



DIVING POLICY & PROCEDURES

Version 7.5

August 2009

This is a working document that may be updated without notice.

Prior to conducting any University of Tasmania diving operation, please ensure you have read and have a working knowledge of the latest copy of this Manual. Copies can be obtained from the University Diving Officer – Phone 03 6226 2608

PLEASE NOTE

The information contained in this manual presents the minimum acceptable safety procedures to be employed in all UTAS diving operations.

No set of standard procedures can anticipate all situations that may be encountered during field operations, and as a result, no individual may assume they will be safe if they blindly follow the guidelines presented in this document.

No standards will ever exist which can substitute for common sense, sound judgment, and a continuing concern for safety.

SAFETY IS NOT A RULE BOOK - IT IS A STATE OF MIND.



DIVING POLICY AND PROCEDURES

OVERVIEW

The University of Tasmania is committed to continuously improving the management and standards of Occupational Health and Safety, and this extends to minimising the risks associated with diving activities. This Diving Procedure provides the minimum requirements for all diving activities undertaken by University of Tasmania employees.

DEFINITIONS

Accountable Person:

An individual, who assumes responsibility for the health and welfare of any other person in a workplace by providing instruction, direction, assistance, advice or service, is deemed an accountable person in accordance with the Workplace Health & Safety Regulations 1998. All management and supervisory staff (which include those with responsibility for students) are therefore considered "accountable persons".

Employee:

For the purposes of this Procedure, employee refers to any staff member, student, contractor or visitor.

Responsible Officer:

Deans, Heads of Division, Heads of School and Administrative Sections have been designated as Responsible Officers under the Workplace Health & Safety Act 1995.

RESPONSIBILITIES

Accountable Person:

Accountable Persons must ensure employees are able to undertake diving activities safely by implementing this procedure, and ensuring that appropriate records relating to diving activities are kept. For further information regarding duties of Accountable Persons please refer to the UTAS Occupational Health and Safety Policy at http://www.admin.utas.edu.au/hr/ohs/pol_proc/.

Where an employee is required to supervise a diving activity, the accountable person is responsible for ensuring that delegated safety responsibilities are fulfilled and that appropriate supervision is provided.

Diving and Boating Safety Committee

The University of Tasmania Diving and Boating Safety Committee (UTDBSC) is a sub committee of the University's Occupational Health & Safety Committee and has the responsibility for the following:

- Oversight and administration of University diving and boating projects, including compliance with relevant policies and operational procedures;
- Development of policies and procedures associated with University of Tasmania Diving and Boating activities;
- Recommendation of appropriate disciplinary action in the event of unsafe diving or boating activities by any individual or group within the University – if necessary including suspension of scientific diving/boating projects, or any individual's certification as a Scientific Diver within the University;
- Investigation of all diving and/or boating accidents/incidents, and to report violations of the University's policies and procedures to the Occupational Health and Safety Unit.
- Consideration of scientific diving/boating related problems encountered while diving or operating under the policies or procedures of the University's Diving Operations Manual and Boating Activity Policy.

Employee

Employees must ensure that prior to undertaking any diving activity, they meet or exceed all requirements outlined in the University of Tasmania Field Activity Policy and Diving Procedures Manual.

Whilst undertaking any diving activity, employees are required to undertake the activities in a manner which does not adversely affect their own health and safety, or that of others, by following such Procedures. They must immediately report to the Accountable Person any matter which may affect their own or others' health and safety.

Responsible Officer:

Responsible Officers must ensure that where employees are required to undertake diving activities, such activities are undertaken in accordance with this Procedure.

University Diving Officer:

The University of Tasmania's Diving Officer is a University-wide suitably qualified and experienced Diver who has responsibility for Diving activities.

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Referenced Material

- American Academy of Underwater Sciences – Standards for Scientific Diving - 2001;
- Australian Institute of Marine Science Diving Procedures Manual - September 1997;
- DCIEM Diving Manual - Part 1: Air Decompression Procedures and Tables;
- Dive Computers - A Consumer's Guide to History, Theory and Performance 1991, Ken Loyst, Karl Huggins & Michael Steidley, Watersport Books;
- Diving and Subaquatic Medicine: 1976, Edmonds, Lowry and Pennefather, Diving Medical Centre.
- NOAA Diving Manual – 4th Edition (2001);
- Standards Australia AS2030 - Storage of Compressed Gases; AS3848.2 – Filling of Gas Cylinders for Diving;
- Standards Australia AS2299.1: 2007 – Occupational Diving Operations Part 1 – Standard Operational Practice;
- Standards Australia AS2299.2: 2002 Part 2 – Scientific Diving;
- Standards Australia AS2815.1: 1992 Training and certification of occupational divers Part 1: SCUBA diving to 30m;
- Standards Australia AS2815.2: 1992 Training and certification of occupational divers Part 1: Air diving to 30m;
- Standards Australia AS2815.6: 200? Training and certification of occupational divers Part 6: Restricted Occupational SCUBA Divers;
- Tasmanian Department of Primary Industry and Fisheries - Diving Procedures Manual 1997;
- Tasmanian Workplace Health & Safety Act 1995 and Workplace Health & Safety Regulations 1998;
- University of Hawaii Diving Manual;
- University of Queensland - Heron Island Research Station Diving Procedures Manual;
- University of Western Australia - Code of Practice for Underwater Diving;
- Workplace Health and Safety Compliance Standard 1996 - Underwater Diving Work;

RELATED POLICIES AND PROCEDURES

A full list of UTAS OH&S Policies and Procedures can be found at http://www.admin.utas.edu.au/hr/ohs/pol_proc/.

The policies listed below relate directly to issues covered in this Manual, and should be consulted for detailed information should one or more need to be addressed by a Risk Assessment or Dive Permission Form.

- Occupational Health & Safety Policy
- Alcohol, Tobacco & Drugs in the Workplace
- Boating Activity Policy
- Confined Space Entry Procedure
- Field Activity Policy
- First Aid in the Workplace Policy
- Guidelines for Driving Vehicles
- Hazardous Substances Policy and Procedures
- Hearing Conservation Management Policy
- Manual Handling Policy and Procedures
- Occupational Exposure to Blood/Body Fluids
- OH&S Issue Resolution Procedure
- Out-of-Service Procedure
- Personal Protective Equipment Policy/Procedures
- Project/Task Risk Assessment & Control
- Workplace Inspection Procedure and Checklist
- Zoonoses and Animal-Based Hazards Policy

This is a working document and may be updated without notice. Prior to conducting any UTAS diving operation, you must have read and understood a copy of the latest version of this Manual

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SECTION 1. SCOPE OF THIS MANUAL AND LEGAL CONSIDERATIONS

1.1 SCOPE

This document is The University of Tasmania (UTAS) Diving Procedures Manual. It is intended to provide information and advice for all divers involved in underwater research and teaching activities at the University, as well as providing a concise statement of approved policy and procedures governing all Snorkel (breath hold) and Compressed Air diving operations conducted through the University, or that could be deemed to be related to the University in any way.

The aim of these procedures is to ensure users conduct their diving operations in a safe manner, and it is the responsibility of each individual diving with the University to ensure they are familiar with this manual, and follow its requirements.

Procedures indicated as "not permitted" in this manual may be allowed by the University Diving Officer (UDO), in exceptional circumstances. Variations can only be permitted by the UDO, with detailed conditions set down in writing and agreed to in writing by all parties involved. These shall be kept on file by the UDO for at least 7 years.

At this time, the following activities are NOT permitted, without explicit written permission from the UDO:

- Diving to depths of greater than 30 meters;
- Diving with gas mixtures other than air (including in water decompression using oxygen);
- Diving with closed circuit or semi-closed circuit rebreather equipment.

1.2 DUTY OF CARE AND LEGAL RESPONSIBILITIES

The following points are designed to provide guidelines to divers and dive teams while operating in the field.

- Under 'Duty of Care', each person has a responsibility for their own health and safety, as well as for the health and safety of other personnel working within the same environment;
- Diving can be hazardous, however education, training and teamwork will lower risk. This manual is to be used as a procedures manual, and if all procedures are followed any risks to health and safety will be significantly reduced;
- Individuals or groups participating in compressed air or breath hold diving operations under the control of the University must operate within the guidelines and intent of all related UTAS standards and procedures;
- Individuals or groups who fail to follow safe diving practices as outlined by this Manual, or as directed by the UDO or a SDO, may be legally responsible and liable for their actions in the event of any incident;
- The nominated Dive Coordinator for a field trip is responsible for the entire Dive Team during the period in which that Dive Team is under his/her control, however it must be noted that **risk assessment is the responsibility of all team members**. In the event that weather conditions, environmental factors, equipment or personnel are considered by any member of the team to create or contribute to an unsafe working situation, then the diving operation must not continue until the situation is corrected to the satisfaction of the entire team;
- At all times any tasks assigned by Dive Coordinators or Team Leaders must be within the experience and training of the diving personnel concerned, and the capacity of the equipment available.

1.3 DEFINITIONS

No effort has been made to rigidly standardise the terminology used in this Manual, as there are no agreed definitions for many of the terms used. Certain words however, are used in instances where instructions or recommendations are given, and these must be interpreted as follows:

- | | | |
|-----------------------------|---|---|
| MUST | - | there are no circumstances under which this recommendation may be ignored |
| WILL/SHALL | - | other than in exceptional circumstances this recommendation should always be followed |
| SHOULD / RECOMMENDED | - | normal diving practice requires this recommendation be followed, but there may be circumstances in which it is appropriate for it to be relaxed |
| CAN/MAY | - | the diver/diving operation may well benefit from employing this technique. |

1.4 CHAIN OF AUTHORITY AND RESPONSIBILITIES

1.4.1 Diving and Boating Safety Committee

The University of Tasmania Diving and Boating Safety Committee is a subcommittee of the University's Occupational Health & Safety Committee and has responsibility for the following:

- Oversight and administration of all University of Tasmania diving and boating projects, including compliance with relevant policies/procedures;

- Ongoing review/development of policies/procedures associated with UTAS Diving & Boating activities;
- Recommendation of appropriate disciplinary action in the event of unsafe diving or boating activities by any individual or group within the University – up to and including suspension of scientific diving/boating projects, or any individual's certification as a Scientific Diver within the University;
- Investigation of all diving and/or boating accidents/incidents, and reporting of violations of the University's policies and procedures to the Occupational Health and Safety Unit; and
- Consideration of scientific diving/boating related problems encountered while diving or operating under the policies or procedures of the University's Diving Procedures Manual and Boating Activity Policy.
- Establishment and/or approval of training programs through which the applicants for diving certification within the University can satisfy the requirements of the UTAS Diving Procedures Manual.
- Establishment of criteria for equipment selection and use.
- Recommendation of new equipment or techniques.
- Establishment/approval of facilities for inspection and maintenance of diving and associated equipment.
- Conducting periodic review of the Diving Safety Officer's performance and program.

1.4.2 University Diving Officer

The UTAS Diving Officer (UDO) is a University-wide suitably qualified and experienced Diver who has responsibility for Diving activities. The UDO is responsible for ensuring all University of Tasmania divers are adequately qualified, trained, equipped and supervised. More specifically, he/she is responsible for the following:

- Administering and supervising all diving projects conducted through the University to ensure full compliance with all relevant procedures, legislation and standards, including:
 - a) *Coordinating maintenance and ensuring currency of the University Diver Register;*
 - b) *Coordinating maintenance of the University Diving Activity and Diving Equipment Registers, and approving and filing diving related paperwork, from ALL diving activities in the University;*
 - c) *Approving new divers and ensuring they are given an induction in diving procedures with UTAS;*
 - d) *Ensuring all divers are trained and qualified for the tasks they wish to participate in;*
 - e) *Appointing Dive Coordinators in writing on an annual basis, and ensuring the Dive Coordinator for each dive prepares a complete dive plan for that diving operation;*
 - f) *Ensuring all equipment is maintained to required standards; and*
 - g) *Ensuring UTAS Risk Assessment, Safe Work Practice and Project Registration forms are completed for each diving project as appropriate, prior to commencement;*
- Assisting with selection, appointment and supervision of Site Diving Officers, and ensuring that effective liaison occurs between the University Diving Officer, Site Diving Officers, and all UTAS divers;
- Providing advice in the planning of research diving operations, in order to maximise their scientific yield without compromising safety;
- Providing, organising, or advising on any diver training required by individuals as appropriate, including inducting all UTAS Dive Coordinators, and ensuring inductions are performed for all new divers and dive support personnel;
- Supervising the use and periodic maintenance of all UTAS diving equipment, and prohibiting the use of equipment which is past its service date, or which he/she considers unsafe;
- Ensuring air tests are carried out for all air compressors used during UTAS diving operations, and that these provide air within the limits prescribed in Clause 4.2.1 of Australian Standard 2299.2;
- Supervising the use of specialist diving equipment;
- Maintaining records of dive plans, dive logs, incident records, air tests and any maintenance/repair of UTAS equipment, and keeping such records for a minimum of 7 years;
- Maintaining diving equipment defects log recording any problems with UTAS equipment, the date of the problem, and the action taken to remedy the problem.

1.4.3 UTAS Deputy Diving Officer

The Deputy Diving Officer (DDO) is a University-wide suitably qualified and experienced Diver who has responsibility for assisting the UDO with monitoring University Diving activities, disseminating information to other divers, and assisting with UTAS training and inductions where possible.

The DDO should be an active UTAS diver, and should be sufficiently familiar with UTAS diving procedures and activities that they can fill the role of UDO should this be delegated to them by the UDO. An individual nominated as UTAS Deputy Diving Officer should have this formally role recognised on their duty statement, including all relevant responsibilities.

1.4.4 Site Diving Officers

The University Diving Officer (UDO) may nominate any individual as a Site Diving Officer (SDO) with their agreement, to assist with diving management tasks. A SDO may be nominated for a particular UTAS site (e.g. Aquaculture), or for a project or research group (e.g. MRL Rock Lobster, Abalone or Marine Environment groups).

NB: An individual expected to act in a Site Diving Officer role should have this recognised on their duty statement, including all relevant responsibilities.

Any nominated Site Diving Officers will be expected to fulfil an important dive leadership role for their diving site or project, and major responsibilities revolve around day to day monitoring of what is occurring within their particular workplace/project (however unless formally delegated, the role of SDO does NOT include approving divers or diving operations). More specifically they should be involved in tasks such as:

- Evaluating fieldwork practices and conditions in conjunction with the UDO, to ensure all diving is conducted to relevant standards and safety requirements, in accordance with this procedures manual;
- Liaising with the UDO to ensure communications are implemented both ways between UDO and divers;
- Assisting divers with risk assessment, project registration and dive planning issues as required;
- Assist in modifying such forms as required by the UDO to meet safety considerations, prior to commencement of diving operations, and ensuring that all risk minimisation strategies resulting from approved Risk Assessments are implemented by the dive teams concerned;
- Ensuring that divers at their site forward all required details and information to UDO for filing;
- Providing advice in the planning of research diving operations, in order to maximise their scientific yield without compromising safety;
- Providing, organising, or advising on any further diver training for individuals, as appropriate;
- Supervising the use and periodic maintenance of all diving equipment under their control, and prohibiting the use of equipment which is past its service date, or which he/she considers unsafe;
- Maintaining records of any maintenance/repair of site diving equipment and forwarding copies of such records to the UDO for filing;
- Maintaining diving equipment defects logs recording any problems with UTAS equipment in their care, the date of the problem, and the action taken to remedy the problem.

1.4.5 Ship's Master

The Master of any mother ship being used for a UTAS diving operation must be briefed by the Dive Coordinator on the diving activities to be undertaken before the ship leaves port. In the event of a diving emergency, the Master shall assist the Dive Coordinator in accessing any outside assistance required.

Responsibilities of the Master of a vessel used by the University for diving operations include:

- Supervising launch and recovery of dive boats from the mother ship, and confirming that all relevant safety equipment is aboard before any dive boat leaves the mother ship;
- Hoisting of signals, warning of approaching vessels, maintenance of radio communications, and if requested by the Dive Coordinator, posting of lookouts;
- Ensuring that no work is carried out on-board the vessel when diving is in progress if there is any possibility that it could hinder the vessel from rendering assistance in an emergency;
- Ensuring that propellers cannot turn, fishing is not undertaken, and rubbish/sewage is not jettisoned from the mother ship whilst divers are underwater near the vessel.

The Ship's Master holds the power of final veto as to whether diving may take place, where they consider present or anticipated weather conditions are such that they may prevent the mother ship from rendering assistance in event of an emergency, or potentially endanger the vessel.

1.4.6 Dive Coordinator

A Dive Coordinator is the designated leader for the operation of any Dive Team. UTAS Dive Coordinators shall be nominated by the University Diving Officer on an annual basis. The role of Dive Coordinator involves numerous important responsibilities, before, during and after each dive trip and **UTAS Dive Coordinators must ensure they are fully conversant with the requirements of their position**, as listed below.

A designated Dive Coordinator must be present at every UTAS diving operation, and may act as either a Dive Attendant or as a Diver during any dive.

Responsibilities of UTAS Dive Coordinator's include:

On Appointment

- Ensuring they have a working familiarity with the UTAS Diving Procedures Manual, the Australian Standard AS2299.2 for Scientific Diving, and any other relevant UTAS OH & S procedures;
- Ensuring they have a comprehensive knowledge of the workings of the DCIEM decompression tables;
- Completing and forwarding a copy of a *UTAS Dive induction Statement of Understanding* to the UDO.

Pre Dive

- Ensuring that the diving operation, Risk Assessment, and all dive sites have been registered with and approved by the UDO, either on the University Field Operations Management System at <http://www.fieldops.utas.edu.au/>, or using the *UTAS Field Operations Registration Form* and *UTAS Risk Assessment Form* (available from the UDO);
- Ensuring suitable measures to control any identified risks have been determined, and ensuring that any individual delegated as responsible for implementing these is capable of doing so, and does them;
- Including in the Risk Assessment an Emergency Evacuation Plan, detailing intended procedures for transporting divers to the nearest usable and available recompression facility, and including a realistic estimate of the time necessary for this in the event of an accident (such time is to be taken as the time from when the diver leaves the water to the commencement of his/her recompression in the chamber);
- Ensuring all divers on the dive team are listed as current on the University Diver Register – held on the University Field Operations Management System at <http://www.fieldops.utas.edu.au/>;
- Communicating all identified issues from the Risk Assessment to all other divers on the dive team;
- Ensuring that a Dive Approval has been completed **AND APPROVED** by the UDO, for the diving operation, **prior to departure** for the trip. This should be completed through the University Field Operations Management System at <http://www.fieldops.utas.edu.au/Home> (contact the UDO if you do not have access). A Dive Approval must be completed and approved for every diving trip.
- Notifying a Nominated Contact of details of the diving operation, including providing all information required on the Nominated Contact Information Form (at [Appendix 6](#)), and ensuring the Nominated Contact is aware of their responsibilities in the event personnel from the trip do not report by the designated time;
- Conducting a pre trip briefing with the Master of any mother ship being used for a UTAS diving operation, before the ship leaves port, detailing the diving activities to be undertaken;
- Ensuring that all required diving and safety equipment is in good working order, has been packed (including adequate oxygen supplies), and is transported to the dive site;
- Determining whether or not travel after the dive will exceed an altitude threshold, and ensuring that the correct delay before travelling after diving is observed - taking into account the type of diving done, and any risk factors that may require an extension to the delay period;
- Restricting or suspending any operation considered unsafe, whilst in the field, with particular attention to weather forecasts and prevailing conditions;
- Ensuring there are adequate means of communication at every dive site in case of emergency;
- Conducting a pre-dive briefing (sample at [Appendix 11](#)) in the presence of the entire Dive Team (including Dive Attendants, Boat Handlers and Divers) and discussing all necessary control measures with the Dive Team, in particular where any dive operation contains one or more of the high risk factors listed in various sections and appendices of this Manual;
- Ensuring every diver is fully aware of their particular tasks for the dive, including knowing which other divers that they are to act as a buddy for;
- Assessing the fitness of all team divers on site immediately before the dive, and vetoing any dive as required where there is some uncertainty that a diver can safely complete it;
- Nominating a Dive Leader to control the underwater part of the diving operation for each dive team, where there are multiple teams or when the Dive Coordinator is staying at the surface during the dive;
- Delegating full responsibility for monitoring the diving operation, including diver recall and diver safety, to the Dive Attendant in the event that the Dive Coordinator intends to dive;
- Ensuring all divers conduct a pre-dive equipment check of their own and other diver's equipment, including performance of a 'bailout' contents check (to be recorded by surface attendant) & a bailout activation drill by any diver wearing 'bailout' equipment;
- Ensuring all divers are using the dive computer issued to them;
- Ensuring all required Dive Record Form pre-dive information is accurately recorded on the form.
- Ensuring all divers are aware of their current nitrogen loading status before entering the water, as well as of the permitted maximum bottom time for the intended maximum dive depth and the next deepest depth group on the decompression tables.

During Dive

- Ensuring a qualified and capable Surface Attendant is present at the surface during every dive unless otherwise approved;
- Ensuring that the dive is conducted according to the Dive Plan, and within the no-decompression limits of the decompression table approved for the dive, unless a decompression dive has been approved;
- Ensuring all dive details for all dives conducted on the trip are recorded by the Dive Attendant on a *UTAS Dive Record Form* at [Appendix 3 \(Open Circuit\)](#) and [Appendix 4 \(Rebreather\)](#) DURING the dive, listing all requested details of that dive;

- Ensuring that a properly qualified and capable Dive Leader is in charge of the 'in water' conduct of the dive, including dive termination in the event of unforeseen circumstances that may reduce diver safety.

Post Dive

- Ensuring no divers have exceeded permissible bottom times, or experienced any risk factors during the dive that could decrease the safety of their dive;
- Ensuring all divers are well after the dive, and not suffering any signs or symptoms of illness;
- Conducting a post-dive debrief with all divers to discuss issues arising before, during or after the dive, including notifying every diver of their current nitrogen loading status;
- Ensuring all equipment used is cleaned and/or flushed with fresh water at the end of each working day;
- Ensuring any defective equipment is tagged OUT OF SERVICE to prevent further use, and is reported to the UDO or a SDO as soon as possible. Equipment known to be faulty in any way must not be used for any UTAS diving operation, and shall be sent for repair immediately on return from the field trip;
- Ensuring all Dive Record Forms are fully and accurately completed, with regard to the dives listed thereon, including signing off on each form themselves and requiring each diver listed on each Dive Record Form to sign off on that form, attesting that the information is a true and accurate record of their dive/s;
- Checking in with the Nominated Contact by the designated time each day, as arranged;
- Notifying the UDO as soon as possible of any injury that occurs to any member of the Dive Team (particularly if diving-related), and fully completing a *UTAS Accident/Incident Report* for this.

Post Trip

- Ensuring the Nominated Contact is informed of the safe return of the dive team in a timely manner;
- Ensuring on completion of the diving operation that all required Post Dive details are submitted to the UDO within 3 days of the trip. This should be done using the UTAS Field Operations Management System at <http://www.fieldops.utas.edu.au/Home> (contact the UDO if you have no web access);
- Ensuring that all data from each Dive Record Form from the trip is accurately entered onto the excel spreadsheet provided by the UDO, then forwarding this to the UDO within 3 days of the trip;
- Ensuring that the original hard copies of all Dive Record Forms from the trip are forwarded to the UDO within 3 days of the trip, fully completed and signed as required by the UTAS Diving procedures manual;
- Ensuring any defective equipment is sent for repair immediately, and notifying the UDO of the problem;
- Providing the UDO with a full report of any incident resulting in accident or injury (or any near miss).

1.4.7 The Diver

All UTAS Divers must have had training and experience in accordance with the requirements of this manual, as well with operation of any equipment being used and any work being carried out during diving.

Every diver should be aware that ultimately they are the best 'safety device' they could have. Each diver should use common sense when deciding whether or not a particular dive is within their capabilities.

