person is at increased risk of developing a chronic disease including cardiac and underlying coronary conditions. The two measures are a Body Mass Index (BMI) and a waist circumference measurement.

A person with a BMI over 30 is considered to be obese. A waistline of greater than 102 cm for most men or 88 cm for most women is an indicator of internal fat deposits, which can surround the heart, kidneys, liver and pancreas, and greatly increases the risk of chronic disease.

Each of these measurements is easy to conduct with limited subjectivity. The reference group considers that if an entry-level dive candidate were to present to an operator with measurements equal to or greater than the thresholds listed above it would be reasonable for the operator to conclude that the person has an increased risk of a chronic disease including cardiac or an underlying coronary condition. In this circumstance the candidate must be required to have a medical certificate declaring them fit to dive prior to being allowed to participate in an entry-level dive course.

The reference group considered that the combination of self assessment with a mandated requirement for identified candidates to have a medical certificate declaring them fit to dive prior to being allowed to participate in an entry-level dive course achieves a safe outcome for persons wanting to engage in a recreational activity without unnecessary regulatory burden on operators.

Recommendation 9: Amend the SRWA Regulation to require an operator to obtain a medical declaration (in a form approved by the regulator) from all entry-level dive candidates prior to allowing them to dive and require the operator to view a fitness to dive medical certificate for the dive candidate if the person:

- identifies they have an at risk condition; or
- is over 45 years old; or
- has a BMI over 30 and a waist circumference greater than 102 cm for males and 88 cm for females.

Recommendation 10: Delete the guidance contained in section 2.3.1.2 of the code of practice and replace with guidance on how to comply with the new SRWA Regulation detailed in recommendation 8.

8. General

There was some discussion regarding the way in which compliance activities were conducted by WHSQ. Although scheduled visits to operators gave time and allowed for a comprehensive assessment of the dive and snorkel services provided, they were limited as operators were aware that an inspector would be visiting. Unscheduled visits were typically limited by time and often conflicted with conduct of the business.

Alternative approaches to compliance were discussed. It was noted that the incident notification requirements under the SRWA Act were broader than those currently in place and would result in more incidents and near misses being notified to WHSQ. This would enable the WHSQ to monitor compliance through the investigation process. However it was noted that certain types of diving incidents, particularly those involving missing persons and resort diver separations that did not result in injury, were not classed as dangerous events.

Industry expressed considerable concern that the obligations to ensure health and safety under the existing legislation rested primarily on the dive business. There was discussion about the relative responsibilities of both workers and clients.

It was noted that dive industry workers were primarily persons holding dive supervisor or dive instructor qualifications issued by a recreational dive training organisation. However it was also noted that these qualifications were not always current or particularly relevant to the type of diving work, such as resort diving, undertaken in Queensland.

Industry indicated a desire that workers be made more aware of their duties and that this be reflected in compliance and enforcement actions taken by WHSQ.

There was also discussion about the responsibilities of customers, particularly certificated divers, and whether they were effectively discouraged from taking responsibility for their own behaviours by the level of care required from the dive businesses. It was agreed that there were many certificated divers who had entry level training, were not experienced or were unfit and that they required support and supervision to dive safely. However experienced divers were sometimes restricted in being able to dive in ways commensurate with their experience and that some therefore did not dive in Queensland. It was agreed that the responsibilities of the various parties should be better clarified.

An example of this opinion is found in the submission by Bob Halstead of Halstead Diving who states that *'I believe the industry safety record would actually be improved if the operators were made to comply with their real responsibilities – e.g. making sure every passenger is aboard before leaving a site, ensuring the vessel has adequate rescue and first aid capability, and is seaworthy etc. instead of trying to take over the responsibilities of the individual certified snorkeller/diver, and or Dive Instructor working to Certifying Agency standards, by policing depths, times, reverse profile dives etc. and creating the false impression that snorkellers/divers are being "looked after".'* And provided further that *'The danger depends on who is making the dive - Does the diver have the skills, knowledge*

and equipment necessary to overcome the risk? If the diver does: - the dive is safe for that diver. If the diver does not: - the dive is dangerous for that diver.'