As well as the duties listed elsewhere in this procedures manual, every UTAS diver has responsibility for:

- Diving safely within the limits of his/her capabilities. If a Diver is uncertain about his/her ability to safely undertake a proposed dive or diving task, they should refuse to attempt that dive/task, **and may do so without prejudice**, advising the Dive Coordinator they are uncomfortable with the dive/task. If a Diver feels they are being asked to undertake dives/tasks beyond their abilities, they should notify the UDO;
- Ensuring that they are medically and physically fit for each dive;
- Giving their full attention during the Dive Coordinator's briefing;
- Abiding by the University's Diving Procedures (as set out in the UTAS Diving Procedures Manual), and any decisions made by the UDO concerning particular diving operations;
- Ensuring they have all equipment required by these procedures, and conducting a functional check of their diving equipment in the presence of their diving buddy or the Diver's Attendant;
- Maintaining contact with their dive buddy, monitoring their own air supply, and informing their buddy at regular intervals of air status. NB. All dives should be completed with at least **30 bar** of air remaining in a diver's cylinder;
- Ensuring that both they and their diving buddies are healthy before and after the dive, and that both their own equipment and their buddy's equipment is fully functional before the dive;
- Performing a 3 minute safety stop at 3-5 m on every dive of greater than 9m depth, unless unsafe to do so;
- Not diving with any malfunctioning equipment, and reporting any equipment fault to their SDO;
- Maintaining in good order, all dive equipment in use by them;
- Notifying the Dive Coordinator injury that occurs to them or their buddy as soon after as possible;
- Maintaining an up to date Dive Logbook.

If any diver is concerned about participating on a particular dive, for any reason, or about any aspects of that dive, they have the right to refuse to take part in the dive without prejudice from any individual.

1.4.8 Boat Handler/Coxswain

The Coxswain is a key member of the dive team, responsible to the Dive Coordinator. Coxswains should hold the required operating certificate for the vessel in use, and at least a Restricted Radio Operators certification.

All UTAS Boat Handlers must be at least 18 years of age.

It is the responsibility of the Boat Handler to:

- Ensure safety equipment is loaded, and the boat has adequate fuel for the planned trip, including a minimum reserve of at least 30% of estimated requirements for the trip. Safety equipment should include all required 'survey' equipment, and adequate repair tools;
- Ensure that the boat is trimmed for operation and all equipment is stowed safely;
- Have a good working knowledge of boats and be ready and able to give prompt assistance in an emergency;
- Be in charge of the boat during travel to/from the dive site, and maintain position at the dive site - usually by anchoring. Inexperienced Boat Handlers must not manoeuvre a vessel whilst divers are in the water, except in emergency;
- Display the appropriate dive flags and signals while diving operations are taking place;
- Deploy a current line as appropriate, once the boat is anchored securely;
- Maintain radio communications with a research station, mother ship or shore base as required.

Important Note: **except in case of emergency, no individual shall work a vessel 'live' (see glossary) whilst divers are in the water without prior approval from the UDO.**

1.4.9 Diver's Attendant/Surface Attendant

A Diver's Attendant should attend any UTAS diver that goes underwater. In cases where their UDO has allowed a two person dive team ([Section 5.2](#)) the Diver's Attendant may be the diver's buddy underwater (i.e. each buddy is an attendant for the other), however in all other cases, the attendant would be a surface Diver's Attendant, and may also act as the Dive Coordinator/Boat Handler at the discretion of the UDO.

All UTAS Diver's Attendants must be at least 18 years of age.

The duties and responsibilities of a Diver's Attendant include:

- Having a complete working knowledge of the Dive Plan, and associated tasks;
- Having training and knowledge of any signals in use;
- Having training and knowledge of any dive tables in use;
- Having training and knowledge of all diving plant and equipment in use;
- Having training and knowledge of first aid and oxygen administration, except where a second person with such training and knowledge is present and remains at the surface;
- Promptly and accurately completing a UTAS 'Dive Record Form' for every diver during each dive;
- Assisting with the deployment and recovery of divers, samples and equipment as required;
- Establishing and maintaining a constant lookout over any divers in the water.

NB: Except where approved by the UDO, the number of Dive Teams allowed per surface lookout is one. Where conditions do not permit constant, easy observation of a dive team, then a surface marker buoy must be used to mark the site at which the divers are working.

A DIVER'S ATTENDANT MUST NOT:

- Leave the boat at any time, to swim or snorkel, other than in an emergency;
- Carry out any activities in the boat such as reading, sleeping or fishing, which may divert his/her attention from the responsibilities set out above.

1.4.10 Instructional Personnel

Qualifications - All personnel involved in diving instruction on behalf of the University of Tasmania shall be qualified for the type of instruction being given, and approved by the UDO and UTDBSC.

Selection – The UDO and UTDBSC shall be responsible for selection of any Instructional personnel used during UTAS diver training.

1.5 DISCIPLINARY PROCEDURES

Should a Diving Officer (any Site Diving Officer or University Diving Officer) have concerns as to whether any individual has failed to adhere to the requirements of the University of Tasmania Diving Procedures Manual, that Diving Officer should discuss his/her concerns with the individual in the first instance. In addition, the Diving

Officer should advise the individual's Supervisor and the University Diving Officer (if the UDO is not the Dive Officer concerned) of the matter as soon as possible thereafter.

If the matter is of a serious or repeated nature, or where the matter has been unable to be resolved at the section level, the Head of School for the individual/s concerned should be notified, and the individual/s should be suspended from diving immediately, pending formal investigation by the University Diving Officer and the University of Tasmania Diving and Boating Safety Committee (UTDBSC), who shall investigate the circumstances and then refer the matter to the University OH&S Unit with a recommendation as to the appropriateness of suspension or cessation of diving activities for any individual concerned. The OH&S Unit will discuss the matter with the Head of School and the University Diving Officer prior to any formal action being taken.

The OH&S Unit will then advise the employee/s and their Supervisor in writing where suspension/cessation of their diving privileges is an outcome, and of any other remedial action that may be required.

In cases where any individual or group is suspended from diving with the University, the University Diving Officer shall inform the individuals concerned in writing, outlining the reason/s. Any person/s in this situation shall be given the opportunity to present their case (in writing) for consideration of readmission to the UTAS Diver Register. All correspondence regarding any disciplinary matters relating to any individual must be in writing, and shall be classed as formal documents and kept on the individual's personal file.

In the event that a diver's registration has been suspended, they may apply for re-registration after complying with any conditions imposed by the University Diving Officer and/or UTDBSC.

The OH&S Unit will advise members of the UTDBSC of any such incidents as require their involvement, that are otherwise not referred through that committee.

1.6 GLOSSARY AND ABBREVIATIONS

1.6.1 Aquaculture

School of Aquaculture, University of Tasmania.

1.6.2 Bail-out system

An independent air supply worn and activated by a diver to counter an out of air, low on air or contaminated air situation. Also referred to as an 'emergency air supply'.

1.6.3 BCD

Buoyancy control device.

1.6.4 Belt block

Redundant breathing gas supply system with controls positioned at front of diver's body on a belt or harness.

1.6.5 Bottle bank

Two or more high pressure breathing air cylinders yoked together and used in conjunction with a regulator to deliver air to a diver.

1.6.6 Bottom time (BT)

The total elapsed time from when a diver leaves the surface to the time (next whole minute) at which ascent is commenced, measured in minutes.

1.6.7 Breathing hoses

Hoses attached to a regulator that is designed to supply air to the diver, carry away expired air and operates at near ambient pressure.

1.6.8 Buddy diver

A member of a group of two or three divers.

1.6.9 Buddy line

A line used to connect two or more divers, allowing them to maintain contact. It should be approx. 2 - 3 m in length, and is usually only used in conditions of low in-water visibility.

1.6.10 Combined dive

The bottom times of more than one dive added together and treated as bottom time for a single dive for the purposes of determining decompression requirements.

1.6.11 Competent person

A person who has acquired, through training, qualifications or experience (or combination of these) the knowledge and skills to enable that person to safely perform a specified task.

1.6.12 Compression (recompression) chamber

A surface chamber in which persons may be subject to pressures equivalent to or greater than those experienced underwater, or which simulate those experienced on an actual dive.

1.6.13 Current line

Line deployed behind boat to facilitate recovery of divers from the water, particularly in conditions of strong current. Also called a 'Mermaid Catcher'.

1.6.14 DAN

Diver's Alert Network. An organisation dedicated to improving diving safety.

1.6.15 Diver's Attendant (DA) or Surface Attendant (SA)

The Diver's Attendant is usually at the surface, however where approved by the UDO, and under good weather conditions only, Divers may only dive without a Dive Attendant as approved by the UDO.

1.6.16 Decompression illness (DCI/DCS)

A generic term for acute illness resulting when pathological consequences arise from decompression. The term covers the conditions known as decompression sickness (bends) and arterial gas embolism, but does not include barotrauma of ascent

1.6.17 Decompression schedule

A specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table. Normally described in terms of maximum depth of seawater (msw) and bottom time (minutes).

1.6.18 Decompression Stop

The specified length of time which a diver must spend at a specified depth to allow for the elimination of sufficient inert gas from the body to allow safe ascent to the next decompression stop or the surface.

1.6.19 DCIEM

Canadian Defence and Civil Institute of Environmental Medicine.

1.6.20 DCIEM Tables

Decompression tables developed by DCIEM. To be used to manage all UTAS air diving operations unless otherwise approved.

1.6.21 Delegate (of UDO)

An individual appointed by the UDO in writing to perform nominated duties.

1.6.22 Dive Coordinator (DC)

The Dive Coordinator is responsible for the overall conduct of the dive, including any necessary pre/post dive activities, and the actual dive.

1.6.23 Dive Leader (DL)

The 'in-water' leader of a dive team: May be either the Dive Coordinator or another nominated Diver.

1.6.24 Dive Plan/Permission Form

A designated UTAS form, used to describe intended details of any proposed diving operation/s and record the University Diving Officer's signed approval.

1.6.25 Dive Record sheet

A designated UTAS form, used to record details of each dive for every diver.

1.6.26 Diver Register

A listing of all divers permitted to dive on UTAS operations according to these procedures – maintained on the Field Operations Management System.

1.6.27 Dive Team

All personnel directly involved in any diving operation.

1.6.28 Divemaster (DM)

A Divemaster is an individual who has received training to a high level from one of the recreational diver training organisations (also called Dive Supervisor or Dive Controller).

1.6.29 Diving Officer (DO)

See 'UDO' and SDO.

1.6.30 Diving Operation

Where personnel from the University of Tasmania undertake a trip for the purpose of scientific or related underwater diving. The operation includes all time devoted to the trip, including preparation before departure, and the subsequent reporting phase on return.

1.6.31 Effective bottom time (EBT): DCIEM Tables

The product of a diver's actual bottom time (ABT) for a dive, multiplied by their Repetitive Factor (RF) at the start of the dive (from any previous exposure to greater than ambient pressure).

1.6.32 Effective bottom time (EBT): SSI EANx Tables

The product of a diver's actual bottom time (ABT) for a dive, added to their Residual Nitrogen Time (RNT) at the start of the dive (from any previous exposure to greater than ambient pressure).

1.6.33 Effective depth

For a dive at altitude, the depth of an equivalent dive at sea level.

1.6.34 Emergency air supply

See 'bail-out system'.

1.6.35 Enriched Air Nitrox (EANx)

Air with a greater-than-normal concentration of oxygen (the x stands for the O₂ concentration).

1.6.36 Equivalent Air Depth (EAD)

Equates a depth using a given concentration of Nitrox to an 'Air' depth, based on equivalent exposure to nitrogen.

1.6.37 Exceptional exposure dive

A dive on which maximum recommended dive time for a given depth (shown by the limiting line in the decompression tables being used) is exceeded by a diver at that depth

- 1.6.38 Float line**
A line attached to a diver, with a highly visible float on the surface.
- 1.6.39 FOMS**
UTAS web based Field Operations Management System.
- 1.6.40 Free flow primary air supply**
A surface supplied breathing method in which air enters the helmet/mask in a continuous flow, and is not controlled by a demand regulator.
- 1.6.41 Incident**
Any unplanned event with potential for damage, loss or injury to personnel and/or equipment and machinery.
- 1.6.42 Lazy shot**
A rope running vertically from the surface (dive control position) to an attached weight, hanging free and positioned off the bottom or worksite. The rope is marked with depth graduations to facilitate decompression stops at the correct depth. See also 'shot line'.
- 1.6.43 Lifeline**
A line of not less than 8 mm diameter, attached to the diver at one end and tended from the surface at the other, which is capable of being used to haul the diver to the surface.
- 1.6.44 Limiting line**
A line shown in some decompression tables, indicating time limits (bottom times) beyond which the decompression tables shown are less safe.
- 1.6.45 Main air supply**
The main supply of any diver's breathing air, including air delivery from SCUBA cylinders, low pressure compressors or 'bottle banks'.
- 1.6.46 Mermaid Catcher**
See Current Line.
- 1.6.47 Mother Ship**
A vessel (generally large) used as a base in remote areas, from which smaller vessels are used to conduct field or diving operations.
- 1.6.48 MRL**
TAFI Marine Research Laboratories, Taroom.
- 1.6.49 Night diving**
Any diving activity conducted in the hours of darkness, including 1 hour prior to sunset and 1 hour after sunrise.
- 1.6.50 Nitrox**
Any breathing mixture composed of nitrogen and oxygen, most commonly produced by the addition of O₂ or the removal of nitrogen from air.
- 1.6.51 Post Dive Report**
A designated UTAS form (may be web based), used to describe actual details of any diving operations.
- 1.6.52 Project Leader (or Team Leader)**
The UTAS staff member with overall responsibility for conduct of a field research team. The Project Leader has no authority over decisions made by a Dive Coordinator during the conduct of any diving operation.
- 1.6.53 Quick release**
Able to be immediately released from closed position by the single operation of one hand.
- 1.6.54 Remote dive site**
Any area of diving operation greater than 30 minutes from medical assistance.
- 1.6.55 Repetitive dive**
Any dive conducted after a surface interval from a previous dive of more than 15 min. and less than 18 hours, or that has a repetitive factor at the start of the dive of greater than 1.0
- 1.6.56 Repetitive factor (RF): DCIEM dive tables**
A figure determined by the repetitive dive group (RG), and the length of the surface interval after a dive, and used for repetitive diving.
- 1.6.57 Repetitive group (RG)**
After a dive conducted using many dive tables, every diver will fall into a Repetitive Group category - determined by the depth and time of any dives they have completed in the previous 18 hrs. Gives an indication of nitrogen loading.
- 1.6.58 Reserve air supply**
The quantity of air that will enable a diver to return safely to the surface from the planned depth of the dive, completing all planned decompression stops.
- 1.6.59 Residual nitrogen**
Extra Nitrogen that remains dissolved in a diver's tissues after surfacing. Decreases over time on the surface.
- 1.6.60 Risk Assessment**
A formal process of identifying and implementing mechanisms for dealing with the risks involved in a particular task. A Risk Assessment must be carried out for every UTAS diving operation.

1.6.61 Safety Line

Lifeline, Buddy Line, Float Line or Current Line.

1.6.62 Saturation

That condition where a person's body tissues are totally saturated with the particular inert gas element of the breathing medium in use.

1.6.63 Scientific diving

In Australia: diving performed for professional scientific research, natural resource management, or scientific research as an educational activity.

1.6.64 SCUBA

Acronym for Self Contained Underwater Breathing Apparatus. Equipment designed to deliver air to a diver, using an open or closed circuit system - independent of the surface.

1.6.65 Site Diving Officer (SDO)

An individual nominated as Diving Officer (under the UDO) for a UTAS workplace or project outside the main campus. At this time there are Site Diving officers at the UTAS Newnham and AMC (Launceston) campuses, and at the TAFI Marine Research Laboratories site.

1.6.66 Shot rope/shot line

A rope running vertically from the surface (dive control position) and fixed to the worksite or bottom with a weight or attachment. The rope should be marked with depth graduations to facilitate decompression stops at the correct depth. See also 'lazy shot'.

1.6.67 SI/Surface Interval

Surface interval. The time between surfacing from one dive and commencing another. Under DCIEM tables if the SI is less than 15 minutes the second 'dive' is deemed a continuation of the first dive. NB: This time varies with different decompression tables.

1.6.68 Snorkel diving

'Free swimming' diving, where fins and a mask and snorkel are used.

1.6.69 SPUMS

South Pacific Underwater Medicine Society. Australasian diving medicine medical professionals organisation.

1.6.70 SSBA

Surface Supplied Breathing Apparatus. Equipment delivering air to diver from the surface.

1.6.71 Surface Attendant (SA)

A diver's attendant, who does not enter the water (*also see Diver's Attendant*).

1.6.72 TAFI

Tasmanian Aquaculture and Fisheries Institute - an institute incorporating the Tasmanian Marine Research Laboratories and the UTAS Schools of Aquaculture and Zoology.

1.6.73 Team Leader (see Project Leader)

1.6.74 Tethered mode (in relation to SCUBA diving)

SCUBA diving when a diver is secured by a lifeline tended by a diver's attendant, or secured to a tended float line.

1.6.75 TUFSS

Tasmanian University Field Safety System – a web based system created by UTAS for registration and management of field operations in particular, and all projects more generally.

1.6.75 UDO

University Diving Officer. See definition in this Manual.

1.6.76 UTAS Diver

Any individual listed on the UTAS Diver Register, who is undertaking a dive on behalf of the University.

1.6.77 UTAS Dive Plan

An operational plan prepared by the Dive Coordinator for a dive, or a series of dives. A dive plan must be prepared and submitted for every UTAS dive.

1.6.78 UTDBSC

University of Tasmania Diving and Boating Safety Committee. See details in this Manual.

1.6.79 Visiting Diver

A trained, certified visiting diver from another country who performs tasks relevant to scientific diving in his/her own country, who has a current diving medical certification and who is allowed to dive with the University by the UDO during his/her visit.

1.6.80 Volunteer Diver

A person not otherwise associated with UTAS, who has volunteered to assist with UTAS diving, and meets all requirements necessary to be listed on the Diver Register as a volunteer.

1.6.81 Working 'live'

Where a vessel being used in the conduct of a diving operation is under power whilst Divers are in the water. Not permitted for any diving operation unless specifically approved by the UDO, or an emergency.

SECTION 2. PERSONNEL FOR DIVING OPERATIONS

2.1 GENERAL REQUIREMENTS

All individuals seeking to participate in diving activities with the University of Tasmania must apply to the UTAS Diving Officer for listing on the University Diver Register, completing and/or forwarding the following:

- Be listed on the UTAS web based field safety system TUFSS (<https://fomsprod.its.utas.edu.au/Home.php>) and approved for the level of diving they wish to undertake. If unable to access TUFSS, they must have completed a UTAS Diver Registration Form (available from the UDO);
- Copies of their relevant diving qualifications;
- Complete copies of their diving logbooks; and
- A copy of a current commercial diving medical (contact UDO for list of doctors who can perform this).

If the individual is a volunteer, the following must also be completed:

- A Volunteer Acknowledgment of Induction & Medical Form (sample copy at [Appendix 7](#));
- A comprehensive safety induction with the University Diving Officer and a workplace Employee Safety Representative based at the site from which the individual will work.

All University divers should note the following:

- After listing on the University Diver Register, and before diving takes place, individuals must familiarise themselves with the University Diving Procedures Manual and decompression tables to be used, and either agree with the Statement of Understanding generated during the FOMS registration process, or sign a paper copy of the UTAS Diving Procedures Statement Of Understanding form (at [Appendix 5](#)). This must be acknowledged as received by the UDO before diving can take place;
- It is the responsibility of all divers to maintain a high level of knowledge and competence with regard to the type/s of diving they undertake, as well as knowledge of diving equipment in use. **In particular, Dive Coordinators must ensure they are fully conversant with the requirements of their position;**
- It is highly recommended that all diving personnel maintain a level of physical fitness commensurate with the type of diving operation/s in which they are likely to be involved whilst at the University. As a MINIMUM, all UTAS divers should ensure they are able to meet the requirements of the swim and practical tests listed at [Appendix 1](#) of this document;
- **Divers who have not been involved in a diving operation within a six-month period shall not dive or act as a Dive Coordinator, without contacting and receiving written permission from the UDO.** A competency assessment may be required, at the discretion of the UDO.

2.2 CONTINUATION OF AUTHORISATION TO DIVE

2.2.1 Term of Authorisation

On an annual basis, the UTAS Field Operations Management System (FOMS) will automatically request that each listed individual confirm their desire to remain listed as a UTAS diver. Unless this is completed, a diving authorisation shall expire one year from the date of issuance, or six months from the date of the last logged dive, or upon expiration of dive medical, or first aid, or oxygen administration certification.

2.2.2 Minimum Activity to Maintain Diver Listing

During any 12-month period, each UTAS diver must log a minimum of 12 dives on each type of equipment they wish to be listed for, or they may be required to undertake a checkout dive with the UDO or UDO's delegate.

2.3 UTAS DIVER INDUCTION REQUIREMENTS

As well as all meeting all other requirements listed in this section for UTAS divers, all new UTAS divers must undertake an induction with the UDO or delegate, and this shall include at least the items listed on the UTAS Diving Procedures Statement of Understanding at [Appendix 5](#) of this Manual. Individuals must either agree with the Statement of Understanding generated during the FOMS registration process, or sign a paper copy of the UTAS Diving Procedures Statement Of Understanding form at [Appendix 5](#). Either must be acknowledged as received by the UDO before any diving is permitted to take place.

2.4 BREATH-HOLD DIVING

UTAS divers intending to undertake breath-hold diving operations must meet at least the requirements listed below at [Section 2.5](#) and fulfill all other listed requirements of this Manual. All breath-hold divers shall be classified by the UDO to a particular level, depending on their experience and training.

2.5 UTAS DIVER CLASSIFICATION AND TRAINING REQUIREMENTS

Individuals intending to undertake diving operations with the University using compressed air must fulfil all listed requirements of this Manual for the level of classification they apply for, and shall subsequently be classified by the UDO based on their qualifications and experience, as well as the UDO's assessment of their abilities. Regardless of experience, all divers should be listed as Restricted on commencement of diving operations with the University, until such time as they have demonstrated competence and gained experience with UTAS dive protocols. 1 to 5 dive trips under control of a UTAS Dive Coordinator would usually be deemed sufficient for this, depending on the individual and their intended tasks.

Minimum training requirements and experience for each classification, and tasks able to be undertaken at each level are listed below. As well as these training requirements, all divers must be prepared to achieve the competencies listed in Australian Standard AS2299.2 (Scientific Diving) should the UDO require this.

Until such time as all required competencies are met (at the discretion of the UDO with regard to a diver's experience), any new diver on the University Diver Register shall be listed as Restricted, and may be limited in the tasks they can perform whilst diving underwater.

2.5.1 Trainee Diver

Able to participate on approved UTAS diving courses. A qualified Diving Instructor approved by the UDO must be present *in the water and in sight of any trainee diver at all times they are underwater (except for snorkel diving)*.

Requirements:

- Meet requirements at *Section 2.1* and *Section 2.3* above, and the Diver Evaluation Test at [Appendix 1](#) (NB. *due to the closely supervised nature of open water training, at the discretion of the UDO, students undertaking such training may be permitted to waive the full diver evaluation. In such cases at least the standard recreational open water swim requirements must be met;*
- Have a working familiarity with the UTAS Field and Diving Procedures Manuals;
- Complete all required documentation prior to commencing any diving sections of the training course;
- Fulfil all responsibilities and obligations listed for UTAS divers in this Manual;
- Supply a commercial diving medical¹ dated within the past 12 months and stating that the diver is fit to dive using compressed air, as well as noting any limitations imposed by the doctor; and
- Meet any other requirements specified by the UDO for the particular training course being undertaken.

2.5.2 Undergraduate Diver

Able to dive on snorkel or SCUBA (as approved by the UDO for each individual) **to depths of less than 18m**, on approved UTAS excursions. A qualified DIVEMASTER (see *Glossary*) must be present *in the water and in sight of any undergraduate diver at all times that they are underwater (except for snorkel diving operations)*.

Requirements:

- Meet the requirements listed at *Section 2.1* and *Section 2.3* above, and the Diver Evaluation Test at [Appendix 1](#) (*see footnote below re medical requirements*);
- Have a working familiarity with the UTAS Field and Diving Procedures Manuals;
- Agree to follow all instructions given by the Dive Coordinator/s during the excursion;
- Hold at least an 'Open-Water' diver certification from a recognised diver training agency;
- Fulfil all responsibilities and obligations listed in this Manual for UTAS divers;
- Supply a recreational diving medical dated within the past 24 months (NB. *see footnote at bottom of page*) and stating that the diver is fit to dive using compressed air, as well as noting any limitations imposed by the doctor; and
- Have logged at least 15 dives since completion of 'Open-Water' dive course, with at least five of those dives logged within the past six months and in temperate waters.