Recommendation 11: Amend the SRWA Regulation to include additional notification requirements for incidents involving failed head counts, resort diver separation and unplanned diver retrieval.

Recommendation 12: WHSQ to continue to liaise with industry to develop further information products that assist in clarifying the roles and responsibilities of businesses, workers and certificated dive customers, such as developing an industry 'Dive esafe' newsletter.

Appendix 1

Ministerial media statement

Education and Industrial Relations
The Honourable Cameron Dick

Thursday, August 18, 2011

Bligh Government and dive industry committed to safety

The Hon. Cameron Dick Minister for Education and Industrial Relations today announced the establishment of a new Dive Safety Reference Group to ensure Queensland continues to have Australia's most comprehensive industry safety regime.

Mr Dick said Queensland needed to strive for a zero harm dive industry. "Recreational diving contributes approximately \$1.4 billion to the Queensland economy every year and it is a major driver in our tourism sector," Mr Dick said. "This means it is in the interests of all Queenslanders that we continue to have one of the safest diving industries in the world.

"Incidents on dive trips can have deadly consequences which are deeply tragic for everyone involved, as well as seriously damaging the image of diving in Queensland.

"Around 1.2 million people go diving or snorkeling in Queensland every year and while the rate of incidents is extremely low, we have to strive towards a zero harm dive industry."

Mr Dick said the reference group would be chaired by Member for Barron River Steve Wettenhall and include Executive Officer of the Association of Marine Park Tourism Operators Col McKenzie, Heather Thatcher from Fantasea Cruises and Workplace Health and Safety Queensland representatives.

"The reference group will meet with operators in key locations including Cairns, Townsville, the Whitsundays and the Sunshine Coast to examine how we can make Queensland's dive industry even safer," he said.

"The reference group will report on the adequacy of the current regulatory framework for the industry, including the diving industry code of practice, and look at how it is being implemented to determine whether further regulation is required.

"It will also look at what other jurisdictions are doing to ensure Queensland's industry continues to implement a world's best practice dive safety regime. "Finally, the reference group will identify strategies to raise public awareness of dive safety to ensure tourists and residents understand their responsibilities when it comes to snorkeling and diving safely."

Mr Wettenhall said the report would help ensure Queensland continues to enjoy a reputation as a safe place to dive and snorkel.

“Cairns is one of the most popular diving locations in the world and our dive operators have a well-earned reputation for safety, however, it is important we continue to look at how we can continue to improve performance,” he said. “The reference group will bring together the key players to work out how we can improve across the industry.”

Mr Dick also used his visit to the Great Barrier Reef International Marine College to announce a suite of tools currently under development to promote safety across the industry.

“For the first time this year we will be holding ‘Diver Safety Awards’ as part of Safe Work Week,” Mr Dick said.

“These awards will promote best practice rescue procedures across the industry. “To enter dive operators will be required to film a dive rescue drill highlighting their commitment to safety.

“We are also developing a handbook for workers and a DVD for tourists and other prospective divers.”

Member for Cairns Desley Boyle applauded the new initiatives.

“Many dive tourists and workers are visitors from overseas and it is important they have access to all the relevant information,” Ms Boyle said.

“The handbook, which is being developed in conjunction with the dive industry, will highlight risk factors, discuss the relevant legislation, highlight case studies and importantly, showcase best practice across Queensland.

“The DVD for prospective divers and snorkelers highlights medical risk factors as well as the various safety procedures in operation.”