¹ *Except for students undertaking open water training and undergraduate diving only, where a recreational medical may be deemed sufficient.*

2.5.3 Restricted UTAS Diver

Able to dive on snorkel, SCUBA or SSBA (as approved by the UDO) **to depths of less than 18m in 'Low Risk Conditions'** (see *Section 11.30 & Appendix 11*), on any approved UTAS diving operation where a qualified UTAS Dive Coordinator is present *in the water and in sight of the diver at all times*.

Requirements:

- Meet the requirements listed at *Section 2.1* and *Section 2.3* above, and the Diver Evaluation Test at [Appendix 1](#) (if Diver Evaluation test is NOT passed, diver may be restricted to shallower depths);
 - Have a working familiarity with the UTAS Field and Diving Procedures Manuals;
 - Fulfil all responsibilities and obligations listed in this Manual for UTAS divers;
 - Hold Rescue Diver certification with an accredited diver training organisation, plus current O2 Provider, and Level 2 Workplace 1st Aid Certification - or commence these within 3 months of listing on the University Diver Register;
 - Hold a current commercial diving medical to Australian Standard AS2299 (Occupational Diver) or equivalent from a doctor registered with SPUMS;
 - Have a working familiarity with the short form DCIEM Air Decompression Tables;
 - Have logged at least 1 dive with the University under the supervision of the UDO or their delegate; and
- NB: To be registered to use any equipment or technique other than standard SCUBA (e.g. SSBA, Nitrox or rebreather diving), a diver must hold certification for and have logged dives with that equipment/technique to the satisfaction of the UDO. Regardless of qualifications held, a theory examination may be required.

2.5.4 Unrestricted Diver

Able to dive or act as a Dive Leader on dives using any method for which they are approved to depths of less than 24m (39m if Nitrox qualified, with special approval) - on any approved UTAS diving operation.

Requirements:

- Meet all the requirements listed at *Sections 2.1, 2.2 and Section 2.5.3* of this Manual (NB: if the Diver Evaluation test at [Appendix 1](#) is NOT fully passed, an Unrestricted Diver shall be restricted to a maximum depth of 18m, and may have other site based restrictions applied (e.g. able to dive in sheltered waters only);
- Have attended an approved UTAS Accountable Person's training course, and update this at least every 3 years;
- Successfully complete a rescue refresher course at least every two years;
- Meet all other requirements for an Unrestricted Scientific Diver as listed in the AS2299.2 Scientific Diving Standard, either with an accredited diver training organisation, or at the discretion of the UDO, through demonstrated knowledge (which may involve a completion of a theory examination) and logged experience;
- Have a working familiarity with any Decompression Tables to be used;
- Have logged at least 20 hours or 20 dives using standard SCUBA outside dive courses, with 3 of those dives logged within the past six months and in temperate waters and at least three dives logged with the University; and
- If requiring unrestricted accreditation for other equipment/techniques standard SCUBA (e.g. SSBA, Nitrox or rebreather diving) - have logged at least 25 hours diving using these, with at least 3 of those dives logged within the past six months and in temperate waters (where relevant).
- To **maintain** an Unrestricted Diver rating, an individual should log at least one dive with the University in any six month period. Logged recreational dives may be accepted as equivalent at the UDO's discretion.

2.5.5 UTAS Dive Coordinator

Able to coordinate and lead UTAS dives to any approved depth shallower than 18m (39m on Nitrox with special approval) using any diving technique or method they are approved for (e.g. SCUBA, SSBA, Nitrox or rebreather).

Requirements (Unrestricted):

- As for *Section 2.5.4* above (NB: if the Diver Evaluation test at [Appendix 1](#) is NOT passed by a Dive Coordinator, they will be restricted to a maximum depth of 18m and may have other site based restrictions applied, such as "able to dive in sheltered waters only"); plus
- Have undertaken a UTAS Dive Coordinator induction course with UDO or delegate and ticked the relevant boxes on the UTAS Diving Procedures Statement of Understanding form (at [Appendix 5](#)) to indicate this;
- Have logged at least 60 hours diving using equipment relevant to any work to be undertaken - including at least five days diving with the University, under the control of a UTAS Dive Coordinator.

At the discretion of the UDO, a diver may be classified as a RESTRICTED Coordinator. In this case they may only supervise/control their own diving project where this comprises work with standard SCUBA, and simple tasks (such as sediment collection) and shallow (<12m) sheltered locations.

- To **maintain** a Dive Coordinator rating, an individual must be up-to-date with all required qualifications, and should have logged at least one dive with the University in the previous six month period. Logged recreational dives may be accepted as equivalent at the UDO's discretion.

Requirements (Restricted):

- As for *Section 2.5.3* plus
- Undertaken a Dive Coordinator induction course with UDO or delegate and ticked relevant boxes on the UTAS Diving Procedures Statement of Understanding form (at [Appendix 5](#)) to indicate this.

2.5.6 SSBA Diver

Restricted:

Able to dive on SSBA and SCUBA to < 18m, on approved UTAS diving operations under control of a Dive Coordinator, where a qualified Dive Coordinator is present *in the water and in sight of the diver at all times*.

Unrestricted:

Able to lead UTAS dives to any approved depth using SSBA.

Requirements:

- Meet all requirements listed at [Section 2.1](#) of this Procedures Manual, including successful completion of the Diver Evaluation at [Appendix 2](#);
- Have a working familiarity with the UTAS Field and Diving Procedures Manuals;
- Hold a UDO approved Advanced Diver Certification; have at least 10 hours or 10 dives logged since course completion, with 3 dives logged within the past six months in temperate waters
- Hold a UDO approved Rescue Diver certification, plus current O₂ Provider, and Level 2 Workplace 1st Aid Certification - or commence these within 3 months of listing on the University Diver Register;
- Hold a UDO approved SSBA Diver Certification, or have equivalent experience covering all competencies required for SSBA by the AS2299.2 Scientific Diving Standard;
- Have logged at least 5 hours or 5 dives using SSBA equipment, with 3 SSBA dives logged within the past six months and in temperate waters;
- Hold a current commercial diving medical to Australian Standard AS2299 (Occupational Diver) or equivalent from a doctor registered with SPUMS;
- Have a working familiarity with the short form DCIEM Air Decompression Tables;
- Restricted SSBA divers: Must have logged at least 1 SSBA dive with the University under the supervision of the UDO or their delegate; and
- Unrestricted SSBA divers: have logged at least 60 hours diving using equipment and breathing apparatus relevant to work to be undertaken - including at least 5 days diving with UTAS, with a SSBA Coordinator.

2.5.7 Rebreather Diver

See *Section 10.6* for further detail. In summary:

Restricted:

Able to dive using a UTDBSC approved rebreather unit to < 18m, on approved UTAS diving operations under control of a Rebreather Dive Coordinator, where a qualified Rebreather Dive Coordinator is present *in the water and in sight of the diver at all times*.

Unrestricted:

Able to lead UTAS dives to any approved depth² using an approved rebreather. NB. Rebreather dives involving operational depths in excess of 30 metres shall be subject to additional training requirements, as determined by the UDO on a case-by-case basis.

Coordinator:

Able to coordinate and lead UTAS dives to any approved depth (see footnote below) using an approved rebreather.

Requirements - Restricted:

- Meet all requirements listed at [Section 2.1](#) of this Procedures Manual, including successful completion of the Diver Evaluation at [Appendix 2](#);
- Have a working familiarity with the UTAS Field and Diving Procedures Manuals;
- Hold a UDO approved Advanced Diver Certification; have at least 10 hours or 10 dives logged since course completion, with 3 dives logged within the past six months in temperate waters
- Hold a UDO approved Rescue Diver certification, plus current O₂ Provider, and Level 2 Workplace 1st Aid Certification - or commence these within 3 months of listing on the University Diver Register;
- Hold a UDO approved SSBA Diver Certification, or have equivalent experience covering all competencies required for SSBA by the AS2299.2 Scientific Diving Standard;
- Have successfully completed an approved training course for the rebreather to be used;
- Hold a current commercial diving medical to Australian Standard AS2299 (Occupational Diver) or equivalent from a doctor registered with SPUMS.

Requirements - Unrestricted:

- As above, plus diving experience with the particular model of rebreather to be used shall include a minimum of 25 hours underwater, of which at least 20 hours shall have been under open-water conditions, and at least 5 dives to the proposed operating depth;
- To maintain listing as an unrestricted rebreather diver, an individual must conduct at least one dive per month with the rebreather they are qualified on, and perform all bailout drills at least every two months. If this is not done their rating will lapse to restricted rebreather diver.

Requirements - Coordinator:

- As for both the above classifications, plus to maintain listing as a Rebreather Dive Coordinator, an individual must conduct at least 25 hours diving with any rebreather they are qualified on each 6 months.

2.6 UTAS DIVE SUPPORT PERSONNEL TRAINING REQUIREMENTS

Most diving operations require the use of personnel in a range of roles. Individuals used to assist in these roles during UTAS diving operations must meet all requirements of this Manual.

2.6.1 Ship's Master

Responsibilities of the Master of a mother ship used for a UTAS diving operation are listed at [Section 1.4.4](#).

Requirements:

- The Master of any such UTAS vessel must meet all requirements of Marine and Safety Tasmania (or equivalent regulatory body if in another State) for their vessel.

² Rebreather dives involving operational depths in excess of 30 metres shall be subject to additional training requirements, as determined by the UDO on a case-by-case basis

2.6.2 Boat Handler/Coxswain

Responsibilities of the Coxswain of any vessel being used for a UTAS diving operation are listed at [Section 1.4.5](#).

Training requirements:

- Meet all requirements of Marine and Safety Tasmania (or equivalent regulatory body if in another State)
- Hold current Oxygen Provider and Level 2 Workplace First Aid Certification
- Have a working familiarity with the UTAS Field and Diving Procedures Manuals; and
- Complete a UTAS vessel familiarisation induction with the University Diving Officer or delegate.

2.6.3 Diver's Attendant/Surface Attendant

The responsibilities of a UTAS Dive Attendant are listed at [Section 1.4.8](#) of this Manual.

Whilst it is not essential for a Dive Attendant to be a qualified diver, they must meet the requirements listed below, and it is highly recommended that where a non-diver is approved as a Dive Attendant, they have a working knowledge of diving issues and potential problems, and diving ailments and their treatment.

Training requirements:

- Must have training and knowledge of any signals in use
- Must have a complete working knowledge of the Dive Plan, and associated tasks
- Must have training and knowledge of all diving plant and equipment in use
- Hold current Oxygen Provider and Level 2 Workplace First Aid Certification (except where a second person with such training and knowledge is present and remains at the surface with them)
- Have a working familiarity with the UTAS Field Manual and Diving Procedures Manual; and
- Complete a UTAS vessel familiarisation induction with the University Diving Officer or delegate.

2.7 VISITING PERSONNEL

As well as the details at [Section 1.4.6](#) and [Section 2.5](#), the following shall apply to all visiting personnel:

- Written application to dive with the University must be received no later than five working days prior to the intended date/s of any dive/s, and must provide all relevant details of the intended diving operation and include all personnel information required by this Manual;
- The visitor must notify the UDO of any medical condition/injury that may have commenced/occurred to them since date of last medical, and which would increase their level of risk if they undertook a dive
- The UDO must have listed them as a diver on the UTAS Field Operations Management System;
- They must familiarise themselves with this Manual, undergo an induction fully describing relevant safety protocols/issues, and sign a copy of the UTAS Diving Procedures Statement Of Understanding Form (at [Appendix 5](#)) - to be forwarded to the UDO to confirm listing on the Diver Register;
- If intending to use their own SCUBA diving equipment they must supply documentation to show that it is in current test and/or service, as per this Manual.

2.8 VOLUNTEERS

As well as the details listed at [Section 2.5](#) regarding qualifications, the following shall apply to all volunteers wishing to participate in a University of Tasmania diving operation:

- They must complete a UTAS Volunteer Acknowledgement of Induction and medical form (at [Appendix 7](#)), and an application to dive with the University must be received in writing no later than five working days prior to the intended date/s of any dive/s. This must provide all relevant details of the intended diving operation and include all personnel information as required by this Manual
- The volunteer must notify the UDO of any medical condition or injury that may have commenced/occurred to them since the date of their last medical, and which would increase their level of risk if they undertook a dive;
- They must familiarise themselves with this Diving Procedures Manual, undergo an induction fully describing all relevant safety protocols and issues, and sign a copy of the UTAS Diving Procedures Statement Of Understanding Form (at [Appendix 5](#)). This must be forwarded to the UDO before listing on the Diver Register will be considered
- If intending to use their own SCUBA diving equipment, it must be inspected by the UDO or delegate, and they must supply evidence to show that it is in current test and/or service, as per this Manual.

2.9 PROOF OF DIVING EXPERIENCE, AND EXCEPTIONS

Divers without a logbook claiming to have the required experience for listing on the UTAS Diver Register may be permitted to dive at the discretion of the UDO. If permitted, the person must first submit a signed statement outlining their diving experience (available from the UDO).

Staff and students with less than the required hours of diving experience may be allowed to dive at the discretion of the UDO, subject to the following:

- At least one fully qualified and experienced diver (i.e. with at least 50 hours experience) must be a dedicated buddy to the inexperienced diver
- The diving activity undertaken must not be in the 'high risk' category (see [Section 11](#), [Appendix 8](#), [Appendix 9](#) and [Appendix 10](#));
- No dive shall be deeper than 12 m.

2.10 WORK-UP DIVES

At the discretion of the UDO, Divers who have not dived for an extended period of time (>6 months), or those who wish to dive to increased depths, may be required to perform a series of 'work up' dives.

2.11 FITNESS TO DIVE

All personnel who have successfully passed an annual commercial diving medical examination and annual UTAS Swim Assessment shall generally be classed as fit to dive, however the physical ability of an individual to act in any role or perform a task can only be determined by that individual on the day of a dive.

Individuals unable to pass the Swim assessment section of the UTAS Diver Evaluation at [Appendix 1](#), shall be restricted to a maximum depth of 18m, and may be further listed as restricted divers (as detailed above) where arduous work in exposed conditions is being considered.

It is the responsibility of every diver to notify the UDO, should any medical condition or injury have commenced/occurred to them since their last medical, which may increase their level of risk if they dive. If an individual decides they are fit to dive, then their fitness may be further assessed **by the Dive Coordinator on site**, or by the UDO at any time, with either of those individuals able to veto any dive if they see fit.

The Dive Coordinator on site MUST prohibit diving for any individual if that person's physiological or psychological state has been altered, or appears to have been altered, by illness, fatigue, injury, intoxication, or loss of coordination from the effects of prescription drugs or other substances.

2.12 UNIVERSITY DIVER REGISTER

Individuals wishing to dive for UTAS must complete a Personnel Registration on the Field Operations Management System (FOMS), or a UTAS Diver Registration form (if they do not have access to FOMS).

It is the responsibility of individuals to keep track of their own dive medical/qualification expiry dates, to ensure currency on the Diver Register. On receipt of updated qualifications/medicals, individuals must update their record on FOMS and re-lodge it for approval, plus send copies of the new documents to the UDO.

No individual shall dive on any UTAS operation unless listed as current on the UTAS Diver Register.

The following information should be maintained for each diver on the Diver Register:

- Name, DOB, address & next of kin information;
- Diving qualifications, and due date for renewal of these (if applicable);
- Employment status (eg. staff, volunteer, external agency etc), and base of operations;
- UTAS diver classification – allocated by UDO;
- Date of most recent diving medical and due date for renewal of diving medical;
- Agency from which first aid qualifications were obtained, ID #, and due date for renewal;
- Agency from which O2 provider qualifications were obtained, ID #, and due date for renewal;
- Details of any personal diving equipment used for UTAS operations, and due date for renewal of test certification for any such equipment;
- Details of any other certification held. e.g. coxswains ticket, radio operator certification etc;
- Other relevant comments

2.13 RECORD KEEPING RESPONSIBILITIES

2.13.1 UDO Responsibilities

The University Diving Officer shall maintain records of the following for at least seven years:

- Details of all divers involved in UTAS diving operations and records of evidence used to assess the diver's diving competencies and fitness;
- Each approved University diving operation;
- Servicing of all equipment used for UTAS diving operations (including private) and results thereof;
- All equipment defects and how these were dealt with;
- Any incidents and accidents they have been notified of; and
- Any other relevant details.

2.13.2 Diver's Responsibilities

All divers shall keep and maintain a permanent log of all diving undertaken for the University, which shall include:

- The diver's photograph;
- Next of kin information;
- The diver's name, address, DOB and signature;
- A record of medical examinations conducted for the purpose of occupational diving;
- A record of UTAS diving activity undertaken; and
- A record of any relevant accidents and incidents including decompression treatment/s.

The diving doctor should sign the diver's logbook at each diving medical examination, and the diver must make this available to the UDO on request.

SECTION 3. DIVE PLANNING

3.1 DIVING AND BOATING OPERATIONS

A Field Operations Registration must be completed on the UTAS Field Operations Management System by the principal researcher on commencement of any UTAS project involving diving. Details provided should reflect all safety and logistical issues that must be considered in setting up the field project, as well as other relevant information such as the field sites intended to be used, emergency planning and emergency contact procedures. All information must be approved by the UDO before any project may be commenced.

3.2 DIVE PLAN

For every diving operation the Dive Coordinator shall complete a Dive Permission Application on the FOMS and submit this to the UDO for approval with sufficient time allowed for adoption of any changes required by the UDO (submission should be a minimum of 72 hours before the first dive listed on the form).

Any dive plan should be based around the abilities of the least experienced diver participating, and discussed in detail with all divers and support personnel before the dive. It must take into consideration at least the following:

- Dates intended for the diving operations;
- Location of intended dive sites (or general area, if specific sites unknown);
- Approximate number of dives per day intended for each diver;
- Estimated bottom times and maximum depths intended for each dive;
- Nitrogen loading status for the divers before and after each dive; and
- Risks identified as inherent in the diving operation during the risk assessment process.

The Dive Coordinator must ensure the Dive Plan is approved by the UDO before starting a diving operation.

3.3 DIVE BRIEFING

To help ensure a successful diving operation, it is important that each member of the dive team understands the objectives of the dive - in particular that they understand their roles and the roles of all other members of the dive team during the dive.

It is the responsibility of the Dive Coordinator to ensure that a dive briefing is conducted before every dive. This allows for the exchange of the above information, and also permits minor modifications to be made to the dive plan as a result of on-site conditions (e.g. adverse environmental conditions or problems with the physical condition of any member/s of the dive team). A dive briefing should include, but not be limited to:

- The objectives of the operation and the assignments of each member of the dive team;
- The intended working depth of the operation, and the topography of the site;
- Conditions to be expected in the operating area;
- A review of communications;
- Any special equipment or considerations;
- Anticipated hazards;
- Lost contact procedures;
- Conditions controlling the termination of the dive (time, remaining air supply, etc);
- Emergency response plan;
- Soliciting questions to ensure understanding of tasks and assignments.

A more comprehensive sample dive briefing is given at [Appendix 11](#), and this should be consulted during formulation of any dive plan.

3.4 DIVE RECORD

For every University dive, the Dive Coordinator must ensure that an entry on the 'UTAS Dive Record Form' (at [Appendix 3](#) and [Appendix 4](#)) is completed for each diver, listing all requested details of that dive. This should be completed at the surface by the Dive Attendant, except where the dive has been approved for 'two person' diving (with no surface Dive Attendant), when each diver must complete the form immediately after the dive.

On completion of the diving operation, the Dive Coordinator must ensure the data from these forms is entered onto a copy of a UTAS Dive Record sheet (available at FOMS downloads <http://www.fieldops.utas.edu.au/downloads>) and that the data and the hard copies of the forms are forwarded to the UDO within 1 week from the last dive.

As well as the above, the Dive Coordinator must generate a Post-Dive report on FOMS, and complete all relevant details prior to submitting this to the UDO for approval.

3.5 POST-DIVE CONSIDERATIONS FOR DIVERS

It is the responsibility of each diver after every dive to report to their Dive Coordinator any problems that may have occurred, including equipment issues, physical problems, or potential symptoms of decompression illness. In the event of any of these occurring, the UDO must be notified as soon as practically possible.

If diving has taken place outside the no-decompression limits, any divers concerned should remain awake for at least one hour after diving, and should be monitored for this period by another dive team member.

3.6 RECOMPRESSION CHAMBER SUPPORT OF DIVING

The requirements of this section have been adapted from *Australian Standard AS2299.2 – Occupational Diving Operations: Scientific Diving*, and this document should be consulted for further information.

3.6.1 Availability of Recompression Chamber Support

Planning for UTAS dives must consider availability of emergency recompression chamber support, which may or may not be dedicated to supporting the diving operation, and may involve an on-site³, or remote chamber.

For on-site chambers and chambers dedicated for dive support, specifications of the chamber, its staffing and operation, the treatment of DCI and the qualifications of its operators shall comply with the requirements in AS/NZS 2299.1. Other chambers considered for dive support shall be multi-place, twin lock chambers within medical facilities, with operational capability and availability to provide emergency diver treatment.

3.6.2 Operations Requiring a Recompression Chamber

An operational recompression chamber shall be accessible within 6 hours of a diving operation at any time when:

- a) *Planned decompression diving is undertaken;*
- b) *Any shallow diving operation exceeds the depth/time limits given in column A of Table 3.1 below;*
- c) *No-decompression SCUBA diving is undertaken to depths of greater than 30 m for bottom times in excess of the limits in the bottom row of Table 3.1 below.*

3.6.3 Operations Requiring an On-site¹ Recompression Chamber

An operational recompression chamber shall be accessible within 5 minutes of a diving operation at any time when:

- a) *Planned decompression diving is undertaken, and omission of any required stops would carry a high risk of decompression illness with CNS or spinal cord involvement;*
- b) *Free or buoyant ascent training is being conducted;*
- c) *The nature of any work being conducted results in a significant risk of emergency ascent; and*

3.6.4 Diving Without a Recompression Chamber On-site

Diving undertaken without on-site recompression chamber support should be performed with controlled ascents and routine safety stops as required by this Manual at [Section 4.1](#). Where multiple dives are undertaken, approved decompression tables shall be followed and residual nitrogen times taken into account in calculating subsequent allowable dive times.

When completing a dive plan, it is the responsibility of the Dive Coordinator (with advice from the UDO if required) to set out a procedure for transporting divers to the nearest acceptable and available recompression facility, and to communicate this Emergency Plan to all other divers on the dive team. They must also realistically estimate the time necessary for the transportation of a diver to the recompression facility in the event of an accident (with such time taken as the time from when the diver leaves the water to the commencement of recompression in the chamber).

In the event that one or more significant identifiable risk factor/s are present before, during or after a dive (e.g. cold water, fatigue, hard work, post dive exercise, etc), the Dive Coordinator must ensure that allowance is made for these and that if at all possible details of such are communicated to all divers BEFORE the dive.

Such allowance shall be implemented by reducing the available time for the dive, with the amount of time reduction to be determined as follows:

- a) **Where the dive is to deeper than 12 m** - moving one or two time or depth levels, depending on the level of the risk factor/s, up the DCIEM tables; or
- b) **Where the dive is to 12 m or less**, - moving one or two time or depth levels, depending on the level of the risk factor/s, across Table 3.1 (below).

As well, for all dives of greater than 9 metres in depth, or between 7 m and 9 m in depth where a dive is for longer than 180 minutes duration, divers must perform a safety stop at between 3 to 5 metres depth for at least 5 minutes.

³ For the purposes of this document, on site means at the dive control position, or if this is impossible, close enough to the dive control position to ensure a diver could be recompressed within the chamber within 5 minutes of leaving the dive depth.

3.6.5 Alterations to Bottom Times for 'Remote' Diving Operations

Where divers are working in remote⁴ areas, it is likely that access to a Hyperbaric Unit may be delayed in the event of a diving accident. For this reason, where a diving operation is conducted in an area with greater than 2 hours travelling time from the nearest recompression facility, care must be taken during planning for the diving operation to consider all risk factors that may increase a diver's susceptibility to DCI. During such diving operations a safety margin must be added to dives by reducing the maximum bottom time permitted by the dive tables.