**Media contact: Office of the Minister for Education and Industrial Relations
3237 1000**

Appendix 2

Information Paper

Introduction

The Minister for Industrial Relations, the Hon Cameron Dick has announced the establishment of a new Recreational Diving and Snorkelling Industry Safety reference group (the reference group) to ensure Queensland continues to have Australia's most comprehensive safety regime and strives for a zero harm recreational diving and snorkelling industry.

The terms of reference for the reference group are:

- Examine and report on the adequacy of the current regulatory framework covering recreational diving and snorkelling;
- Identify and consider contemporary responses including legislative responses, to ensure Queensland's recreational diving and snorkelling industry continues to be world's best practice; and
- Identify strategies to increase public awareness of risks associated with recreational diving and snorkelling and how the public can assist in ensuring safety.

The reference group is chaired by Member for Barron River Steve Wettenhall MP and includes Executive Officer of the Association of Marine Tourism Park Operators Col McKenzie, and Heather Thatcher from Fantasea Cruises and Chris Coxon from the Workplace Health and Safety Queensland dive unit.

In addition to accepting written submissions, the reference group is holding public industry forums in key locations of Cairns, Townsville, the Whitsundays, the Sunshine Coast and Brisbane to examine how to make Queensland's recreational dive industry safer.

Following this consultation, the reference group will report on the adequacy of the current regulatory framework for the industry, including the recreational diving industry code of practice, and look at how it is being implemented to determine whether further regulation or guidance material is required. It will also identify strategies to raise public awareness of recreational dive and snorkel safety to ensure participants, workers and businesses understand their responsibilities when it comes to safety.

This information paper aims to provide an overview of industry participation, risk factors, the current ways in which Workplace Health and Safety Queensland (WHSQ) regulates the industry and key issues for consideration by industry.

Snap shot of Queensland recreational dive and snorkelling industry

There are approximately 1.2 million diving trips and 2.3 million snorkelling trips undertaken in Queensland each year, with approximately half undertaken by overseas visitors.

Queensland's recreational diving and snorkelling sector contributes approximately \$1.4 billion to the Queensland economy every year and it is a major driver in the

state's tourism sector. It is therefore in the interests of all Queenslanders to continue to have one of the safest recreational diving industries in the world.

Incidents on recreational diving and snorkelling trips can have deadly consequences which are deeply tragic for everyone involved, as well as seriously damaging to the image of diving in Queensland. However, the rate of incidents in Queensland is already extremely low.

The article "Review of scuba diving fatalities and decompression illness in Australia" in the *Diving and Hyperbaric Medicine Journal* in 2008 estimated Queensland scuba diver fatality rate at about 0.49 per 100 000 dives, significantly lower than 2.5 per 100 000 cited for Victoria and lower than five other international studies quoted.

The existing work health and safety framework

Currently, Queensland has comprehensive regulations and a code of practice for the recreational dive and snorkelling industry, made under the *Workplace Health and Safety Act 1995* (the WHS Act). These have been developed collaboratively with the dive industry and refined over a number of years.

As a part of the the harmonisation of national work health and safety laws, specific regulation directed to ensuring the safety of customers of recreational dive and snorkelling providers was considered 'out of scope' by Safe Work Australia for the national model *Workplace Health and Safety Regulations 2008* (the WHS regulations).

In order to retain the existing regulatory protection for customers of recreational dive and snorkelling providers, it has been necessary to introduce specific stand-alone *Safety in Recreational Water Activities Act 2011* (the SRWA Act). The WHS regulations and code of practice relevant to the safety of customers of recreational dive and snorkelling providers will be transferred across to the SRWA Act from 1 January 2012.

The health and safety of workers engaged in the recreational diving and snorkelling industry will be covered under the nationally harmonised work health and safety laws, including specific dive regulations and code of practice. These regulations are currently being finalised and it is anticipated that there will be no significant changes for the recreational diving industry in Queensland.

To support the regulatory framework WHSQ undertakes a range of activities to assist industry to comply with the relevant regulatory provisions. The establishment of the WHSQ Diving Unit in January 2009 increased WHSQ's ability to provide enhanced services to the recreational dive industry.