The following rules must be adhered to at all times during remote diving operations:

- If the permitted Effective Bottom Time (EBT) is exceeded during any dive, the diver concerned must not re-enter the water for at least 24 hrs.
- After any dive, divers must avoid any activity likely to increase their risk of contracting DCI (e.g. exercise);
- During dive planning, when determining the amount of time required to evacuate a patient from the dive site to a recompression chamber, the following points should be taken into account:
 - a) *The time commences from when the diver is removed from the water or shows any signs of DCI, and ends when they can be placed inside the recompression chamber.*
 - b) *The only form of transport that can reliably be counted on to be available for patient evacuation is the means by which the dive site was initially accessed (i.e. car/boat). The assumption must not be made that air or road ambulance will be available, contactable, and able to reach the site within a reasonable time period;*
 - c) *As mentioned above, where identifiable factors are present, or likely to be present, that may increase the risk of DCI during a dive, the Dive Coordinator must build an extra safety margin into any dive plan. This is particularly important if diving in areas greater than 2 hrs away from the nearest recompression facility.*

Notwithstanding the above, the following table shall be used to derive maximum repetitive group limits for diving each day, depending on the level of recompression chamber support available.

The times given in Table 3.1 shall take precedence over the DCIEM tables where Table 3.1 is to be followed.

Table 3.1 - Repetitive Group Limits for Diving Depending on Level of Recompression Chamber Support (based on the DCIEM Air Decompression Tables)

Maximum dive depth (m)	Maximum repetitive group	
	Column A (chamber within 2 hrs)	Column B (chamber exceeds 2 hrs)
6	I	H
9	I	H
12	H	G
15 to 30	DCIEM no-deco limits	One Repetitive Group less than DCIEM no-deco limits

3.7 TRAVELING AND FLYING AFTER DIVING

Due to increased risk of DCI incurred through exposure to altitude after diving, restrictions on road and air travel apply where UTAS divers are subject to pressures of greater than one atmosphere whilst breathing compressed air. These shall apply to all UTAS divers and must be followed, except in the event of an extreme emergency where no other option is available. In any such case, these rules should only be breached on the advice of medical personnel trained in hyperbaric medicine, and with the consent of all diving personnel involved.

After incurring any form of decompression illness, a diver should not be exposed to greater than 300m effective altitude for seven days.

3.7.1 Flying After Diving

As it is impossible to guarantee that a diver will not be affected by DCI due to the effects of flying after diving, the following rule must be adhered to by all UTAS divers, except in cases of extreme emergency, where a person may require helicopter evacuation from a site. NB: In a pressurised aircraft, the altitude referred to is the 'effective cabin altitude'. Commercial aircraft are usually pressurised to an effective cabin pressure of 2400m or less.

After any dive covered by this manual, using compressed gases, the minimum surface interval before the diver/s involved can travel by air shall be 48 hours.

⁴ For the purposes of a diving risk assessment, 'remote' is deemed to be further than 30 minutes from a recompression chamber.

3.7.2 Road Travel After Diving

The restrictions on road travel after diving take the form of a 'delay period' before divers are able to ascend to heights of greater than a certain threshold. These restrictions have been developed as a result of a number of well documented incidences of DCI cases being precipitated by divers driving to altitude on their trip home after a dive.

For any field trip, it is the Dive Coordinator's responsibility to determine whether or not travel after the dive will exceed an altitude threshold, and to ensure the correct delay before travelling after diving is observed.

The table below, taken from Appendix H of AS2299.2, lists the appropriate delay periods required after diving before travel above certain altitudes is permitted. These recommendations have been developed with advice from Hyperbaric Medicine Specialists, and should be applied where air or road travel after a dive will exceed any of the altitude thresholds listed. Dive Coordinators should also consider [Appendix 18 – Maximum Altitudes Of Roads In Tasmania](#) during dive planning.

When calculating applicable delays after diving, the Dive Coordinator must also take into account:

- These recommendations are for divers who are in normal health following diving. If any signs or symptoms of illness or injury are present, advice should be sought regarding the need for emergency evacuation.
- Exertion by their divers after any dive/s subject to this table; and
- Effects on their divers of in-water exertion and water temperature during the dive/s.

Table 7.1 (AS2299.2) - Recommended Delay Before Exposure To Altitude After Diving

Altitude (m)	Minimum delay before travel to altitude (Hrs)		
	Category of Dive (see Legend)		
	Category 1	Category 2	Category 3
0 - 150	Nil	Nil	2
150 - 600	Nil	2	12
600 - 2400	12	24	48
>2400	24	48	72

LEGEND:

- Category 1: A single dive to ≤ 50% of the DCIEM no-decompression limit, or two short dives within 18h with a total, combined bottom time of ≤ 50% of the no-decompression limit for the depth of the deeper dive. No decompression dives or repetitive dives to have been performed in the preceding few days.
- Category 2: Dives exceeding category 1 but not included in Category 3, e.g. one or more dives to ≤ 50% of the no-decompression limits, or a single decompression dive in a day.
- Category 3: Repetitive deep diving over multiple days; multiple decompression dives on one day; extreme exposures; omitted decompression, or other adverse events.

3.8 DIVING WITH OTHER GROUPS

Due to the nature of University research, situations often arise where University of Tasmania divers need to work with divers from other groups/organisations. The following sections outline the requirements to be met by UTAS divers when operating under these circumstances.

3.8.1 Research Diving In Conjunction With Another Scientific Organisation

Where UTAS divers operate with divers from another scientific organisation there are two scenarios that may occur.

- Where UTAS personnel are working with another organisation (i.e. with their divers, and/or using their vessel), then the UTAS diver/s will normally be bound by that organisation's diving code, provided that code has been approved by the UDO prior to the planned operation.

In this situation they must meet all certification requirements of that organisation, and gain approval to dive as required by the relevant diving procedure. The responsible UTAS Diving Officer must be notified of such diving operations, but the diver/s involved need not complete UTAS dive planning and dive record forms for these dives.

- Where UTAS personnel are working with divers from another organisation based from a UTAS vessel, or on any official UTAS diving operation.

In this situation, divers from the other organisation must meet all certification requirements of the University of Tasmania, and gain approval to dive from the UDO prior to commencement of the operation.

3.8.2 Research Diving In Conjunction With Members of the Public

From time to time UTAS divers may operate in conjunction with members of the general diving public. In all such situations the diving operation must be approved by the UDO ahead of time, and all participating UTAS divers must follow the relevant UTAS diving procedures (including approvals). It is of the utmost importance that the Dive Coordinator for such an operation makes it clear to the 'public' divers participating that they are in no way connected with the University in any capacity.

Note: An individual who is not listed on the UTAS Volunteer Register may not travel in any UTAS vehicle or vessel, except in case of emergency.

3.9 HOOKAH (LOW PRESSURE SURFACE SUPPLY) DIVING OPERATIONS

Divers using hookah must meet all training requirements outlined at [Section 2.5.6](#) of this Manual, and must carry all equipment required at [Section 6](#) of this manual. All other hookah diving requirements outlined in the Australian Standard for Scientific Diving AS2299.2 must be followed. In particular:

- The hookah unit must be capable of providing a more than sufficient breathing gas supply to all hookah divers in the water for the duration of the planned dive, including decompression;
- A surface attendant must attend all hookah divers in the water, at all times.

3.10 HIGH PRESSURE SURFACE SUPPLY DIVING OPERATIONS

All requirements outlined in the Australian Standard for Scientific Diving AS2299.2 must be followed for UTAS diving using high-pressure SSBA equipment (e.g. bottle banks at the surface).

3.11 COMMUNICATIONS

3.11.1 Lifelines

In situations where UTAS divers are required to operate with lifelines tethering them to the boat, attended by a Diver's Attendant, all divers must be familiar with the standard communication signals listed at [Appendix 16](#). This includes SSBA diving operations – including both hookah and high-pressure surface supply.

3.11.2 Voice Communications

Where divers are intending to use voice communication systems, they must be conversant with the particular equipment to be used, prior to attempting any dive. It should be noted that familiarisation with equipment is especially important where full facemasks are being used. In such cases, consideration should be given to performing a familiarisation dive or dives with the equipment to be used, in sheltered waters, prior to undertaking field operations.

SECTION 4. DECOMPRESSION TABLES AND DIVE COMPUTERS

The use of a conservative decompression table is essential for safe, 'low' risk diving.

Dive computers and dive tables are simply guides that attempt to take into account the physiological processes involved with the breathing of compressed gases at depths. They are most definitely not infallible, and do not take into account many factors that can affect an individual's susceptibility to decompression sickness. These factors include variations in age, sex, weight, physical condition, recent illnesses/injuries, as well as many others.

During the formulation of the dive plan the UTAS Dive Coordinator must give consideration to any existing or potential risk factors that may render the dive less safe (also see [Section 5](#) & [11](#) of these procedures).

4.1 DECOMPRESSION TABLES

The DCIEM (Canadian Defence and Civil Institute for Environmental Medicine) Short Standard Air decompression tables must be used for all UTAS air diving operations, except shallow dives that are covered under [Table 3.1](#) in [Section 3.6.4](#) of this Manual.

Either the equivalent air depth method, or a UDO approved EANx decompression table must be used for monitoring all UTAS dives performed using EANx. Any method/table used must be specified in the Dive Permission application, and approved by the UDO prior to diving.

Waterproof copies of these tables are available from the UDO, and a familiarisation session in their use must be conducted by the UDO or Delegate for all new UTAS divers. If at any time divers have questions about any dive tables, they should consult the University Diving Officer or a Site Diving Officer for advice.

4.1.1 Safety Stops

For all dives of greater than 9 metres in depth, or between 7 m and 9 m in depth where a dive is for longer than 180 minutes duration divers must perform a safety stop at between 3 to 5 metres depth for at least 5 minutes if it is safe to do so.

The performance of safety stops by divers, even after short dives to shallow depths, has been proven to reduce the incidence of DCI in divers.

4.1.2 Ascent Rates

It is highly recommended that wherever possible all divers adopt an ascent rate of slower than 9 metres per minute when surfacing after any dive to a depth of 30 m or less. Reduction in ascent rates to this speed has been shown to be beneficial in reducing the incidence of DCI in divers.

4.1.3 Alterations to Bottom Times for 'Remote' Diving Operations

Where divers are working in remote areas, it is likely that in the event of a diving accident, access to a Hyperbaric Unit may be delayed.

For this reason, where any UTAS diving operation is conducted in an area that is greater than 2 hours travelling time from the nearest recompression facility, great care must be taken during planning for the diving operation to allow for all risk factors that may increase a diver's susceptibility to DCI. During such diving operations a safety margin must be added to dives by reducing the maximum bottom time permitted by the dive tables, and the amended bottom times given at [Table 3.1](#) in [Section 3.6.4](#) must be used as a basis for the dive plan.

4.1.4 Multi-level diving

Details regarding use of any tables or dive computers for multi-level diving must be noted on the Dive Permission request and approved by the UDO prior to departure. Such details must include WHY such use is requested, as well as measures that will taken to ensure such multi-level diving is safe.

For this reason, where any UTAS diving operation is conducted in an area that is greater than 2 hours travelling time from the nearest recompression facility, great care must be taken during planning for the diving operation to allow for all risk factors that may increase a diver's susceptibility to DCI. During such diving operations a safety margin must be added to dives by reducing the maximum bottom time permitted by the dive tables, and the amended bottom times given at [Table 3.1](#) in [Section 3.6.4](#) must be used as a basis for the dive plan.

4.2 DIVE COMPUTERS

Important Note: At this time, an approved dive table must be used for planning and control of all UTAS air dives. A computer may only be used to keep track of, or assist with any dive.

Divers using computers must be familiar with their use, including any peculiarities specific to the type being used.

Any diver wishing to use a dive computer other than one of those supplied by the University must notify the UDO, providing information on the type of computer, its permitted ascent rate/s, and any other relevant factors.

Rules for dive computer use:

- Read the instruction manual carefully before using the computer, ensuring you understand it;
- Where a diver is using a dive computer as well as dive tables, **the advice of the more conservative of the two must always be followed**. Although this is usually the dive tables (especially with DCIEM tables), many brands of dive computer take into account factors such as multiple ascents, multiple diving days and errors in planned dive profiles, and because of this, on some occasions, a dive computer may indicate a diver's bottom time has expired earlier than the dive tables indicate that the dive should be ended;
- A diver must not begin using a dive computer if they have had an exposure to ambient pressures of greater than 1 ATA during the previous 24 hours (e.g. from diving, or time spent in a recompression chamber) - unless the computer was also exposed at the same time, to the same pressure (i.e. it was being worn at the time);
- Where a computer has facility to do so, it should be adjusted to a more conservative setting than the base setting. If this facility is not offered, it may be possible to adjust the altitude setting to a higher one than the actual altitude of the dive - which will have the same effect;
- Wherever possible, the deepest dive in a series must be performed first, and each repetitive dive should be at a shallower depth than the last;
- Computers must not be shared between divers during any diving operation. Each diver must have their own computer for the duration of any diving trip;
- Where a particular brand of computer permits an ascent rate of > 9 metres per minute, the diver must restrict their ascent rate to approximately 9 m/min or slower, rather than following the rate indicated by the computer;
- Do not 'push the limits' of any computer - they are not infallible. When planning your dive using the tables, allow for relevant risk factors that are known to increase the risk of DCI, such as cold water, fatigue etc;
- Use 'safe' dive profiles. Avoid 'saw-tooth', 'reverse' and 'square' profile dives. If approved, multi-level dives must start at the deepest depth and become shallower during the dive;
- For all dives of greater than 9 metres in depth, or between 7 m and 9 m in depth where a dive is for longer than 180 minutes duration divers must perform a safety stop at between 3 to 5 metres depth for at least 5 minutes where it is not unsafe to do so.

If a computer fails during a dive after indicating the need for decompression (NB: decompression dives are not permitted!), either of the following 'omitted decompression procedures' should be adopted where no symptoms of Decompression Illness are being exhibited by the diver/s concerned. Where symptoms are noted – medical advice must be sought immediately. Any such incident must be reported to the UDO as soon as possible. **NB. These procedures are for emergency use only.**

- a) Within 7 minutes of surfacing, secure an adequate air supply and return to the decompression Stop listed on the DCIEM tables that is 3m deeper than the first omitted Stop. Decompress at this depth for the time of the first omitted Stop, then continue the decompression as per the Table A schedule on the DCIEM tables;
- b) Where a Recompression Chamber is available within 7 minutes of surfacing, the diver/s may be placed in the Chamber and recompressed on O₂ at a pressure equivalent to a sea level depth of 12 m. The diver should remain on O₂ at this pressure for twice the total omitted decompression time. Chamber ascent time (on oxygen) is 2 minutes.

After conducting either of these procedures, the diver's condition must be monitored for at least 24 hours after the dive for symptoms of DCI, and the diver must not enter the water again until at least 24 hours after the dive. As well, the diver must not expose him/herself to anything likely to increase the risk of DCI (e.g. exercise, altitude, alcohol etc), or which could mask the symptoms of DCI (e.g. alcohol, drugs). If symptoms of DCI occur, the diver should be transported to the nearest recompression facility as soon as possible.

The Dive Coordinator for any dive must ensure dive tables are used more conservatively than normal if a diver is subject to any factor/s likely to increase DCI risk before, during or immediately after a dive (see [Section 11](#), [Appendix 8](#), [Appendix 9](#) and [Appendix 10](#) of these procedures).

SECTION 5. DIVE TEAMS

5.1 NORMAL' DIVE TEAMS

A normal dive team comprises a group of individuals, who as a unit can perform the duties of a Dive Coordinator, Diver/s (Dive Leader and buddy/s), Diver's Attendant/s and Boat Handler (where required). A 'normal' dive team may be made up of:

- Two qualified divers diving within sight of each other at all times and one competent Dive Attendant; or
- Three qualified divers diving within sight of each other at all times and one competent Dive Attendant; or
- More than three divers, grouped into pairs or trios (and diving within sight of each other at all times), and one or more competent Dive Attendants, as required.

NB: Where more than one Dive Team is in the water and there is only one Dive Attendant, dive teams must work in close proximity to each other (within 30m), or one diver in each team must tow a surface marker buoy to allow their location to be easily determined.

5.2 EXCEPTIONS TO NORMAL DIVE TEAMS

5.2.1 Two Person Dive Teams

The use of two person dive teams is discouraged, but may be approved by the UDO in some circumstances, such as in the case of two experienced divers working at shallow depths in sheltered waters, or one diver working tethered at shallow depths in sheltered waters.

Before approval is given for any two person diving operation, the UDO should consider the divers involved, and the dive plan and risk assessments submitted for the dive - with particular reference to all identifiable potential risk factors (see [Section 11](#) – *Factors Known to Increase Diving Risk*, and [Appendix 8](#), [Appendix 9](#) and [Appendix 10](#)).

5.2.2 Two Person Dive Team – single tethered or buoyed diver

Conditions, which must be met before diving may take place with a two-person dive team using a Surface Attendant and a tethered or 'buoyed' diver, are as follows:

- The operation must have been approved for two person diving (see [Section 5.2](#));
- At the time of the dive, the Dive Coordinator must have determined that "low-risk conditions" are prevailing at the dive site (these conditions are defined at [Section 11.29](#) and at [Appendix 10](#));
- Where the above points have been met, the Surface Attendant and diver must monitor the on-site conditions, and the diver must agree to abort the dive at a signal from the Surface Attendant should conditions cease to be safe;
- Any boat used must be moored as close to the dive site as possible, and all divers must stay within 50m of the vessel;
- The dive site must be of such a nature that there is no risk of serious entanglement of the tether;
- The surface attendant **must** be able to see the diver's bubbles at all times, **must** watch for these on a regular basis (at least every minute) and **must** terminate the dive if conditions change such that this becomes difficult.

5.2.3 Diving without a Dive Attendant (at the surface)

Diving without a surface Dive Attendant will only be approved by the UDO or delegate in exceptionally safe circumstances, such as in cases of experienced divers working at shallow depths in sheltered waters. Diving without a Dive Attendant shall not be permitted where there will be more than two buddy groups in the water at one time (i.e. more than six divers).

Before approval is given for diving to occur without a surface Dive Attendant, the UDO should consider all relevant factors (as listed [Section 11](#), [Appendix 8](#), [Appendix 9](#) and [Appendix 10](#) of this Manual).

As well as the conditions listed at [Section 5.2.3](#) above, conditions, which must be met before diving without a Dive Attendant may take place, are as follows:

- The divers involved must agree they are prepared to dive without a Boat Handler/Surface Attendant;
- Both divers must continually monitor conditions during the dive, and must agree to abort the dive at a signal from the other diver if either feels that conditions cease to be safe;
- Any boat used must be moored as close to the dive site as possible, and all divers must stay within 50m of the vessel;
- A check must be made that the anchor of the boat being used is secure, immediately upon starting the dive;
- Surface conditions must be checked regularly during the dive, but not by ascending to the surface (i.e. the divers must be able to see the surface from their worksite on the bottom).

Where such a diving operation is to take place waters, the Dive Coordinator should consider the deployment of a current line from the stern of the boat - before divers enter the water. This should comprise a floating rope with minimum length of 50m (greater in poor conditions) and diameter of 10 mm, with a large, highly visible buoy (preferably with a dive flag mounted) attached to its free end;

5.2.4 Solo Diving

Solo diving (i.e. diving with no buddy diver or surface Dive Attendant present) is not permitted under any circumstances, except in case of extreme emergency.

5.2.5 Diving Involving Undergraduate Classes

Where compressed air diving is conducted as part of an undergraduate course, there must be a person in charge of the group who is a registered UTAS Dive Coordinator, and a recreational Divemaster (see *Glossary*). This person shall ensure that:

- All records of divers times and repetitive groups and surface intervals are kept;
- Sufficient lookouts are posted;
- Consideration is given to both in and out of water supervision;
- Novice divers are paired with an experienced diver where possible;
- There is a means to go to the assistance of a person or persons in trouble;
- First aid and O₂ equipment are available, as well as personnel who are trained in the use of this equipment;
- An adequate means of summoning assistance is at hand in case of emergency.

The use of a formal dive protocol is encouraged, to assist undergraduates in understanding some ground rules for the field trip (see [Appendix 13](#) for a sample dive protocol). Also, special consideration should be given to enforcing a maximum depth and area limitation, and to providing a means for recall of divers. The use of a surface marker buoy for each buddy pairing may facilitate these requirements.

5.3 LOST BUDDY PROCEDURES

Where divers are paired together on a dive, and lose contact with each other during that dive, the 'lost buddy' procedure to be followed should be the standard procedure taught on most 'open-water' diving courses in Australia. This involves trying to locate each other through the following set routine:

- Immediately on noticing contact has been lost with their buddy, each diver should circle 360°, looking for the buddy, or their exhaust bubble trail (often easier to see if looking up slightly);
- If visual contact is not made after the above procedure, each diver should ascend 3 - 5 metres, and repeat the procedure;
- If contact is still not re-established, each diver should surface (at a rate of no more than 9 m/minute). On regaining contact at the surface the dive may be recommenced or terminated, at the discretion of the Dive Coordinator or Dive Leader. If a diver is still missing more than 5 minutes after his/her buddy surfaces an immediate search should be instigated where it is safe to do so, and continued until either the diver is located or the searching diver deems that further assistance is required.

NB: Lost buddy procedures must be discussed in every pre-dive briefing.

SECTION 6. DIVING AND BOATING EQUIPMENT

All equipment used for UTAS diving must be approved for such use by the UDO, and the UTDBSC. University diving/boating equipment must not be used for any dives that are not approved University activities, except in cases where the permission of the UDO has been obtained.

It is the responsibility of the Dive Coordinator to ensure that all required equipment is used or carried by each diver on every dive, unless special dispensation has been granted by the UDO.

6.1 COMPULSORY EQUIPMENT FOR ALL DIVERS (SNORKEL, SCUBA AND SSBA)

The following equipment must be used or carried by each diver unless dispensation has been granted by the UDO:

- Exposure protection (wetsuit or drysuit) appropriate to the prevailing environmental conditions, including a hood (consideration should be given to carrying windproof clothing to wear over a wetsuit after diving);
- Mask, fins, snorkel (attachable or attached to mask) and a sharp diver's knife. The knife shall be worn in such a way (e.g. on inside of leg) that it will not foul any discarded equipment such as released weights;
- A weight belt, or a buoyancy control device incorporating an integrated weight system with quick-release;
- Where divers are operating in free-swimming SCUBA mode in circumstances in which there is surface support, there must be a means to recall the divers to the surface, independent of the vessel motors;
- The Dive Coordinator must ensure that at or close to their dive site there is adequate means of immediate communication in the event of an accident or emergency.

6.2 COMPULSORY EQUIPMENT FOR SCUBA, AND BREATHING GAS SUPPLY

As well as the equipment listed at *Section 6.1* above, the following equipment must be used or carried by each diver on every SCUBA dive unless special dispensation has been granted by their UDO or delegate:

- An approved SCUBA cylinder and valve designed in accordance with AS 2030;
- An approved regulator and alternative air source or air supply, such as a pony bottle or octopus regulator;
- An approved control device (BCD) with oral and SCUBA-feed inflators, for use with wetsuits and drysuits;
- An approved air cylinder pressure gauge, depth gauge and timing device, e.g. watch or dive computer;
- Sufficient quantity of breathing gas to complete the planned dive plus a reserve amount providing a minimum safety margin of 25% for dives shallower than 21m, and 30% for dives to deeper than 21m;
- A high visibility inflatable position-signalling device (eg. 'safety sausage™');

6.3 COMPULSORY EQUIPMENT FOR SSBA

As well as the equipment listed at *Section 6.1* above, the following equipment must be used or carried by each diver on every SSBA dive unless special dispensation has been granted by the UDO or delegate:

- a) An air hose for each diver, fitted with a non-return valve located as close as possible to the diver, e.g. at breathing medium inlet to mask or mouthpiece, or as an integral part of components specified in Item (b);
- b) Either - (i) an approved full face mask, band mask or incompressible helmet; or (ii) a half facemask and separate demand valve;
- c) Inlet and exhaust valves;
- d) Either one of or a combination of -
 - i) an approved demand gas supply device with or without breathing tubes; or
 - ii) an approved free flow gas device;
- e) An emergency gas supply (bail out cylinder and regulator), of sufficient capacity⁵ to allow the diver to perform a safe ascent from the working depth of the dive, at a rate of no greater than nine metres per minute. This must be set up through a distribution block and valve, and be able to be brought into operation by a diver through the use of only one hand. It must be fitted with an approved pressure gauge, easily readable by the diver;
- f) An approved harness system, to secure the gas supply hose and the equipment to the diver;
- g) A safety line, except where the diver's hose is being used for this purpose, in which case the hose must be secured to the harness by a hose grip (Chinese finger) and lockable clip; and
- h) An approved air cylinder pressure gauge, depth gauge and timing device, e.g. watch or dive computer

⁵ NB. Where a drysuit, full face mask and voice communications are in use together, the bail out cylinder size for SSBA operations must be at least 5 litres water capacity, and the cylinder must contain a minimum of 120 bar of air pressure at the start of the dive. Under exceptional circumstances the use of lower volume bail out systems may be approved by the DO.