WHSQ has an extensive range of information products to support the recreational diving and snorkelling industry to undertake their business safely. As well as the advisory and education work performed by the WHSQ Dive Unit, WHSQ has online information products such as checklists, fact sheets, non-English publications, presentations, alerts, posters and prosecution outcomes. In 2011 WHSQ is also implementing the Dive Safety Awards to recognise dive operators who regularly undertake diver rescue drills.

Key risk areas

The following matters have been identified by WHSQ as current key risk areas for the recreational dive and snorkelling industry.

The Dive Safety Reference Group is particularly interested in industry participants providing submissions that address these matters and provide comment on how these matters can be made safer without creating a one size fits all regulatory requirement.

Submission are also sought from industry participants on how systems can be implemented that encourage business to develop innovative ways to ensure Queensland continues to lead the world in recreational dive and snorkelling safety.

Missing divers and snorkellers

Since the deaths of two American divers who were left behind by a dive vessel in 1998, there have been a number of other instances where divers and snorkellers have gone missing from their vessels. In most cases certificated divers have gone missing on the surface after a dive requiring search and rescue by Emergency Services. In fewer cases vessels have left the dive or snorkel sites without properly counting all persons on board and leaving persons behind.

Searches for missing divers undertaken by the Emergency Services (Queensland Police Service, Emergency Management Queensland and Australian Maritime Safety Authority) are costly, resource intensive and create considerable risk for the searching parties. Currently the cost of search and rescue is borne by the Queensland Government with no cost to dive industry operators. Missing diver incidents also attract intense media interest creating ongoing costs and negative perceptions of the recreational diving and broader Queensland tourism industry.

Analysis of the incidents show certain trends:

- manual counts of persons on vessels have failed due to a lack of diligence and a lack of cross checking procedures;
- all incidents of persons going missing after dives involved pairs of certificated divers;
- certificated divers of all levels of experience have become lost or disorientated whilst underwater and surfaced away from the designated dive area;
- none of the missing divers were supervised by a dive worker during the dive;
- all incidents of persons going missing after dives were associated with currents;
- all of the incidents occurred at offshore reefs. In some cases this delayed or limited the response by Emergency Services;
- approaching dusk and nightfall exacerbated the difficulties of some searches; and
- most divers were equipped with simple signalling devices such as safety sausages and whistles. None were equipped with electronic signalling devices. The simple signalling devices did not allow the divers to be spotted by lookouts

The current advice in the *Recreational Diving, Recreational Technical Diving and Snorkelling Code of Practice 2010* (the code of practice) provides a range of ways

in which counts can be undertaken to prevent any person being left behind after diving and snorkelling. However, not all systems involve a cross check involving two separate crew persons independently verifying that everyone is on board.

Although electronic counting systems are used in other contexts, such as on cruise ships, they are not currently in use in the Queensland recreational dive and snorkel industry. To maintain public confidence that Queensland has the safest diving in the world, the industry needs to identify counting systems that give surety to the accuracy of the counts undertaken.

To ensure divers who surface away from their vessels are recovered in a timely manner, the dive industry needs to consider what additional equipment or systems may be required. A range of electronic signalling devices are available and are currently being introduced or mandated in other countries, such as Egypt.

Possible questions:

- *What factors increase the risk of a failed count of persons on board?*
- *Is the current regulation for conducting a count of all persons on board adequate?*
- *What additional information should be included in the Recreational Diving, Recreational Technical Diving and Snorkelling Code of Practice 2010 to ensure persons are not left behind at dive sites?*
- *How can the current head count systems be made more robust and less prone to counting errors?*
- *Should independent divers (i.e. not diving with a guide) be issued with an electronic signalling device to assist with on board recovery?*

Cardiac risk and snorkellers

The most common cause of death for recreational snorkellers is after suffering a cardiac event. Some drowning events also involved cardiac events. Most events involved men aged over 50 years. In approximately half of these cases, the person exhibited cardiac risk factors, such as obesity, smoking or high blood pressure, even if they were not diagnosed with a cardiac disease.