6.4 OTHER EQUIPMENT WHICH MAY BE REQUIRED

Additional equipment, which may be required for safe conduct of a dive, includes:

- Emergency air supplies;
- Further exposure protection, such as gloves;
- A compressed air powered signalling device;
- Submersible dive tables;
- A lifeline or float-line;
- Night diving equipment as appropriate, including primary and backup torch, and cyalume stick/s.

6.5 ADDITIONAL EQUIPMENT WHICH MAY BE USED BY DIVERS

The following equipment may be used by UTAS divers provided diver safety is not compromised:

- Underwater photographic equipment;
- Underwater slates, measuring tapes, lightweight grids, frames, collection bags and traps;
- Sledge hammer or hammer, to pound in stakes and pickets;
- Small hand tools such as screw drivers, pliers, etc, and small hand held pneumatic tools as approved ⁶;
- Small lift bags - of no greater than 20 litres volume unless AS2815.2 qualifications are held by the diver; ⁷
- Small air lifts - of no greater than 250 litres per minute air flow rate.

Other than as listed above, no UTAS diver shall use a tool underwater unless they have received appropriate training, are familiar with the operation that item of equipment, and have received permission from the UDO.

6.6 AIR COMPRESSOR SYSTEMS

6.6.1 Design and Location of Compressors

The following features should be considered in the design and location of compressor systems:

- Any power driven compressor systems used to provide compressed breathing air for University diving operations must comply with the guidelines set out in AS2299.1-1999 for such systems.
- Fill station controls located in a remote position, shielded from cylinders being filled, to minimize risk of injury in the event of a cylinder failure;
- Pressurized gas bank cylinders secured to prevent falling;
- All high pressure lines and fittings of appropriate rated working pressures and secured every 60 cm;
- All air compressor intakes located away from areas containing engine exhaust or other contaminants.

6.6.2 Compressor Operation and Air Test Records

Personnel filling pressure cylinders from or diving with any UTAS air compressor or fill station shall be trained and qualified in operation of that equipment. Such training shall be documented and kept on file by the UDO.

Where a power driven compressor is driven by an internal combustion engine, particular care must be taken to prevent the compressor from sucking in exhaust gases from the engine, either by extending the exhaust of the engine, the inlet of the compressor, or both. If either of these modifications is made, care must be taken to ensure that any such extensions meet the compressor manufacturer's recommendations/specifications.

An oil-lubricated compressor should be checked for oil and hydrocarbon contamination at least every 100 hours or 6 months (whichever comes first). The results of these tests shall be entered in a formal log maintained by the UDO, and copies of the results shall be kept on file by the UDO. This log shall also record hours of operation, repair, overhaul, filter maintenance, and temperature adjustment for each compressor.

6.6.3 Breathing Air Compressors

Any power driven compressor systems used to provide compressed breathing air for University diving operations must produce air to the standard specified in AS2299.1-1999.

6.6.4 Enriched Air Nitrox Compressors

In addition to the above, any compressor/filtration system used for production of EAN must produce oil-free air as per applicable standards. Extra filtration and/or an oil-free or oil-less compressor is highly recommended when blending or mixing Nitrox using O₂ concentrations greater than 40%, to reduce the presence of oil mist and reduce the possibility for oxygen ignition of hydrocarbons;

⁶ Air for any tools used must be taken from a source entirely separate from the diver's air supply.

⁷ Air for filling any lift bag must be delivered from a source other than the diver's primary regulator (e.g. an octopus regulator), except in the case of bags of less than 25l capacity, where a diver may use their exhaled air from the exhaust of their regulator.

6.7 EQUIPMENT SECURITY

Diving and boating equipment should be deemed life support equipment, and all maintenance requirements must be met at mandated intervals (see *Section 6.14*), with details recorded on the TUFSS system. Originals of all service certifications must be forwarded to the UDO as soon as possible after servicing, for central filing.

To assist with ongoing tracking and maintenance of equipment, all UTAS diving and boating equipment must be stored in a secured area wherever possible. Such areas should be kept clean, and as 'dust free' as possible.

Security shall ideally be implemented via a swipe card access system, or similar system that allows 'tracking' of individuals who access the area.

At any UTAS site where individuals are issued with diving equipment for long-term use, and are to be held responsible for such equipment, consideration should be given to ensuring that such individuals have access to their own dedicated storage locker. As noted above, security for such lockers should ideally be implemented via a swipe card access system, or similar system that allows for restricted access, as well as 'tracking' of personnel accessing the locker.

Access to diving compressors and fill panels MUST be restricted to individuals who have undertaken a training session and induction with the UDO or their delegate into the use of these items.

6.8 UTAS 'LOAN EQUIPMENT'

Where University equipment is issued on loan to a UTAS diver, a form detailing the condition of the equipment must be signed by both parties (UDO and diver) at handover and on return of the equipment. After issue, the diver shall be fully responsible for care of the equipment, and must ensure proper cleaning and maintenance is carried out as described in this Manual. Problems with any item must be reported to the UDO as soon as possible.

In the event of any UTAS equipment being abused, damaged, or stolen, due to inadequate care, the individual concerned shall replace/repair the item/s involved immediately, at their own expense.

6.9 SCUBA CYLINDERS

UTAS cylinders must not be used for non-UTAS activities, except with permission of the UDO.

6.9.1 Testing of SCUBA Cylinders

All UTAS SCUBA cylinders must be tested and serviced at least annually, and any cylinder used on a UTAS dive must be in test at the time of the dive. If any cylinder is found to be totally drained of air at the time of filling, it must be inspected and tested prior to being used again, with costs to be paid by the last user.

Any cylinder rated for Nitrox use must be serviced as oxygen clean if such use is to be continued.

6.9.2 Filling of SCUBA Cylinders

UTAS SCUBA cylinders may only be filled at approved filling stations (a list of which shall be kept by the UDO), or with a portable air compressor unit approved for such use by the UDO or delegate. After filling, cylinders should have their valves taped or capped to prevent contamination and allow easy identification of full cylinders.

The amount of air pressure left in returned cylinders must be checked prior to filling, and cylinders must contain at least 30 BAR of pressure. If, at the time of filling, any cylinder is found to be totally drained of air, it must be inspected and tested prior to being used again, the cost for which will be charged to the last user of the cylinder.

Cylinders with any defects (e.g. air leaks from valves) must be tagged OUT OF SERVICE and the UDO notified, with the details recorded in the University's diving equipment defects log (which shall be kept by the UDO). SCUBA cylinders should be stored partially filled, unless about to be used.

Users who have not previously used the University's cylinder filling compressors must not do so until they have been given detailed operational and safety instructions by the UDO or their delegate, and received permission.

SCUBA cylinders which do not belong to the University may be filled with the University's compressors at the discretion of the UDO or delegate, provided the diver who will be using it is a certified SCUBA diver, and:

- i. the cylinder has passed a hydrostatic inspection during the previous year,
- ii. a record is kept of all fills provided, on the UTAS filling record sheet kept by the compressor. This must include the date, the number of fills, and the name of the individual the fill/s were done for.

6.10 USE OF UNIVERSITY EQUIPMENT BY NON-UTAS PERSONNEL

Personnel from outside the University may only use UTAS equipment under the following conditions:

6.10.1 Diving Equipment

Where UTAS diving equipment is issued to an external group or organisation, or an individual not listed on the UTAS Diver Register, the issuing Diving Officer must ensure that any user is fully qualified and trained in the use of the equipment. Equipment condition must be 'signed off' prior to issue and on return by both parties. After issue, the user shall be fully responsible for care of such equipment, and ensure proper cleaning and maintenance is carried out. Problems with any item must be reported to the issuing Diving Officer as soon as possible.

If equipment is damaged or stolen due to inadequate care, the user to whom it was issued concerned shall be required to replace/repair (as decided by the UTDBSC), the item/s at their own expense.

6.10.2 University Research Vessels

Organisations/groups who charter University vessels may dive following their own diving procedures, provided those procedures meet all relevant government standards for the type of diving operation and that no UTAS personnel are officially associated with the diving operation. Other than as outlined or in cases of emergency, no persons other than those affiliated with UTAS are permitted to use or be transported by UTAS vessels.

6.11 USE OF PERSONAL DIVING EQUIPMENT BY UTAS DIVERS/PERSONNEL

Personal diving equipment may be used by UTAS divers/personnel provided the following conditions are met:

- Equipment must be approved for use by the UDO;
- Equipment must be maintained in service at the owners expense, as per *Section 6.13* below, unless otherwise agreed;
- A copy of all relevant and current service certificates for the equipment must be forwarded to the UDO prior to use, and kept on file for a minimum of seven years.

6.12 PRE DIVE EQUIPMENT CHECK

For all UTAS dives a full pre-dive check shall be performed on the equipment of any diver/s (including stand-by diver/s). The diver, and one of either the diver's Attendant or the diver's buddy should do this.

A suitable pre-dive equipment checklist can be found at [Appendix 11](#). Note that this is intended as a guide only, and should be modified to suit each individual diving operation as appropriate.

6.13 MEDICAL EQUIPMENT

6.13.1 First Aid Kit

For every UTAS diving operation, a first aid kit adequate for any injuries that may be reasonably foreseen must be available on site. The UDO should be contacted for a sample list, describing minimum contents of an appropriate diving first aid kit – which should be added to as needed, for long trips, or other special circumstances.

6.13.2 Oxygen Resuscitation Equipment

For every UTAS diving operation involving compressed air breathing apparatus, there must be available, on site, oxygen resuscitation equipment suitable for the treatment of an unconscious, breathing patient, and a supply of medical oxygen sufficient to transport at least two patients to the nearest treatment facility.

Where possible such equipment must be carried for snorkel diving operations as well.

All such oxygen resuscitation equipment shall be kept clean and dry in a waterproof case, and maintained as per the schedule set out for diving equipment at *Section 6.13* below.

6.14 EQUIPMENT MAINTENANCE/RECORD KEEPING

All diving/safety equipment used on University diving operations (*including personal equipment*) must be maintained and serviced at least to the manufacturer's specifications, or more often if in regular use. Details of such servicing/maintenance must be recorded on the TUFSS system, and original copies of all documentation must be forwarded to the UDO as soon as possible after servicing for central filing.

As a minimum, the following service schedules must be observed for the equipment listed below:

Table 6.13 - Equipment service intervals

SCUBA cylinder	Annual service/test required at qualified test station
Air storage cylinder	Service/test required every 5 years at qualified test station
Regulator/Contents gauge	Annual service required by a qualified technician ⁸
Depth gauge (mechanical)	Must be checked for accuracy every three months ⁹
Depth gauge (electronic)	Must be checked for accuracy every six months ³
Dive computer	Depth sensor must be checked for accuracy every six months
BCD inflator unit/valves	Annual check required
Air compressor systems	Air purity - every 6 months or 100hrs, whichever comes first - to AS2299.2 breathing air standard; mechanical systems - as per manufacturers instructions
Air delivery hoses	Annually - to test pressure

⁸ Contents gauges must also be annually tested for accuracy, to ensure that accurate reporting of cylinder pressure is maintained as the contents drop from working pressure to near empty. Comparison with other contents gauges may be used for this purpose.

^{9, 3} Any gauge used in diving operations for measuring depths of <30m must have an accuracy of within 1% of the maximum scale reading.

All equipment in use shall be cleaned and/or flushed with fresh water at the end of every working day, and any faults or defects noted. **Defective equipment must be tagged OUT OF SERVICE¹⁰** to prevent accidental use, and all defects reported to the Dive Coordinator or Diving Officer. Equipment known to be faulty in any way **MUST NOT** be used for any UTAS diving operation.

Maintenance records for all UTAS equipment must be filed by the UDO in a central location, including information regarding all repairs, servicing, and testing.

6.15 EQUIPMENT HYGIENE

To help prevent possible transmission of infectious diseases between divers, sharing of masks, snorkels and regulators between divers is discouraged if an appropriate disinfection schedule has not been completed. Where UTAS divers are issued with equipment, they are responsible for equipment hygiene whilst it is in their care.

Personnel must ensure that oil, petrol lubricants, chemicals or preserving solutions (such as formalin) do not come into contact with diving equipment, as these will destroy the equipment or otherwise render it unusable. **Such products must not be stored or transported in close proximity to UTAS diving equipment at any time.**

If equipment is contaminated, the affected item/s must not be used, and the following steps must be taken:

- The equipment should be rinsed thoroughly with water to remove as much of the contaminant as possible;
- The equipment must be clearly tagged OUT OF SERVICE, indicating that it must not be used, and detailing the type of contaminant with which it has been in contact;
- The equipment must be forwarded to the UDO/SDO for cleaning, with a report detailing the circumstances under which the contamination occurred.

Where an item of UTAS equipment is rendered unusable by damage or contamination caused by negligence or carelessness, the diver to whom the equipment was issued will be responsible for its replacement.

6.16 DRYSUITS

Given the cold water temperatures and extreme weather conditions experienced in Tasmania, the provision of drysuits to staff involved in some types of diving operation is highly recommended¹¹, and may in fact be required by the UDO. It should be noted that some individuals will have a lower tolerance to cold than others, and this should also be considered as a factor where an individual has requested that they have a drysuit.

Such operations may include (but not be limited to) longer dives (>60min), multiple dives, and/or dives to depths of greater than 20 m where wetsuit compression would reduce its thermal efficiency. Appropriate thermal protection should be worn under the suit, though this will vary depending on the type/s of material used in the construction of the drysuit. A hood must always be worn in conjunction with the drysuit whilst diving.

UTAS divers intending to wear a drysuit, who have no documented previous experience in the use of drysuits, must either obtain a formal 'drysuit diving' qualification from an accredited training agency, or must undergo a drysuit familiarisation briefing and dive with the UDO or delegate prior to commencing diving operations using a drysuit.

It should be noted that for many divers, a drysuit AND a wetsuit may be required, if they are involved in different types of diving operations throughout the year.

For further information see the UTAS Personal Protective Equipment Policy.

6.17 DIVE FLAGS

The international dive flag (code alpha - white with blue swallow tail) must be flown from any boat used as a platform for a UTAS diving operation. As well, a dive flag must be used in the following situations:

- When diving in water of less than 3 m depth, a large dive flag must be positioned immediately above the dive site, either in a boat, or through use of a float supported flag - particularly in areas where there is a high level of danger from boat traffic (such as near boat ramps);
- When diving from shore, **either** a large dive flag must be placed on the shore to indicate the position of the dive site, and one diver from each buddy group involved on the dive should tow a smaller dive flag on a surface float to indicate the position of that buddy group at all times, **or** a large floating flag must be towed by the divers;
- Where a diving operation involves two or more buddy groups, and those groups are not intending to dive together, one diver from each buddy group involved on the dive must tow a smaller dive flag on a surface float to display the position of that buddy group to the Dive Attendant at all times.

¹⁰ A supply of OUT OF SERVICE TAGS must be kept in a location accessible to all UTAS divers, e.g. O2 kit.

¹¹ It should be noted that where a dive is likely to require a large amount of physical exertion, a drysuit may not be the best choice, due to the high body temperatures that are likely to be generated inside the suit causing discomfort and sweating. This can potentially dehydrate a diver through fluid loss, a predisposing factor for DCI, and should be avoided.

SECTION 7. SNORKEL DIVING

As a general guide, snorkel diving by UTAS personnel should only be used as an observation and/or a light recovery or collection technique. No difficult or strenuous work of any kind should be attempted using snorkel diving, without implementation of appropriate safety precautions and the written permission of the University Diving Officer.

An individual wishing to participate in snorkelling activities through the University must be listed on the *University Diver Register*, having met all snorkelling requirements of this procedures manual (see [Section 2](#)), and must satisfy the UDO of their fitness to take part in such activities by possessing a current dive medical and/or by satisfactorily completing the swim assessment at [Appendix 1](#).

Although no 'formal' qualifications are required of snorkel divers, they are required to complete a detailed Dive Plan for any trip - including a Risk Assessment for any tasks to be performed.

7.1 OTHER SNORKEL DIVING CONSIDERATIONS

Other than as listed above, no special qualifications are required of snorkel divers except that they be reasonable swimmers, comfortable in the water, and observe common sense rules regarding boating and swimming safety. Inexperienced snorkellers must undertake a snorkel diving familiarisation course with the UDO or delegate, and should initially practice snorkelling in either a swimming pool, or other sheltered, shallow waters, until they attain enough confidence to swim in deeper water.

As mentioned, the UDO (or delegate) has the right to assess any snorkel diver new to the Diver Register, and a formal assessment test would comprise the swimming/finning sections of the "Diver Evaluation" (at [Appendix 1](#)), as well as an assessment of 'snorkelling specific' skills, as determined by the UDO or delegate.

7.2 SIZE OF SNORKEL TEAMS

The minimum size of a snorkel team performing low risk tasks in low risk conditions is two, which could comprise either a snorkeller and a surface Coordinator, or two buddy snorkellers (in this case, both divers must remain in visual contact with each other at all times during the dive). In areas where there are higher risks, the snorkel team shall consist of either one snorkeller and a surface Coordinator, or two buddy snorkellers and a surface Coordinator, depending on the experience of the snorkel team and the task being undertaken (as assessed by the UDO or delegate).

The Dive Coordinator must be aware of and make allowance for the fact that the level of fitness required for safe breath hold diving is higher than that for SCUBA or SSBA diving.

7.3 SUPERVISION OF LARGE GROUPS

Where large groups (i.e. > 10 people) conduct snorkelling operations, there must be at least one person on watch at the surface for every ten divers. The surface Coordinator/s must perform a regular head count, and must be capable of going to the assistance of any person in difficulties. Coordinator/s must be equipped with a whistle, and the group must be informed that if the whistle is sounded, all snorkellers must return to the beach/boat. All snorkellers must be paired up (experienced with novice if possible) and pairs must stay together during the dive.

1st aid and oxygen equipment and trained operators must be on site while any such diving operation is in progress.

7.4 EDUCATIONAL AND SPECIAL INTEREST GROUPS

Where educational or special interest groups from outside the University are operating in University workplaces they may forgo the requirement of diver registration, by evaluating the competence of their snorkellers themselves, and supplying a complete listing of all persons who are to be involved in any proposed diving operation. A dive plan must be provided to the UDO, and all other UTAS snorkelling guidelines must be followed.

7.5 BRIEFING FOR SNORKEL DIVING

Before commencement of any snorkel diving operation, a briefing must be given by the Dive Coordinator, to ensure that all those involved are familiar with important information such as dive objectives, area of operation, environmental conditions, problems that may be encountered, etc. The sample Dive Coordinator's pre-dive briefing supplied at [Appendix 11](#) may be adapted for this purpose, but it must include details of any agreed recall signal (e.g. whistle).

7.6 OTHER SAFETY CONSIDERATIONS

A dive flag must be displayed adjacent to any snorkelling site at all times. It is highly recommended that all snorkel divers wear a safety line with surface float/dive flag, to clearly display their location to the Dive Coordinator, and to aid in the diver's recovery from the water in the event of an accident. The wearing of a safety line is mandatory where the snorkeller is the only diver at the site.

The safety line must be at least 5 m greater in length than the maximum depth of the water around the dive site, and the float should be large enough and of such a colour to be easily visible. If possible, a small dive flag should be attached to the surface float (NB. This does not remove the need for a large dive flag to be displayed at the site).

Given the very real dangers of shallow water blackout, divers participating in breath hold diving activities should take great care to not exceed their personal limits. No diver should exceed 15 m depth at any time.

No snorkel diving other than surface observation (where the diver remains at the surface at all times) is to be undertaken by any diver who has a repetitive factor (RF) of greater than 1.1 from previous compressed air diving operations.

During snorkel diving operations, an appropriate first aid kit must be available on site, with at least one person who is adequately trained in first aid (L2 Workplace). As well, oxygen resuscitation equipment must be on site, along with a person certified in the use of such equipment and an adequate supply of medical oxygen.

Snorkelling is prohibited in areas of high boating traffic, e.g. around boat ramps or in shipping channels.

7.7 EXPOSURE PROTECTION

As with SCUBA divers, snorkel divers must wear suitable protection from environmental conditions such as cold, sun, marine animals, abrasions etc. The use of drysuits for snorkel diving is not recommended (other than for surface observations, where no actual diving underwater takes place).

SECTION 8. BREATHING GAS

8.1 BREATHING AIR STANDARDS

Breathing air for UTAS diving operations shall meet the standard set out in AS2299.1-1999.

8.1.1 Air to be Mixed with Greater than 40% Oxygen

In addition to standards outlined in AS2299.1-1999, the following standards shall be met for breathing air that is to be placed in contact with oxygen concentrations greater than 40%, or used in Enriched Air Nitrox (EAN) filling operations by the partial pressure mixing method, with greater than 40% oxygen as the enriching agent:

Table 9.1 - Specifications for Air to be Mixed with Greater than 40% Oxygen.

Air Purity	As per AS2299.1-1999
Condensed Hydrocarbons	< 5 mg/m ³
Hydrocarbon Contaminants	less than or equal to 0.1 mg/m ³

8.2 OXYGEN AND MIXED GAS

8.2.1 Oxygen

O₂ used for mixing Enriched Air Nitrox (EAN) or mixed gas shall meet purity levels for Medical (U.S.P.) Grade.

Table 8.2 - Medical (U.S.P.) Grade Oxygen Specifications.

Oxygen Content	Minimum 99.5%
<u>Contaminants</u>	<u>Maximum</u>
Nitrogen	0.1%
Argon	0.4%
Hydrocarbons	3 ppm
Methane	25 ppm
Carbon Dioxide	5 ppm
Carbon Monoxide	1 ppm
Moisture	25 ppm

8.2.2 Nitrogen or Helium

Nitrogen or Helium used to produce breathing mixtures shall be of an acceptable grade for breathing by humans.

Table 8.3 - Nitrogen Specifications.

Nitrogen Content	Minimum 99.5%
<u>Contaminants</u>	<u>Maximum</u>
Oxygen	55 ppm
Hydrocarbons	1 ppm
Carbon Dioxide	1 ppm
Carbon Monoxide	1 ppm
Moisture	25 ppm

Table 8.4 - Helium Specifications.

Helium Content	Minimum 99.5%
<u>Contaminants</u>	<u>Maximum</u>
Oxygen	50 ppm
Hydrocarbons	1 ppm
Carbon Dioxide	1 ppm
Carbon Monoxide	1 ppm
Moisture	25 ppm

8.3 PRODUCTION OF SPECIAL GAS MIXTURES

8.3.1 Authorisation

Production of special gas mixtures (EAN, Heliox, Trimix, etc) shall be authorised and approved by the UDO, and personnel involved in the production of EAN and mixed gas shall be appropriately trained and qualified for the method of production used, as determined by the UDO.

SECTION 9. NITROX DIVING GUIDELINES

The following guidelines address the use of Enriched Air Nitrox (see glossary) by UTAS divers.

9.1 PREREQUISITES

Any diver wishing to use Nitrox for a UTAS dive must hold at least an approved Nitrox Diver certification.

Application to use Nitrox must be made to the UDO (accompanied by proof of qualifications/experience), and written permission received, before a diver may use Nitrox on any UTAS dive.