The current regulation and code of practice address advice about medical risks, lookouts, guides, buddies, flotation devices, environmental assessment, provision of appropriate equipment and emergency preparedness. WHSQ has a range of awareness and engagement products to support increasing public awareness and the ability of snorkelling operators to identify, inform and respond to at-risk snorkellers.

The snorkelling industry needs to consider innovative ways to advise at-risk snorkellers of the relevant risks and then manage these risks in ways which allow the safe participation by all customer groups.

Possible questions:

- *What factors increase the risk of injury or death to recreational snorkellers?*
- *Is the current regulation for advising snorkelling participants about the medical risks associated with snorkelling adequate?*

- *How can industry better identify at risk snorkellers?*
- *How can industry and WHSQ better educate potential at risk snorkellers of the risks?*
- *Should snorkelling be separated from the Recreational Diving, Recreational Technical Diving and Snorkelling Code of Practice 2010, with guidance provided in a snorkelling code of practice?*

Resort diver separation from instructors

Resort, or introductory diving, accounts for approximately half of all diving that takes place in Queensland. As the participants have no more than an absolute minimum of training and no experience in diving, the degree of responsibility and control required by operators is extremely high. In nearly all cases of fatalities involving resort divers, the incident has commenced with the separation of the resort diver from their supervising dive instructor.

Analysis of resort diver incidents show certain trends:

- all incidents commenced with a separation between the resort diver and dive instructor;
- at the time of separation, most instructors were swimming in front of and facing away from the resort divers;
- most incidents involved dives conducted at maximum (4:1) student: instructor ratios;
- Several incidents involved poor environmental conditions, particularly poor visibility (<4m), currents, swell or choppy surface conditions;
- no dives were conducted using assistants;
- hand holding or tethering was not used;
- some divers were overweighted; and
- some divers surfaced but were unable to maintain positive buoyancy at the surface.

The current regulation and the extensive advice in the code of practice provide a range of ways in which resort divers should be supervised while underwater. Despite the advice about reducing ratios in poor conditions and holding hands, these do not appear to be common industry practices.

Training and supervision of dive instructors to ensure that they are using correct supervision techniques also appears to be a common concern. To maintain public confidence that Queensland has safe systems for conducting resort diving, the industry needs to provide ways in which the supervision of all resort divers can be guaranteed on all dives.

Possible questions:

- *What factors increase the risk of injury or death to resort divers?*
- *Is the current regulation for supervision of resort divers adequate?*
- *Should the regulation prescribe additional controls for resort dives conducted in poor environmental conditions?*
- *Should resort dives only be conducted by a dive instructor and certified assistant unless all persons are in contact?*

Appendix 3

Written submissions

1.	Keith Cardwell	FNQ Dive
2.	Rod Punshon	Pro Dive Cairns
3.	John and Linda Rumney	Enos Agent
4.	Cathy Meehan	SPUMS
5.	Lee Waters	Seasafe Pty Ltd
6.	Ray Crampton	Dive World
7.	Bob Halstead	Halstead Diving
8.	Heather Batrick	yongaladive.com.au
9.	Richard Evans	PADI Asia Pacific
10.	Jo Harris	Spirit of Freedom
11.	Travis Clarke	Quicksilver Connections
12.	Heinz Hoegger	Quicksilver Connections
13.	Scott Cappellani	Down Under Dive
14.	Judy Marshall	Great Adventures
15.	Alan Wallish	Passions of Paradise

Appendix 4

Examples of available signalling devices

Links to currently available electronic location devices for divers

<http://www.seamarshall.com/>

<http://www.sea-safe.com.au/>

<http://www.nautiluslifeline.com/>