9.2 REQUIREMENTS FOR PERMISSION TO USE NITROX

Submission of the required documents will not automatically result in authorisation to use Nitrox. The applicant must also convince the UDO that he/she is skilled and proficient in its use. Even after completion of training and evaluation, authorisation to use Nitrox may be denied to a diver who cannot demonstrate to the satisfaction of the UDO the appropriate judgment or proficiency to ensure the safety of the diver and any dive buddy.

Prior to authorisation to use Nitrox, the following minimum requirements should be met:

9.2.1 Training

Hold an approved Nitrox Diver certification from a recognized diver training organisation; and have logged at least five dives using Nitrox during or post-training.

9.2.2 Examinations

Each diver should demonstrate proficiency in skills and theory in written, oral, and practical examinations covering:

- Written examinations covering the information presented in the classroom training session (i.e., gas theory, oxygen toxicity, partial pressure determination, etc);
- Practical examinations covering the information presented in the practical training session (i.e., gas analysis, documentation procedures, etc);
- Open water checkout dives, to appropriate depths, to demonstrate the divers theoretical and practical skills.

9.2.3 Minimum Activity to Maintain UTAS Nitrox Diver classification

The diver should log at least one Nitrox dive per year.

9.3 NITROX TRAINING GUIDELINES

Training in these guidelines shall be in addition to that needed for a full scientific diver certification under the AS2299.2 Australian Standard. Nitrox training may be included as part of a Scientific Diver training course.

9.3.1 Classroom Instruction

Topics should include, but are not limited to: review of previous training; physical gas laws pertaining to Nitrox; partial pressure calculations and limits; equivalent air depth (EAD) concept and calculations; oxygen physiology and oxygen toxicity; calculation of oxygen exposure and maximum safe operating depth (MOD); determination of decompression schedules (both by EAD method using approved air dive tables, and using approved Nitrox dive tables); dive planning and emergency procedures; mixing procedures and calculations; gas analysis; personnel requirements; equipment marking and maintenance requirements; dive-station requirements.

The UTDBSC may choose to limit standard Nitrox diver training to procedures applicable to diving, and subsequently reserve training such as Nitrox production methods, oxygen cleaning, and dive station topics to divers requiring specialised authorization in these areas.

9.3.2 Practical Training

The practical training portion will consist of a review of skills as stated for SCUBA in the AS2299.2 Australian Standard for Scientific Diving, with additional training as follows:

- a) Oxygen analysis of Nitrox mixtures;
- b) Determination of MOD, oxygen partial pressure exposure, and oxygen toxicity time limits, for various Nitrox mixtures at various depths;
- c) Determination of nitrogen-based dive limits status by EAD method using air dive tables, and/or using Nitrox dive tables, as approved by the UTDBSC;
- d) Nitrox dive computer use may be included, as approved by the UTDBSC.

9.3.3 Written Examination (based on classroom instruction and practical training)

Before approval to dive using Nitrox is granted, the trainee should successfully pass a written examination demonstrating knowledge of at least the following:

- a) Function, care, use, and maintenance of equipment cleaned for Nitrox use;
- b) Physical and physiological considerations of Nitrox diving (ex.: O₂ and CO₂ toxicity);

- c) Diving regulations and procedures as related to Nitrox diving, either scuba or surface-supplied (depending on intended mode);
- d) Given the proper information, calculation of:
 - i) Equivalent air depth (EAD) for a given fO_2 and actual depth;
 - ii) pO_2 exposure for a given fO_2 and depth;
 - iii) Optimal Nitrox mixture for a given pO_2 exposure limit and planned depth;
 - iv) Maximum operational depth (MOD) for a given mix and pO_2 exposure limit;
 - v) For Nitrox production purposes, percentages/pressure of oxygen present in a given mixture, and pressure of each gas required to produce a fO_2 by partial pressure mixing.
- e) Dive table and dive computer selection and usage;
- f) Nitrox production methods and considerations;
- g) Oxygen analysis; and
- h) Nitrox operational guidelines (*Section 9.4*), dive planning, and dive station components

9.3.4 Open water EAN Dives

A minimum of five supervised open water dives using Nitrox is required for authorization. The mode used in the dives should correspond to the intended application (i.e., scuba or surface-supplied). If the MOD for the mix being used can be exceeded at the training location, direct, in-water supervision is required.

9.3.5 Surface-Supplied Training

All training as applied to surface-supplied diving (practical, classroom, and open water) must follow the requirements of the AS2299.2 Australian Standard, and UTAS equipment requirements as outlined at [Section 6](#).

9.4 UTAS NITROX DIVING REGULATIONS

9.4.1 Dive Personnel Requirements

An Unrestricted UTAS diver, who has met the training and practical requirements of these guidelines, may be authorised by the UDO to use Nitrox.

On any dive during which Nitrox will be used, the Dive Coordinator must be an authorised UTAS Nitrox Diver, and hold appropriate authorisations required for the dive as specified above.

Authorisation by the UDO for Nitrox dives must occur as part of the dive plan approval process, and any proposed Nitrox dive must be flagged clearly as such by the Dive Coordinator.

In addition to the responsibilities listed at [Section 1.4.5](#), for any dive operation the Dive Coordinator must:

- Verify that all divers intending to use Nitrox on a dive are properly qualified and authorised;
- As part of the pre-dive procedures, confirm with each diver the Nitrox mixture being used, and establish dive team maximum depth/time limits, according to the shortest time limit or shallowest depth limit among the team members;

The Dive Coordinator or Dive Leader should also give consideration to reducing the maximum allowable pO_2 exposure limit for the dive team if on-site conditions so indicate (see *Section 9.4.2 below*).

9.4.2 Dive Parameters

- a) *Oxygen Exposure Limits*
 - i. The inspired oxygen partial pressure experienced at depth should not exceed 1.4 ATA. EAN dives should comply with the current NOAA Oxygen Exposure Limits (at [Appendix 19](#));
 - ii. The maximum allowable exposure limit should be reduced in cases where cold, strenuous dive conditions or extended exposure times are expected, and the UDO should consider this in the review of any dive plan application, which proposes to use Nitrox. The Dive Coordinator should also review on-site conditions and reduce the allowable pO_2 exposure limits if conditions indicate this would reasonably be warranted.
 - iii. If using the equivalent air depth (EAD) method the maximum depth of a dive should be based on the oxygen partial pressure for the specific Nitrox breathing mix to be used.
- b) *Bottom Time Limits*
 - i. Maximum bottom time should be based on the depth of the dive and Nitrox mixture being used.
 - ii. Bottom time for a single dive must not exceed the NOAA maximum allowable "Single Exposure Limit" for any O_2 partial pressure, as listed by the NOAA O_2 Exposure Limits (at [Appendix 19](#)).
- c) *Decompression Tables and Gases*
 - i. A set of UTAS approved Nitrox decompression tables must be available at the dive site for all Nitrox dives unless using the equivalent air depth (EAD) method, in which case dives should be conducted using the DCIEM air decompression tables.

- ii. If Nitrox is used to increase the safety margin of air-based dive tables, the MOD and oxygen exposure and time limits for the Nitrox mixture being dived must not be exceeded.
- iii. Breathing mixtures used for in-water decompression, or for bail-out purposes, should contain the same or greater oxygen content as that being used during the dive, within the confines of any applicable depth limitations and the oxygen partial pressure limits outlined above.

d) *Nitrox Dive Computers*

With the written approval of the UDO a dive computer may be used to compute decompression status during Nitrox dives. This will only be permitted subject to the following:

- i. Any computer used must be set to a personal adjustment level determined by the UDO before use;
- ii. The diver must read and follow all manufacturers' guidelines and operating instructions;
- iii. Any dive computer use must comply with the guidelines listed at [Section 4.2](#) of this Manual, where these are more conservative than those applied by the computer operating instructions;
- iv. Any UTAS diver applying for permission to use a computer to monitor Nitrox diving must demonstrate a clear understanding of the display operations of the unit being used, to the satisfaction of the UDO or his/her delegate, prior to diving with the computer;
- v. Where Nitrox is used to increase the safety margin of an air-based dive computer, the MOD and oxygen exposure and time limits for the Nitrox mixture being dived must not be exceeded;
- vi. Prior to each dive, the diver MUST check any dive computer capable of pO₂ limit and fO₂ adjustment, to ensure compatibility with the mix being used; and
- vii. Decompression requirements must be calculated for the dive, for the maximum depths/times to be dived, using an approved Nitrox decompression table or DCIEM tables and equivalent air depths. These requirements are to be written down and carried by each diver during the dive in case of computer failure.

e) *Repetitive Diving*

When performing repetitive dives using Nitrox gas mixtures, the following shall apply:

- i. Repetitive dives using Nitrox mixtures must be performed in compliance with all procedures required by the specific dive tables used;
- ii. Residual nitrogen time should be based on the EAD for the specific Nitrox mixture to be used on the repetitive dive, and not that of the previous dive;
- iii. The total cumulative exposure (bottom time) to a partial pressure of oxygen in a given 24 hour period should not exceed the current NOAA Diving Manual 24-hour Oxygen Partial Pressure Limits for "Normal" Exposures;
- iv. When repetitive dives expose divers to different oxygen partial pressures from dive to dive, divers should account for accumulated oxygen exposure from previous dives when determining acceptable exposures for repetitive dives. Both acute (CNS) and chronic (pulmonary) oxygen toxicity concerns should be addressed.

f) *Oxygen Parameters*

- i. **Authorised mixtures** - Only gas mixtures that are approved by the UDO may be used for Nitrox diving. These would most commonly be EAN32 and EAN36.
- ii. **Purity** - Oxygen used for mixing any breathing gases for use on UTAS dives must meet the standards specified at [Section 8](#) of this document

g) *Gas Analysis*

- i. **Personnel Requirements**

Individuals responsible for analysing EAN mixtures must be trained and experienced in the technique; and only those individuals approved by the UDO may analyse Nitrox mixtures.

- ii. **Analysis Verification by User**

Prior to any dive it is the responsibility of each diver to analyse the oxygen content of his/her scuba cylinder, and acknowledge in writing the following information for each cylinder: fO₂, MOD, cylinder pressure, date of analysis, and user's name.

All Nitrox dives carried out as part of a UTAS diving operation must be recorded on a copy of a 'UTAS Open Circuit Dive Record form' (at [Appendix 3](#)).

h) *Gas Mixing*

- i. **Personnel Requirements**

Individuals responsible for producing Nitrox mixtures must be trained and experienced in all aspects of the technique, and only those individuals approved by the UDO may mix Nitrox mixtures.

- ii. **Production Methods**

The specific Nitrox production method used for UTAS diving must be approved by the UDO.

9.5 NITROX DIVING EQUIPMENT

All of the designated equipment and stated requirements regarding scuba equipment required by the AS2299.2 Scientific Diving Standard shall apply to UTAS Nitrox diving operations.

Additional equipment necessary for Nitrox diving operations includes:

9.5.1 Oxygen Cleaning and Maintenance Requirements

Equipment which may be exposed to concentrations of greater than 40% oxygen at pressures above 10 ATA during a dive or the cylinder filling process **must** be cleaned and maintained for oxygen service;

- a) Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designed and maintained for oxygen service;
- b) Oxygen systems operating at greater than 8 ATA shall have slow-opening shut-off valves.

This should include the following equipment:

- Scuba cylinders
- Cylinder valves
- Scuba and other regulators
- Cylinder pressure gauges
- Hoses
- Diver support equipment
- Compressors
- Fill station components and plumbing.

9.5.2 SCUBA Cylinder Identification Marking

SCUBA cylinders to be used with Nitrox mixtures should display the following identification/documentation:

- a) Cylinder markings indicating "NITROX", or "EANx", or "Enriched Air";
- b) Nitrox identification colour coding should include a 10 cm wide green band around the cylinder, starting immediately below the shoulder curvature. If the cylinder is not yellow, the green band should be bordered above and below by a 2.5 cm yellow band;
- c) The alternate marking of a yellow cylinder by painting the cylinder crown green and printing the word "NITROX" parallel to the length of the cylinder in green print is acceptable;
- d) A contents label - detailing the current fO₂, MOD/pO₂, date of analysis and name of analyser;
- e) A label indicating whether the cylinder is prepared for O₂ or mixtures containing greater than 40% O₂.

9.5.3 Regulators

Regulators to be used with Nitrox mixtures containing greater than 40% oxygen must be cleaned and maintained for oxygen service, and marked in an identifying manner as such.

9.5.4 Other Support Equipment

- a) Oxygen analysers:

An oxygen analyser is required which is capable of determining the oxygen content in the SCUBA cylinder. Two analysers are recommended to reduce the likelihood of errors due to a faulty analyser. The analyser should be capable of reading a scale of 0 to 100% oxygen, within (one) 1% accuracy.

All diver and support equipment should be suitable for the fO₂ being used.

- b) Compressor systems:

Any compressor system used for production of Nitrox for UTAS operations must meet the requirements detailed at [Section 6.6](#) of this document.

- c) Fill Station Components:

- All components of a Nitrox fill station that will contact Nitrox mixtures containing greater than 40% oxygen must be cleaned and maintained for oxygen service. This includes cylinders, whips, gauges, valves, and connecting lines.

SECTION 10. SPECIALISED DIVING MODES

10.1 GENERAL

Any dive requiring staged decompression, conducted in restricted overhead environments (cavern, cave, tunnel, ice, or shipwreck penetration), conducted in blue-water (open ocean), incorporating breathing gas mixtures other than air and EAN, involving breathing gas delivery systems other than open-circuit SCUBA or SSBA, or conducted in any other particularly hazardous environments, shall be considered Specialised Diving.

For each of these modes, this section defines specific considerations regarding the following issues:

- Special Medical Examination requirements, if any;
- Training and/or experience verification requirements for University authorisation;
- Equipment requirements;
- Operational Requirements and additional safety protocols to be used.

For dives that involve more than one specialised diving mode, all requirements for each diving mode shall be met.

Decompression diving shall be defined as any diving during which the diver cannot perform a direct return to the surface without performing a mandatory decompression stop to allow the release of inert gas from the diver's body. Such diving shall only be performed with the permission of the UDO and UTDBSC.

10.2 'COMMERCIAL' DIVING OPERATIONS

The following shall be observed when any UTAS diver is conducting diving that could be deemed to be 'commercial' in nature by the UDO.

10.2.1 Minimum Experience

- a) For diving on open circuit, divers shall hold an ADAS part 1 diver qualification as per Australian Standard AS2815.1 (or ADAS recognised international equivalent), as well as logged experience appropriate to the type of work being performed;
- b) For diving on surface supply, divers shall hold an ADAS part 2 diver qualification as per Australian Standard AS2815.2 (or ADAS recognised international equivalent), as well as logged experience appropriate to the type of work being performed;

10.2.2 Training Requirements

All training for commercial diving operations shall be conducted by an ADAS accredited diving school (or ADAS recognised international equivalent).

10.2.3 Minimum Equipment Requirements

All equipment used for commercial diving operations shall be as referenced in the Australian Standard AS2299.1 Commercial Diving Standard.

10.2.4 Minimum Operational Requirements

All 'UTAS sponsored' commercial diving operations shall meet the requirements of this Manual, as well as the Australian Standard AS2299.1 Commercial Diving Standard, with the AS2299.1 document taking precedence where the documents differ.

10.3 STAGED DECOMPRESSION DIVING

The following procedures shall be observed when conducting dives requiring planned decompression stops¹².

All operational UTAS diving operations requiring decompression shall be conducted using approved rebreathers.

10.3.1 Minimum Experience

- a) Unrestricted Scientific Diver qualification as per Australian Standard for Scientific Diving AS2299.2 and a minimum of 100 logged dives;
- b) Demonstration of the ability to safely plan and conduct dives deeper than 30m;
- c) Extensive logged decompression diving experience, or approved decompression diving certification from a recognised diver training organisation.

¹² Note 1: Diving operations requiring planned decompression stops may only be performed using enriched air nitrox mixtures.

Note 2: No decompression diving shall be permitted using open circuit diving equipment except for training purposes, and all such training must be conducted in calm conditions.

10.3.2 Training Requirements

All training shall be appropriate for the conditions in which dive operations are to be conducted.

- a) Minimum Training shall include the following:
 - i. A minimum of 6 hours of classroom training to ensure theoretical knowledge to include: physics and physiology of decompression; decompression planning and procedures; gas management; equipment configurations; decompression method, emergency procedures;
 - ii. It is recommended that at least one training session be conducted in a pool or sheltered water setting, to cover equipment handling and familiarization, swimming and buoyancy control, to estimate gas consumption rates, and to practice emergency procedures;
 - iii. At least 6 open-water training dives simulating/requiring decompression shall be conducted, emphasizing planning and execution of required decompression dives, and including practice of emergency procedures;
 - iv. Progression to greater depths shall be by 4-dive increments at specified depth intervals;
 - v. No training dives requiring required decompression shall be conducted until the diver has demonstrated acceptable skills under simulated conditions.
- b) The minimum skills a diver must demonstrate during dives simulating/requiring decompression are:
 - Buoyancy control
 - Proper ascent rate
 - Proper depth control
 - Equipment manipulation
 - Stage/decompression bottle use as pertinent to planned diving operation
 - Buddy skills
 - Gas management
 - Time management
 - Task loading
 - Emergency skills
- c) Divers shall demonstrate to the satisfaction of the UDO or their delegate proficiency in planning and executing required decompression dives appropriate to the conditions in which diving operations are to be conducted;
- d) Upon completion of training, the diver shall be authorised to conduct required decompression dives with UDO approval.

10.3.3 Minimum Equipment Requirements

- a) Valve and regulator systems for primary (bottom) gas supplies shall be configured in a redundant manner that allows continuous breathing gas delivery in the event of failure of any one component of the regulator/valve system;
- b) Cylinders with volume and configuration adequate for planned diving operations;
- b) One of the second stages on the primary gas supply shall be configured with a hose of adequate length to facilitate effective emergency gas sharing in the intended environment;
- c) As well as equipment required elsewhere in this document, dive equipment shall include:
 - Diver location devices adequate for the planned diving operations and environment;
 - Compass.
- d) Redundancy in the following components is desirable or may be required at the discretion of the UDO:
 - Decompression Schedules;
 - Dive Timing Devices;
 - Depth gauges;
 - Buoyancy Control Devices;
 - Cutting devices;
 - Lift bags and line reels.

10.3.4 Minimum Operational Requirements

- a) Approval of dive operations requiring decompression dives shall be on a case-by-case basis;
- b) Staged decompression diving shall only be conducted in the presence of the UDO or delegate, unless specified otherwise by the UTDBSC;
- c) The maximum pO₂ to be used for planning required decompression dives is 1.5. It is recommended that a pO₂ of less than 1.4 be used during bottom exposure;
- d) Gas supplies shall be adequate to meet planned operational requirements and foreseeable emergencies, and shall be estimated for each diver based on historic diver respiratory minute volume, with allowances for exertion and stress. Such information shall be provided as part of the Dive Permission application;
- e) At least one third of the gas supply shall be reserved for emergencies. Except in the event of an emergency, all divers shall surface with at least one-third of the gas supply remaining;
- f) Decompression gas shall be available in twice the amount estimated to be required for a full staged decompression schedule as planned;

- g) Decompression dives may be planned using dive tables, dive computers, and/or PC software approved by the UDO or UTDBSC;
- h) Breathing gases used while performing in-water decompression shall contain the same or greater oxygen content as that used during the bottom phase of the dive;
- i) If breathing gas mixtures other than air are used for required decompression, their use shall be in accordance with the regulations set forth in the appropriate sections of this standard;
- j) Prior to each dive, the dive team shall review the approved emergency procedures for the planned dive. As a minimum, these shall cover equipment malfunction, unexpected diving conditions, or dive team separation;
- k) The maximum depth for required decompression diving using air as the bottom gas shall be 35m;
- l) Use of additional Nitrox and/or high-oxygen fraction decompression mixtures as travel and decompression gases to decrease decompression obligations is encouraged;
- m) Use of alternate inert gas mixtures to limit narcosis is required for depths greater than 45m;
- n) Diver/vessel contact and communications procedures shall be reviewed and approved by the DSO, and established and rehearsed to the satisfaction of the DSO or his/her designee.
- o) When conducting staged decompression diving from an anchored vessel or shot-line deeper than 40 metres, the dive team shall maintain contact with the vessel/shot-line by one of the following means, to assist in diver location and rescue in the event of an emergency:
 - Maintaining direct visual contact with the anchor;
 - Following a predetermined, prominent underwater feature;
 - Maintaining a continuous guideline between the vessel anchor and the divers.
- p) If a period of more than 6 months has elapsed since the last mixed gas dive, a series of progressive workup dives to return the diver(s) to proficiency status prior to the start of project diving operations are recommended. Mission specific workup dives are recommended.

10.4 RESTRICTED OVERHEAD ENVIRONMENTS

Restricted overhead environments include any diving environment in which a direct ascent to the surface is impeded by a physical barrier, including cave, cavern, ice and shipwreck penetration. It does not include underwater arches, lava tubes, opened shipwrecks or kelp forests, in which:

- Two divers can easily swim abreast;
- There is no significant danger of entrapment or entanglement;
- Loss of visibility due to siltation is unlikely;
- Direct sunlight is always available for illumination.

10.4.1 Minimum Certification and Experience

- a) Divers shall document training in restricted overhead environment diving appropriate for the conditions in which dive operations are to be conducted. Such documentation shall be to the satisfaction of the UDO and/or DBSC. Training shall be conducted by agencies and instructors approved by the UDO.
- b) Divers shall demonstrate to the UDO, proficiency in planning and executing dives in a restricted overhead environment appropriate to conditions in which diving operations are to be conducted.

10.4.2 Minimum Equipment Requirements

- a) Divers shall employ a continuous line from a point outside the overhead environment to their position;
- b) A minimum of three lights shall be carried by each diver except in environments in which direct sunlight is visible, where each diver shall carry a minimum of two lights;
- c) Redundant breathing gas delivery systems shall be designed such that no single component failure can prevent access by the diver to an appropriate breathing gas supply;
- d) An alternate second stage shall be included with a hose of adequate length to facilitate emergency gas sharing while swimming in a single file formation;
- e) The DCB may require redundancy in other equipment systems to ensure dive team safety, including:
 - Submersible Cylinder Pressure Gauges;
 - Dive Computers or Decompression Calculation Devices;
 - Dive Timing Devices;
 - Depth gauges;
 - Buoyancy Control Devices.

10.4.3 Minimum Operational Requirements

- a) Divers shall immediately begin exiting from a restricted overhead environment when a light source or a piece of equipment fails or malfunctions;

- b) Divers shall begin exiting the overhead environment as soon as any member of the dive team reaches two-thirds of his/her starting air supply;
- c) Where an enclosed or confined space is not large enough for two divers, a diver shall be stationed at the underwater point of entry, an orientation line shall be used, and an emergency breathing gas supply will be available at the point of entry;
- d) Emergency procedures for loss of gas supply, equipment malfunction, team separation, unexpected diving conditions and loss of visibility shall be developed. All participating divers must review emergency procedures prior to commencement of each day of diving.

10.5 BLUE-WATER DIVING

Bluewater diving is defined as diving conducted in any body of water in which there is no physical bottom within diving depth ranges. The following regulations are derived from the publication, *Bluewater Diving Guidelines* (listed in bibliography). Exceptions to this may be made on a case-by-case basis, if a risk of entanglement with other structures exists, or there are other means of physical control. Procedures for diver control and communication must be developed to the satisfaction of the UDO and/or UTDBSC.

10.5.1 Minimum Certification and Experience

The diver shall have completed practical training in blue-water diving techniques, and demonstrate proficiency to the satisfaction of the UDO or delegate. This training shall include:

- a) Bluewater diving equipment deployment;
- b) Entry procedures;
- c) Buoyancy control and awareness;
- d) Diver communication;
- e) Scientific procedure familiarisation;
- f) Out-of-air procedures;
- g) Dangerous marine life defensive techniques;
- h) Exit procedures;
- i) Emergency communication and protocols.

10.5.2 Equipment Requirements

- a) Divers shall employ a down-line and counterweighted trapeze line system in order to maintain diver contact and depth control;
- b) The total weight in water of the down-line and tether array shall be no greater than 5 kg;
- c) All diver tether attachments shall use connectors that can be quickly released by the diver while the line is under a tension at least equivalent to the weight of the entire array. Attachments shall be to either the diver's BCD, or to a separate harness, but not to the diver's weight belt.

10.5.3 Operational Requirements

- a) A safety diver shall be stationed at the trapeze attachment point. This diver's sole function is to monitor and control the dive team, and monitor the diving environment for potential hazards. This diver shall be authorised to terminate diving operations for any or all members of the dive team;
- b) A lookout/boat operator shall be stationed aboard any small craft from which blue-water diving is conducted as long as divers are in the water.

10.6 MIXED GAS DIVING

Mixed gas diving is the use of breathing gas mixtures other than air, or EAN mixes less than 40% (Heliox, Trimix, etc). The use of mixed gas under University auspices shall be approved by the UTDBSC on a case-by-case basis.

10.6.1 Minimum Certification and Experience

- a) Nitrox certification and authorisation as per [Section 9](#) of this manual;
- b) Advanced Nitrox certification from a recognised diver training organisation;
- c) Certification for and authorisation to conduct decompression diving as per [Section 10](#) of this manual;
- d) Mixed gas certification from a recognised diver training organisation;
- e) Demonstrate to the UDO's satisfaction, experience, skills, knowledge, and attitude appropriate for using mixed gases, or being trained in the safe use of mixed gases.

10.6.2 Minimum Training Requirements

- a) Classroom training including:
 - i. Review of topics and issues previously outlined in Nitrox and required decompression diving training, as pertinent to the planned operations;
 - ii. The use of helium or other inert gases, and the use of multiple decompression gases;
 - iii. Equipment configurations;
 - iv. Mixed gas decompression planning;
 - v. Gas management planning;
 - vi. Thermal considerations;
 - vii. END determination;

- viii. Mission planning and logistics;
 - ix. Emergency procedures;
 - x. Mixed gas production methods;
 - xi. Methods of gas handling and cylinder filling;
 - xii. Oxygen exposure management;
 - xiii. Gas analysis; and
 - xiv. Mixed gas physics and physiology.
- b) Practical Training:
- i. Confined water session(s) in which divers demonstrate proficiency in required skills and techniques for proposed diving operations;
 - ii. A minimum of 6 open water training dives;
 - iii. At least one initial dive shall be in 40 m or less to practice equipment handling and emergency procedures;
 - iv. Subsequent dives will gradually increase in depth, with a majority of the training dives being conducted between 40 m feet and the planned operational depth;
 - v. Planned operational depth for initial training dives shall not exceed 80 m;
 - vi. Diving operations beyond 80 m feet shall require additional training dives.

10.6.3 Gas Quality Requirements

All component gases used for blending breathing gas mixtures for UTAS diving operations shall meet the specifications detailed at [Section 8](#) of this document.

10.6.4 Equipment Requirements

Equipment requirements shall be developed and approved by the UDO for each mixed gas diving operation, and met by divers, prior to engaging in mixed-gas diving. All equipment shall meet requirements of this document.

10.6.5 Minimum Operational Requirements

Approval of dive plan applications to conduct mixed gas dives shall be on a case-by-case basis. In all cases:

- a) All applicable operational requirements for Nitrox and Decompression diving shall be met;
- b) The maximum pO_2 to be used for planning required decompression dives should be 1.5 BAR. *It is recommended that a ppO_2 of less than 1.5 BAR be used during bottom exposure;*
- c) Maximum planned Oxygen Toxicity Units (OTU) will be considered based on mission duration;
- d) Divers decompressing on high-oxygen concentration mixtures shall closely monitor one another for signs of acute oxygen toxicity, and must wear full-face masks.

If a period of more than 6 months has elapsed since the last mixed gas dive, a series of progressive workup dives to return the diver(s) to proficiency status prior to the start of project diving operations are recommended.

10.7 REBREATHERS

Closed circuit underwater breathing apparatus (CCUBA), or rebreathers, are defined as any device that recirculates some or all of the exhaled gas in a breathing loop and returns it to the diver. This characteristic fundamentally distinguishes rebreathers from SCUBA, in that the breathing gas composition is dynamic instead of fixed.

Due to the increased level of discipline required to operate rebreathers and the need for self-reliance as compared with SCUBA, when evaluating any dive plan incorporating rebreathers, emphasis will be placed on individual qualifications of the diver and design of the rebreather model used, in addition to specific operational protocol.

10.7.1 Minimum Certification and Experience

- a) Unrestricted Scientific Diver qualification as per AS2299.2 and a minimum of 100 logged dives;
- b) Nitrox certification and authorisation as per this manual;
- c) Mixed gas certification and authorisation as per this manual, where other than air diluents are to be used;
- d) Satisfactory completion of a rebreather training program authorised by the manufacturer of the rebreather to be used, or other training regime approved by the UDO, must be demonstrated;
- e) Divers must demonstrate proficiency in pre-dive, dive, and post-dive operational procedures for the particular model of rebreather to be used. Skills shall include, at minimum, oxygen control system calibration and verification, carbon dioxide absorbent canister packing, and system monitoring;
- f) Divers must demonstrate proficiency in bailout procedures, including problem recognition, manual system control, flooded breathing loop recovery, absorbent canister failure, and alternate bailout options;
- g) Divers must demonstrate proficiency in proper system maintenance, including full breathing loop disassembly and cleaning (mouthpiece, check-valves, hoses, counter-lung, absorbent canister, etc.), oxygen sensor change out, and other tasks required by specific rebreather models to be used;
- h) Prior to becoming an Unrestricted rebreather diver, diving experience with the particular model of rebreather to be used shall include a minimum of 25 hours underwater, of which at least 20 hours shall have been under open-water conditions, and at least 5 dives to the proposed operating depth;

- i) Rebreather dives involving operational depths in excess of 30 metres will be subject to additional training requirements, as determined by the UDO on a case-by-case basis.

10.7.2 Maintenance of Qualification

To maintain listing as an unrestricted rebreather diver, an individual must conduct at least one dive per month with the rebreather they are qualified on, and perform all bailout drills at least every two months.

To maintain listing as a Rebreather Dive Coordinator, an individual must conduct at least 25 hours diving with any rebreather they are qualified on in each 6 monthly period.

10.7.3 Equipment Requirements

Closed circuit rebreathers used for UTAS diving operations must be approved by the UTDBSC, and shall meet at least the following requirements:

- a) A minimum of three independent oxygen sensors shall be incorporated into the rebreather design, and a minimum of two independent displays of oxygen sensor readings shall be available to the diver. Additional redundancies in onboard electronics, power supplies, and life support systems is highly preferred;
- b) Each diver shall be equipped with an alternate breathing gas supply, such as redundant rebreather or open circuit bailout capability, designed to safely return the diver to the surface at normal ascent rates, including sufficient gas to complete any required decompression.

10.7.4 Operational Requirements

All dives involving rebreathers must comply with all operational requirements for SCUBA dives to equivalent depths. In addition, rebreather divers must comply with the following minimum operational requirements.

- a) SPECIFIC OPERATIONAL REQUIREMENTS: All Dive Plans that include the use of rebreathers must include, at minimum, the following details.
 - Composition and volume(s) of "diluent" gases to be used;
 - Complete description of alternate bailout procedures, including manual rebreather operation and open-circuit bailout procedures, if any;
 - Other specific details as requested by the UDO.
- b) GENERAL OPERATIONAL REQUIREMENTS:
 - The oxygen partial pressure in the breathing gas shall not exceed 1.4 ATA at depths greater than 6 metres;
 - Rebreather equipment shall be used and maintained in accordance with the specifications of the manufacturer, including pre- and post-dive procedures and operational limits (e.g., depth, temperature, etc);
 - All rebreather divers shall have available an alternate means to return to the surface in case of catastrophic, unrecoverable breathing loop failure (e.g., a second rebreather system, or sufficient open-circuit gas);
 - If a rebreather diver's buddy is using SCUBA, the rebreather must be equipped with a means to provide the SCUBA diver with sufficient open-circuit breathing gas to allow both divers to return safely to the surface;
 - The "diluent" gas supply shall contain enough oxygen such that it will sustain a diver at the depth it is used;
 - Divers shall monitor both primary and secondary O₂ display systems at regular intervals during the dive;
 - The oxygen "set-point" must not be lower than 0.5 atmospheres, nor higher than 1.4 atmospheres.

10.7.5 Consumables

- a) Long-term storage of chemicals used for CO₂ absorption shall be in a cool, dry area in a sealed container. Field storage shall be as practicable, but must be adequate to maintain viability of the material until use;
- b) The Dive Coordinator shall ensure the CO₂ absorption canister is used as per manufacturer's specifications;
- c) Other consumables (e.g., batteries, oxygen sensors, etc.) shall be maintained, tested, and replaced in accordance with the manufacturer's specifications.

SECTION 11. FACTORS KNOWN TO INCREASE DIVING RISK

A Risk Assessment (see [Appendix 8](#)) must be carried out for all UTAS diving operations.

It is the initial responsibility of the Dive Coordinator for any particular diving operation, to ensure as far as is practicable that all hazards are identified for that operation through the Risk Assessment process. Following this assessment, the Project Supervisor and UDO must ensure that suitable measures to control any risks have been determined. In addition, they must be sure that any Dive Coordinator responsible for implementing the control measures is capable of doing so.

Once on site, **day to day risk assessment is the responsibility of the Dive Coordinator for each operation.** A copy of the UTAS On-site RA form (see [Appendix 8](#)) should be consulted prior to each dive, to assist this process.

The UDO and any Dive Coordinator concerned must give special consideration to dives involving any high risk factors (see below, and see [Appendix 8](#), [Appendix 9](#) and [Appendix 10](#) for lists of potential risk factors). It is the responsibility of the UDO to ensure the Dive Coordinator has considered such hazards, and if these do not preclude the diving operation, to ensure that control measures are in place to minimise such hazards.

The following are known diving risk factors and should be carefully considered during risk assessment preparation:

11.1 ALCOHOL

Alcohol should not be consumed within 12 hours prior to diving, and must not be taken until after any diving for the day is over. At all times, especially when diving over multiple days, alcohol should only be consumed in moderation, if at all.

Alcohol consumption will increase a diver's susceptibility to DCI, enhance the effects of inert gas narcosis, and increase a diver's rate of heat loss in cold water.

11.2 COLD

No diving suit currently on the market is able to provide completely adequate thermal protection in cool temperate waters, such as those around Tasmania. Given this fact, and the potentially lethal effects of cold, all UTAS personnel undertaking diving operations should take care to stay as warm as possible.

A diver should cease diving operations if they become more than uncomfortably cold.

To minimise the effects of cold, all divers should take care to keep warm before the dive, and must wear appropriate exposure protection during the dive. In particularly cold water, dives should be planned to minimise the amount of time in the water and the number of entries and exits made during the day. Sufficient time between dives must be allowed for a diver to rewarm adequately, prior to the next dive.

It should be noted that divers will continue to lose heat from their bodies for some time after exiting the water, and this 'after-drop' in body core temperature can reach dangerous limits even if the diver was in a reasonable state on exiting the water. For this reason, Dive Attendants should monitor all divers for signs of hypothermia after any dive in cold water.

11.3 CURRENTS

Diving in currents stronger than a diver can easily swim against is strongly discouraged. If permitted, all divers involved must be experienced in diving in currents and be tethered to the boat or use a surface float, so that their location is always visible. An experienced boat handler with knowledge of local conditions must be in the vessel. Where an anchored boat is being used for untethered SCUBA operations in such conditions, a current line of > 50m length and 10mm diameter must be streamed behind the vessel, and the divers must work 'up-current' of the vessel.

11.4 DANGEROUS MARINE ANIMALS

Divers working with dangerous marine animals must indicate this on their Dive Permission application. As well, they must brief the UDO and any persons in their dive team of the most appropriate first aid procedures for injuries associated with such animals. This is especially important for marine injuries requiring specialised treatment.

Divers whose tasks may attract dangerous marine animals, or who are diving at sites where they may reasonably be expected to be found on occasion, must explicitly flag this on the Dive Permission proposal, and must implement procedures to minimise risks to divers, and to deal with any emergency that may occur.

11.4.1 Sharks

It is well documented that seal colonies can attract dangerous sharks. To this end, Dive Coordinators wishing to conduct any dive within one km of a seal breeding colony at any time of year must flag this on their Dive Permission request and receive permission from the UDO for the operation. In addition, no 'unprotected' dives are permitted within 5 km radius of a seal breeding colony at any time during pupping season - in the months November to March inclusive.

- No diving operations will be undertaken for at least 2 nights within 5 km of a location where a white shark has been reliably sighted. (Note that this is the mandatory minimum restriction to diving operations and that other restrictions may be adopted in individual cases).
- Where a dive is planned to occur within 5km of a known seal breeding colony, immediately prior to the trip (e.g. the afternoon before a morning departure) the Dive Coordinator should attempt to obtain up to date information on recent shark sightings in the area - from any practicably accessed reliable source (e.g. charter boat operators, local fishermen etc).
- The use of individual electronic shark shields is strongly recommended for all UTAS divers where there is a greater than normal risk of shark 'interactions', as detailed above.
- Emergency recall systems must be established for all marine diving operations undertaken by UTAS, with detail provided on use of these by the Dive Coordinator during their pre-dive briefings.
- In areas where a higher than normal risk of shark interaction has been identified, divers must operate in pairs to provide a better opportunity of detecting sharks at a distance before they become a threat.
- An injured or bleeding diver should leave the water immediately; other divers should also exit the water.

11.4.2 Operating procedures if a shark is encountered

Underwater

If a diver encounters a shark while undertaking scientific operations the following actions should be taken.

- Remain calm **do not** rush to the surface as the shark is likely to follow;
- Attract the attention of your buddy if they are not aware of the shark;
- Both divers should face each other to keep the shark and the other diver in view;
- Where a 'Shark Shield' is being worn, divers should ensure that it is on and operating;
- If using towed buoys the emergency signal should be given, this should consist of rapid up and down deployment of the buoy to attract the attention of the surface vessel. On seeing the signal, the vessel should immediately be positioned over the divers buoy/s, ensure that the boat's Shark Shield is operating correctly (should one be fitted) and prepare for the retrieval of the divers;
- During ascent divers should prepare for quick entry into the vessel by undoing all harness attachments to facilitate this;
- The ascent should be made in a calm manner being aware of your breathing and ascent rate;
- Approaching the surface your BC should be removed and weight belt dropped so as a quick assisted entry into the vessel can be achieved.

Action To Be Taken By Support Vessel

Given the recent increase in shark sightings in some States, should a higher than normal risk of diver/shark interaction be identified for a UTAS diving operation, it is imperative that a vigilant watch is kept by the Surface Attendant at all times while divers are deployed.

If the dive vessel personnel sight a shark while divers are deployed the following actions should be taken.

- Keep a good look out for surfacing divers and prepare to retrieve the divers.
- If the dive operation involves the vessel being anchored with divers in close proximity, the Attendant should recall divers either by means of a predetermined EMERGENCY recall signal (such as a stainless steel chain) or via tow buoys. If the tow buoy recall signal is used the following signals should be given.

Coordinator To Diver

One strong pull to gain the divers attention followed by a series of 4 bells (4 short quick pulls)

Diver To Coordinator

4 bells to advise that the recall signal has been received and acknowledged.

11.4.3 Shark Shield use

All UTAS divers should be aware the University has several Shark Shields available for use, and are encouraged to use these even where an area is deemed to be 'low risk' for sharks.

Shark shields **MUST** be worn by UTAS divers operating in South Australian waters, and in conditions as detailed in Section 11.4.1. Other than in these areas/situations, shark shields are only advised, and individuals may choose not to wear them.

OR Where any diver in a dive team chooses to wear a shark shield, all other divers in that team must also wear them.

11.5 DECOMPRESSION DIVING

Air dives requiring mandatory decompression are not permitted during any UTAS diving operations unless in case of emergency, and will only be allowed in exceptional circumstances if prior written approval has been obtained from the UDO, and the dives are conducted as per the Australian Standard for Occupational diving, AS2299.1-1999.

Staged decompression diving using Nitrox and mixed gas is covered in [Section 10](#) of this manual.

11.6 DEEP DIVES

Dives planned for depths of greater than 18m must be obviously flagged as such on the Dive Permission request. Generally such dives will only be permitted where enriched air nitrox or rebreathers are being used.

Dives to depths of >39m on air are prohibited, except where the AS2299.1-1999 Dive Standard requirements are met (i.e. an on site recompression chamber is available), and written UDO approval has been granted.

Where such dives are conducted, they must generally be performed using an approved rebreather.

11.7 DIVE PROFILES

Some dive profiles are acknowledged to be associated with higher risks of decompression sickness than others. A dive profile which attains maximum depth early in the dive and gradually ascends to shallower depths is recommended. Dives that incorporate "rectangular", "reverse" or "saw tooth" profiles are known to expose divers to a higher risks of decompression sickness and should be avoided.

11.8 OVERSEAS DIVING

UTAS divers operating on UTAS projects outside Australia must ensure they hold current membership of DAN (Divers Alert Network) Asia Pacific and that they have arranged a contingency emergency evacuation plan.

11.9 DRUGS/MEDICATION

If at all possible, divers should avoid taking any drugs or medications whilst diving.

At this time little or no change has been observed in the toxicity of most of the common drugs in use under hyperbaric conditions, however drugs can influence diving safety in other ways, such as by impairing judgement and concentration, or by affecting a diver's susceptibility to narcosis and/or DCI. To that end, if any UTAS Diver is required to take medication for either short or long term prescription, they should contact their diving doctor or the UDO for advice on any potential problems this may cause.

In particular, divers should take care to check on potential complications with some seasickness medications, and some drugs used to assist people to stop smoking.

11.10 EXERCISE

Divers should not participate in activities involving vigorous physical exertion before, during (if avoidable) or after diving, as exercise of this nature will predispose a diver to DCI. Where exercise is unavoidable before, during or after a dive (e.g. diving in strong currents, or walking in to a dive site), extra allowance must be made to take account of this factor when calculating permissible dive times.

11.11 FATIGUE

Fatigue can be extremely dangerous during diving operations, and is also a potent predisposing factor for DCI. A tired diver should not be permitted to dive, and Dive Coordinators should monitor this. During diving operations it is the responsibility of each diver to ensure they get adequate sleep to avoid becoming unduly fatigued.

11.12 HIGH RISK SHALLOW DIVES

Shallow dives in areas of heavy boat traffic expose divers to risk of injury from such traffic. If diving in such an area, divers must fly a dive flag on a float immediately above their work site to indicate their position.

Dive Coordinators should also note that cases of DCI have been reported as a result of long shallow dives (in less than 6-7m depth), and should try to minimise the effect of other predisposing factors in the event that such a dive is approved. Where such a dive is planned, [Table 3.1](#) at [Section 3.6.4](#) of this Manual must be used to obtain maximum allowable dive times for the dive.

11.13 ICE AND POLAR DIVING

Divers planning to dive under ice or in polar conditions must consult the UDO prior to the operation.

For ice diving operations in Tasmania, (e.g. highland lakes during winter) this document should be followed:

"Guidelines for Conduct of Research Diving", US National Science Foundation, Division of Polar Programs, 1990.

For polar diving operations, either the diving guidelines of the Australian Antarctic Division must be followed, or those of the organisation through which the project is being conducted – provided these are approved by the UDO.

11.14 INEXPERIENCED DIVERS

Divers with less than the required hours of underwater experience required by this procedures manual to qualify as a registered UTAS diver can only dive with the express permission of the UDO, or during training. When granting inexperienced divers permission to dive, the UDO must consider the level of experience of the diver and their buddy/s, how recently the diver completed their dive training course, and the purpose of the dive.

As a general guide, inexperienced divers may not perform any tasks underwater other than observations. As well as this, they may only dive if the following criteria are met:

- They are paired with a more experienced diver of greater than 50 hours underwater experience;

- The inexperienced diver completed their training course within the past 6 months; and
- Any task related factors to be completed by the experienced diver for the dive are low risk.

11.15 MEDICAL ASSISTANCE

It is the responsibility of the Dive Coordinator for any dive or set of dives to determine the most efficient means of obtaining medical assistance in the event of an accident during the dive. The various appendices to this manual dealing with medical matters should be consulted when determining medical requirements for any diving operation. An appropriate first aid kit must always be carried during UTAS diving operations.

For any SCUBA dive conducted more than 5 minutes away from the University, a research station, or a mother ship, medical oxygen must be carried in the boat, along with a regulator capable of delivering such oxygen to a conscious or unconscious diver. Adequate supplies of medical oxygen must be carried in the boat and/or vehicle to keep at least two individuals on oxygen until such time as the patient can be 'handed over' to qualified assistance (i.e. ambulance officers), or until further supplies of oxygen can be accessed.

For all UTAS dives, approved resuscitation equipment must be carried in the boat and a person trained in the use of such equipment should be present as the Dive Attendant.

11.16 MULTI-DAY REPETITIVE DIVES

Divers performing successive multi-day repetitive dives must use the DCIEM dive tables for calculating their no decompression limits on each dive. The effects of nitrogen build-up during this type of diving operation are well documented with regard to increased incidences of DCS, and the risk of this must be considered even when all dives are shallow (current information indicates that long shallow dives may have an elevated incidence of DCI).

Divers performing repetitive dives over multiple days must have a 24 hr break from diving after every third day, except where using repetitive dive profiles involving less than three dives per day, in which case a 24 hr break must be taken on the fifth day.

The guidelines listed at [Section 3.7](#) of this procedures manual, for travel after diving must be followed.

11.17 MULTIPLE ASCENTS

Research has shown that the more ascents performed during a day's diving, the greater the DCS risk. Multiple ascents during a dive increase the DCS risk by increasing bubble formation during the extra ascents.

Once bubbles have formed, rates of gas up-take and elimination are altered for all subsequent dives until there has been a long enough surface interval (SI) to allow complete off-gassing. This SI cannot be accurately determined through the use of dive tables, so dives must be planned carefully to ensure the number of ascents during a dive is kept to a minimum.

All ascents from shallower than 30 m must be at a rate of slower than 9 metres/minute.

11.18 LACK OF LOCAL KNOWLEDGE

Divers with little 'local' knowledge of a proposed dive site, or of Tasmanian diving conditions, shall not be permitted to dive unless accompanied by a UTAS Dive Coordinator familiar with the proposed dive environment.

11.19 'LIVE BOATING' - DIVING WHILE THE DIVE BOAT IS UNDER WAY

Where a dive boat is kept under way whilst divers are in the water is commonly known as 'working live'. Although there are several advantages to working in this manner, depending on the situation, the main danger of the practice is the potential for injury to divers from the hull and/or propeller/s of the boat.

Except in cases of emergency, this practice is not permitted during a UTAS diving operation unless the Dive Coordinator expressly receives approval from the UDO or delegate, and the following conditions are met:

- The Coxswain must be suitably qualified to drive the boat being used, according to this manual, and must also have considerable experience in small vessel handling (as determined by the UDO);
- A separate Dive Attendant must always be present in situations where the Boat Operator may not be able to clearly see the location of the divers at all times from the boat's control position;
- A dive flag must be flown at all times;
- All divers involved in the operation must agree to the use of this practice.

11.20 LONG DIVE TIMES

Excessive dive duration is a potent predisposing factor to decompression illness, particularly when coupled with multiple ascents and multi-day diving operations. For this reason, all UTAS dive plans should keep the amount of time divers spend in the water on any given day to a minimum. Dive Coordinators should plan all diving operations with this aim in mind.

Without prior approval from the UDO, no diver is to spend more than 6 hours total time in the water in any 24 hour period, whether the tables allow this or not.

11.21 NIGHT DIVING

For a night dive to be approved by the University Diving Officer, the following conditions must be met:

- The provision of a Boat Handler/Dive Attendant, or shore watch person (for shore dives) is mandatory;
- The Boat Handler/Dive Attendant must have a white light suitable for signalling passing boats;
- Any boat used for night diving must have a working anchor light;
- After anchoring, a flashing strobe light must be attached to the anchor line at the optimum distance below the surface that will allow divers to find the vessel without surfacing (where visibility permits this);
- Exit lights must be set when diving from shore;
- Each diver must have at least 2 torches and a cyalume stick or light, which is visible in a 360° arc;
- Night dives to depths of greater than 18 m must have compelling justification. For these dives, special control measures may need to be implemented, at the discretion of the UDO.

11.22 OBSTRUCTED ASCENTS

See [Section 10.3](#).

11.23 REMOTE DIVE SITE LOCATIONS

'Remote' is defined in the Glossary, and elsewhere in this procedures Manual.

At least one member of any dive team working in a remote location must be experienced with the type of conditions expected at all sites to be dived. Extra consideration must be given if anchoring the dive boat on steep drop offs and in areas with breaking waves, and if driving vessels through narrow channels with standing waves. Divers must exercise special caution in surge zones and passages, where strong currents commonly occur.

Any boat operating in remote areas must be equipped with extra fuel, and all required radio, safety and first aid equipment, as well as any other items deemed necessary by the UDO or the Dive Coordinator for the trip.

For long field trips to remote areas, the Dive Coordinator for the operation must consider availability of the nearest recompression chamber in the event of a diving accident (see [Section 3.6](#)).

11.24 SATURATION DIVING

If performing saturation diving operations of any format, all divers shall, as a minimum, comply with the standards set out in the NOAA Diving Manual (4th Edition), chapter 17.

11.25 STRONG WIND WARNINGS - DIVING DURING

If strong winds are likely to be present at a site, diving should only be conducted where the site is situated in a sheltered location such as on the lee side of an island or headland. On departure for the site the Dive Coordinator must reassess likely weather and sea conditions that may need to be negotiated to reach the site and return.

11.26 SURFACE ATTENDANT - DIVING WITHOUT ONE

Diving without a Dive Attendant present at the surface is not recommended, but may be performed if special approval is granted from the UDO or Delegate. Such diving will not be permitted in cases where there will be more than two buddy groups in the water at one time (i.e. more than six divers).

When making an assessment of whether or not to allow diving to take place without a Dive Attendant, the UDO must take into account all relevant factors, including but not limited to:

- Experience of the divers involved;
- Depth of the proposed dive/s;
- Nature of the dive site;
- Weather conditions likely to be prevailing at the time; and
- Task/s to be performed.

Other conditions that must be met before diving without a Dive Attendant may occur are listed at [Section 5.2.2](#).

11.27 TIME SINCE LAST DIVE

The UDO or any SDO may require that a diver undergo an initial supervised dive or pool session if he/she has not dived during the previous 6 months (as per 'New Diver Evaluation' – at [Appendix 1](#)). This dive is to allow the diver to regain familiarity with equipment and the underwater environment in a supervised situation, and to allow the Diving Officer to ascertain the diver's level of competence. Additional supervised dives may be required until it is judged that the diver can dive safely and competently. The Diving Officer may conduct this supervised dive himself/herself if they are a qualified Divemaster, or they may delegate the task to another Divemaster.

NB: A supervised dive for those who have not been diving for 6 months is not mandatory, particularly where the diver is highly experienced and his/her first dive is in sheltered conditions to depths not exceeding 12 m.

11.28 TASK RELATED FACTORS

Diving tasks requiring use of winches with large cable, cranes and other heavy tools require divers to be trained to at least Australian Standard 2815.2, and to use voice communication between surface operators and divers.

11.29 TWO PERSON DIVING

'Two person diving' could involve either two divers with no Dive Attendant at the surface, or one tethered diver with a Dive Attendant at the surface (see [Section 5.2](#)). Either of these may be permitted at the discretion of the UDO, taking into account all relevant factors, including but not limited to diver experience, depth of the proposed dive/s, weather conditions likely to be prevailing at the time of the dive/s, and task/s to be performed.

11.30 DEFINITIONS OF 'LOW RISK' CONDITIONS

- Depth of the site and its immediate surroundings does not exceed 15 m;
- Swell and/or wave height does not exceed 0.5 m;
- Current is nil to slight (a diver is able to easily swim into the current, with minimal exertion);
- Underwater visibility is greater than 4 m;
- Wind strength <10 knots and weather forecast favourable (i.e. indicates conditions will remain like this);
- The dive starts and ends in full daylight.

For further information on Risk Assessment, and 'High', 'Medium' and 'Low' risk conditions, see [Appendix 10](#).

SECTION 12. EMERGENCY RESPONSE PLANS AND INCIDENT REPORTING

12.1 EMERGENCY PLAN

In the event of an emergency it is essential to immediately assist the injured person. To help with this, as part of the Risk Assessment process for any UTAS diving operation, the Dive Coordinator for the operation must prepare an emergency response plan for the area of operation.

The Diving Emergency Protocols flow chart (see [Appendix 14](#)) may be customised to fulfil this requirement.

12.2 EMERGENCY REPORTING PROCEDURES

For any accident requiring medical treatment, a UTAS Accident Report Form must be completed by the injured person (if possible). A copy of this form may be obtained from the UDO or Employee Safety Representative if required.

A summary of events leading up to the accident obtained from the person in charge of the workplace should be appended to this report form. The circulation of the report and the detail required will depend on the nature of the incident.

The procedures given below are the minimum that should be carried out in the various circumstances.

12.2.1 Minor Accidents And Near Accidents

Problems of this nature are to be included in the Diver's Log Book and a short report on the incident is to be lodged with the UDO as soon as possible after the event.

12.2.2 Accidents Resulting In No Permanent Injury

Such accidents include large flesh wounds, broken bones, concussion and any other injuries that would bar the diver from normal work or diving for a period.

The UDO must be notified as soon as possible after the accident, and a detailed report on the accident must be provided to the UDO as soon as possible after the event.

The UDO must decide whether there is any evidence of negligence or unsafe diving practice and report as appropriate to the UTAS Occupational Health, Safety and Training Unit and the UTDBSC.

Before recommencing diving after such an accident, any injured diver should have a full medical examination.

12.2.3 Accidents Resulting In Permanent Injury, Inability To Dive, Or Death

With regard to such accidents, the UDO must be notified immediately, and should help facilitate retrieval. As soon as possible, a complete report should be compiled by the Dive Coordinator involved and submitted to the UDO. This should then be forwarded, with the Diving Officer's comments and recommendations attached, to the UTAS Occupational Health, Safety and Training Unit and the UTDBSC.

FOR ANY INCIDENT INVOLVING A UTAS DIVER, PARTICULARLY IN CASE OF A SERIOUS ACCIDENT OR FATALITY, THE UNIVERSITY DIVING OFFICER MUST BE NOTIFIED AS QUICKLY AS POSSIBLE

Telephone 0418-120-705

Appendix 1 Diver Evaluation

The following is the basis of the watermanship skills evaluation for new entry level divers to the University Diver Register. If deemed necessary, the UDO may vary performance requirements and skills for the evaluation.

A1.1 Swim and Surface Evaluation

- 400m swim in under 12 minutes (no fins);
- Tread water for 10 minutes (no fins);
- Tow another person 25 m (no fins).

A1.2 Snorkel diving skill Evaluation

- Swim 1km on snorkel in less than 20 minutes (with fins);
- Swim 25 m underwater on one breath (with fins);
- Swim 50 m underwater on three breaths (with fins);
- Perform an inert diver tow. i.e. in less than 5 minutes, tow or push another diver a distance of 100 metres, with both divers wearing snorkel equipment;
- Demonstrate mask clearing;
- Demonstrate two methods of snorkel clearing;
- Duck dive to 2 metres and retrieve an item from that depth;
- Demonstrate weight belt removal and replacement at surface;
- Recover weight belt from 3-5 m and fit at surface.

A1.3 SCUBA skill Evaluation

- Fully assemble equipment, perform necessary checks and enter water;
- Surface swim 25 metres demonstrating ability to alternate between snorkel and SCUBA while kicking;
- Demonstrate mask clearing;
- Demonstrate regulator recovery and clearing;
- Demonstrate weight belt removal and replacement at surface;
- Demonstrate removal and replacement of SCUBA equipment – both at surface and underwater;
- Demonstrate buoyancy control by fin pivot;
- Demonstrate buoyancy control by hovering motionless for at least 15 seconds;
- Demonstrate use of alternative air source – both while stationary and while swimming;
- Rescue and transport, as a diver, a passive simulated victim of an accident (optional);
- Problem solving assessment (optional);
- Discussion of ascent rates, dive profiles and other University diving practices.

Appendix 2 UTAS Diver Skills Evaluation Report Form

Checkout dives are only to be carried out by UTAS staff with Divemaster/DiveCon or Instructor qualifications AND delegated authority from the Diving Officer to perform these. Only approved equipment may be used, and prior to commencing the checkout dive, the equipment used by the individual shall be inspected to ensure that it is in a safe/operable condition and has been correctly assembled.

The dive plan and dive emergency plan must be reviewed with the diver prior to dive

Assessing Instructor/DiveCon Name		Diver Name	
Date	Dive Permission ID	Location	
Water Temp.	Dive Permission ID	Dive platform (vessel name/shore dive/jetty)	
Bottom Time.	Depth	Visibility	Current

Assess diver ability on execution of skills relative to performance of tasks required for project/diving operations. Be objective in your observation.

(Note as **U** = Unsatisfactory, **N** = Needs Improvement, **S** = Satisfactory, **E** = Excellent)

Preliminary Observations

- Observe set up of equipment, note any fumbling or improper set-up
- Dive Table Knowledge
- Evaluate knowledge of equipment operation
- Dive Emergency Plan
- Is the individual physically fit and able to carry own equipment?
- Diving from Small boat
- Anxiety level (observe for unusual or questionable behaviour)
- Ascent/Descent Rates
- Evaluate judgement, motivation, and professional attitude
- Assessment at dive site
- Review safety protocols with diver; (In-water and Topside)
- Select and discuss the characteristics of appropriate dive site(s)
- Review evaluation skills on surface prior to dive
- Verify that diving gear chosen and diving technique are adequate and authorized for use

Diver Skill Evaluation

- | | |
|---|---|
| <input type="checkbox"/> Physical condition | <input type="checkbox"/> Snorkelling skills (clearing at surface) |
| <input type="checkbox"/> Swimming ability | <input type="checkbox"/> U/W communication (hand signals) |
| <input type="checkbox"/> Buddy check | <input type="checkbox"/> Ditch & don B.C. (pool skill & open water) |
| <input type="checkbox"/> Equipment knowledge/set-up | <input type="checkbox"/> Regulatory recovery |
| <input type="checkbox"/> Water entry | <input type="checkbox"/> Clearing flooded mask |
| <input type="checkbox"/> Proper weighting | <input type="checkbox"/> Mask removal, replace & clear |
| <input type="checkbox"/> Free dive with mask & snorkel | <input type="checkbox"/> Sharing air drill |
| <input type="checkbox"/> Buoyancy control at surface | <input type="checkbox"/> Weight belt removal/replacement |
| <input type="checkbox"/> Buoyancy control mid-water | <input type="checkbox"/> Drysuit roll out & venting |
| <input type="checkbox"/> Buoyancy control at depth | <input type="checkbox"/> Disconnect/reconnect BC/Drysuit inflators |
| <input type="checkbox"/> Controlled ascent/descent rate | <input type="checkbox"/> Knowledge of systems used during dive |
| <input type="checkbox"/> U/W navigation/orientation | <input type="checkbox"/> Buddy Contact/awareness during dive |
| <input type="checkbox"/> Surface kick (flutter, scissors) | <input type="checkbox"/> Breakdown equipment and site cleanup |

Diver Skill Evaluation (continued)

Awareness/anxiety assessment: (apprehensive, cautious, comfortable): _____

Critique of ability & skills: _____

Comments/problems encountered: _____

Post Dive Assessment

Critique - judgement, motivation, professional attitude, proper use of diving tables etc:

Indicate deficiencies: _____

Refresher training needed, recommended, required, or not required (Y/N): _____

Additional training needed: _____

Recommendations:

Re-certification at current level: YES / NO (if no, recommend level below and training required above)

Recommended certification level of: • TRAINEE • RESTRICTED • UNRESTRICTED

Evaluated by: _____

Assessing Instructor/Dive Con Signature

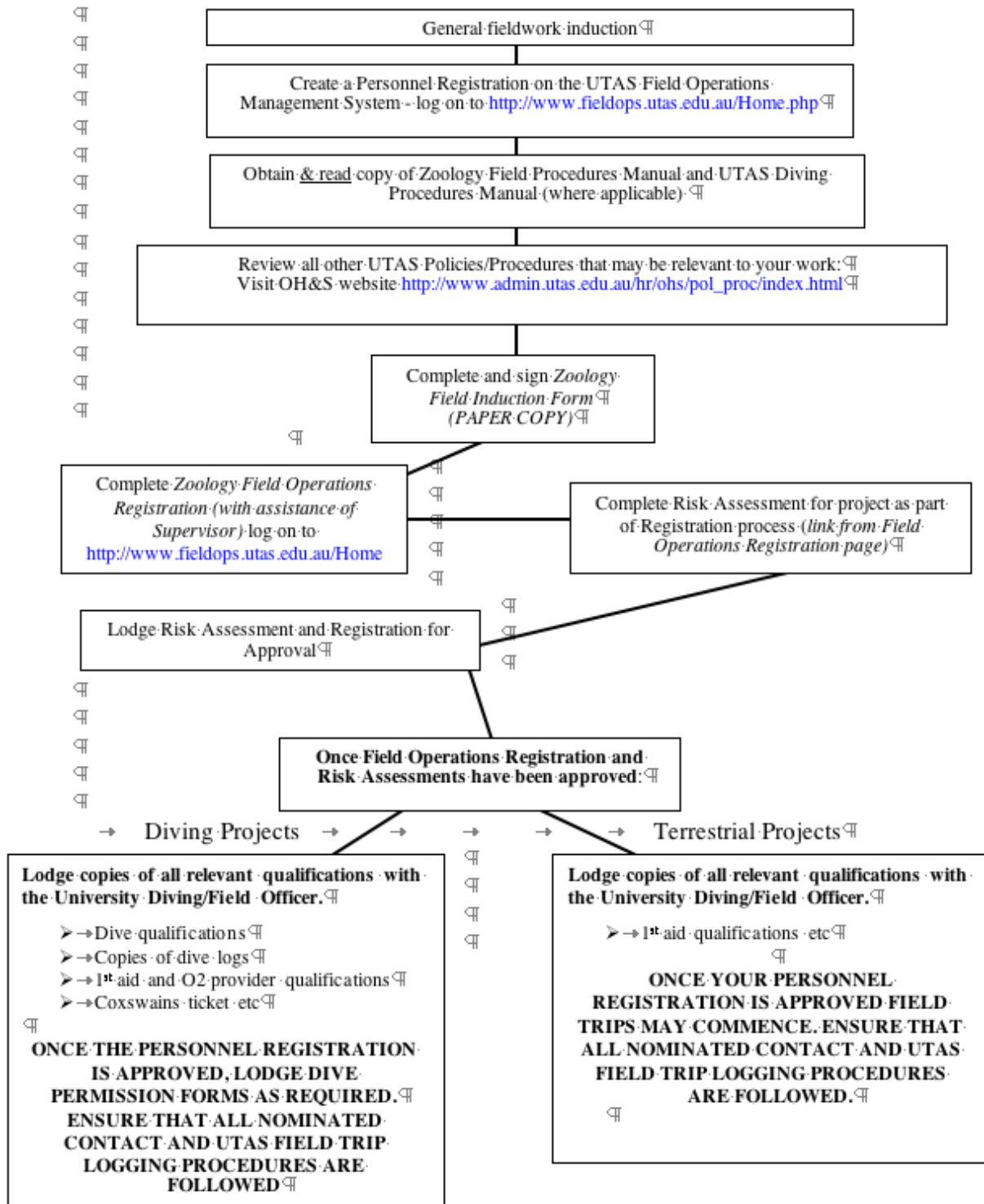
Date

This form must be submitted to the UDO along with completed UTAS dive record forms.

Appendix 3 UTAS Field Operations Start-Up Procedures

Please use the following flow chart to ensure that all required processes and paperwork are completed prior to starting fieldwork. All registration procedures must be completed on the UTAS Field Operations Management System (FOMS) where personnel have access to this system. External personnel wishing to register themselves, or any projects, should contact the UDO for 'paper copies' of the required forms.

Prior to project commencement



Appendix 4 UTAS Open Circuit Dive Record Form

UNIVERSITY OF TASMANIA – OPEN CIRCUIT DIVING RECORD FORM

Please use this form for Open Circuit Diving Only. Use the Rebreather Diving Record form for closed circuit diving. Details of every dive for each diver must be recorded on a dive record form DURING THE DIVE by the surface Dive Attendant. At the end of a trip the form must be signed off by the Dive Coordinator, and submitted to the University Diving Officer within 72 hours of return.

Where more than one dive is done by a diver on a trip, please record the dives for that diver sequentially on one Dive Record Form. NB: Any dive after a surface interval of greater than 15 minutes must be deemed a new dive. INCOMPLETE DIVE RECORD FORMS RECEIVED WILL BE RETURNED, AND NO DIVING OPERATIONS FOR THAT GROUP APPROVED UNTIL SATISFACTORY COMPLETION AND RECEIPT BY UDO.

Dive Coordinator: FOMS Project ID # FOMS Dive Permission ID #: *These ID's MUST be added*

Standby Diver/s: Boat used (or N/A): O₂ Cylinder Pressure at start of day:

Diver: Dive #: Site: Attendant:

Equipment used: SCUBA LP SSBA HP SSBA Gas mix: Air EAN32 EAN36 Other (mix?) SCUBA Tank Pressure IN: SCUBA Tank Pressure OUT:

Date	Computer ID# ¹	RF/RNT IN	RG OUT	SI since last dive	Time IN	Time at surface	Max. Depth	Bottom Time (min)	Tot. Time (min)	EBT ² (min)	Deco (min @ m?)

¹ ID # of Dive Computer used for this dive

² Effective Bottom Time (EBT) will be calculated as either $RF \times BT$ (air with DCIEM tables) or $RNT + BT$ (EAN with Nitrox tables)

of ascents to surface during dive (incl. final ascent): Incidents during dive?

Diver: Dive #: Site: Attendant:

Equipment used: SCUBA LP SSBA HP SSBA Gas mix: Air EAN32 EAN36 Other (mix?) SCUBA Tank Pressure IN: SCUBA Tank Pressure OUT:

Date	Computer ID# ¹	RF/RNT IN	RG OUT	SI since last dive	Time IN	Time at surface	Max. Depth	Bottom Time (min)	Tot. Time (min)	EBT ² (min)	Deco (min @ m?)

¹ ID # of Dive Computer used for this dive

² Effective Bottom Time (EBT) will be calculated as either $RF \times BT$ (air with DCIEM tables) or $RNT + BT$ (EAN with Nitrox tables)

of ascents to surface during dive (incl. final ascent): Incidents during dive?

Diver: Dive #: Site: Attendant:

Equipment used: SCUBA LP SSBA HP SSBA Gas mix: Air EAN32 EAN36 Other (mix?) SCUBA Tank Pressure IN: SCUBA Tank Pressure OUT:

Date	Computer ID# ¹	RF/RNT IN	RG OUT	SI since last dive	Time IN	Time at surface	Max. Depth	Bottom Time (min)	Tot. Time (min)	EBT ² (min)	Deco (min @ m?)

¹ ID # of Dive Computer used for this dive

² Effective Bottom Time (EBT) will be calculated as either $RF \times BT$ (air with DCIEM tables) or $RNT + BT$ (EAN with Nitrox tables)

of ascents to surface during dive (incl. final ascent): Incidents during dive?

Diver: Dive #: Site: Attendant:

Equipment used: SCUBA LP SSBA HP SSBA Gas mix: Air EAN32 EAN36 Other (mix?) SCUBA Tank Pressure IN: SCUBA Tank Pressure OUT:

Date	Computer ID# ¹	RF/RNT IN	RG OUT	SI since last dive	Time IN	Time at surface	Max. Depth	Bottom Time (min)	Tot. Time (min)	EBT ² (min)	Deco (min @ m?)

¹ ID # of Dive Computer used for this dive

² Effective Bottom Time (EBT) will be calculated as either $RF \times BT$ (air with DCIEM tables) or $RNT + BT$ (EAN with Nitrox tables)

of ascents to surface during dive (incl. final ascent): Incidents during dive?

Diver: Dive #: Site: Attendant:

Equipment used: SCUBA LP SSBA HP SSBA Gas mix: Air EAN32 EAN36 Other (mix?) SCUBA Tank Pressure IN: SCUBA Tank Pressure OUT:

Date	Computer ID# ¹	RF/RNT IN	RG OUT	SI since last dive	Time IN	Time at surface	Max. Depth	Bottom Time (min)	Tot. Time (min)	EBT ² (min)	Deco (min @ m?)

¹ ID # of Dive Computer used for this dive

² Effective Bottom Time (EBT) will be calculated as either $RF \times BT$ (air with DCIEM tables) or $RNT + BT$ (EAN with Nitrox tables)

of ascents to surface during dive (incl. final ascent): Incidents during dive?

Diver: Dive #: Site: Attendant:

Equipment used: SCUBA LP SSBA HP SSBA Gas mix: Air EAN32 EAN36 Other (mix?) SCUBA Tank Pressure IN: SCUBA Tank Pressure OUT:

Date	Computer ID# ¹	RF/RNT IN	RG OUT	SI since last dive	Time IN	Time at surface	Max. Depth	Bottom Time (min)	Tot. Time (min)	EBT ² (min)	Deco (min @ m?)

¹ ID # of Dive Computer used for this dive

² Effective Bottom Time (EBT) will be calculated as either $RF \times BT$ (air with DCIEM tables) or $RNT + BT$ (EAN with Nitrox tables)

of ascents to surface during dive (incl. final ascent): Incidents during dive?

I/we, the undersigned, confirm that the records of diving on this document accurately reflect the dives performed as detailed on this form (NB. all divers listed MUST sign form).

Diver's/Dive Coordinator's Comments:

Diver 1 Name/Signature: Date: Diver 2 Name/Signature: Date:

Diver 3 Name/Signature: Date: Diver 4 Name/Signature: Date:

Diver 5 Name/Signature: Date: Diver 6 Name/Signature: Date:

Dive Coordinator's Signature: Date:

Appendix 5 UTAS Rebreather Dive Record Form

Please use this form for Rebreather diving only. Use the Open Circuit Diving Record form for other diving. Details of every dive for each diver must be recorded on this form DURING THE DIVE by the surface Dive Attendant. At the end of a trip the form must be signed off by the Dive Coordinator, and submitted to the University Diving Officer within 72 hours of return.

Where more than one dive is done by a diver on a trip, please record the dives for that diver sequentially on one Dive Record Form.

NB: Any dive after a surface interval of greater than 15 minutes must be deemed a new dive.

FOMS Project ID #: FOMS Dive Permission ID #: **These MUST be added**

Dive Coordinator:

Standby Diver/s: Resusc. O₂ Cylinder Pressure at start of day:

Diluent: AIR Other (note mix)

NB: If mix differs between dives/divers, note mix for each dive/diver

Diver: **Dive #:** **Site:** **Attendant:**

Start Dive: High setpoint: Low setpoint: RG: O₂ pressure: Diluent pressure:

End Dive: RG: O₂ pressure: Diluent pressure:

Date	SI since last dive	Time In	Time Out	Max. Depth	Bot. time (min)	Tot. time (min)	Deco (time/depth)

Dive Profile (please record time of each ascent to surface, and subsequent descent): Repetitive Group and repetitive factor at end of dive - RG: RF:

--	--	--	--	--	--	--	--	--	--

RG calculation: Effective Bottom Time = (RF) x (BT) = min. RG: RF:

Diver: **Dive #:** **Site:** **Attendant:**

Start Dive: High setpoint: Low setpoint: RG: O₂ pressure: Diluent pressure:

End Dive: RG: O₂ pressure: Diluent pressure:

Date	SI since last dive	Time In	Time Out	Max. Depth	Bot. time (min)	Tot. time (min)	Deco (time/depth)

Dive Profile (please record time of each ascent to surface, and subsequent descent): Repetitive Group and repetitive factor at end of dive - RG: RF:

--	--	--	--	--	--	--	--	--	--

RG calculation: Effective Bottom Time = (RF) x (BT) = min. RG: RF:

Diver: **Dive #:** **Site:** **Attendant:**

Start Dive: High setpoint: Low setpoint: RG: O₂ pressure: Diluent pressure:

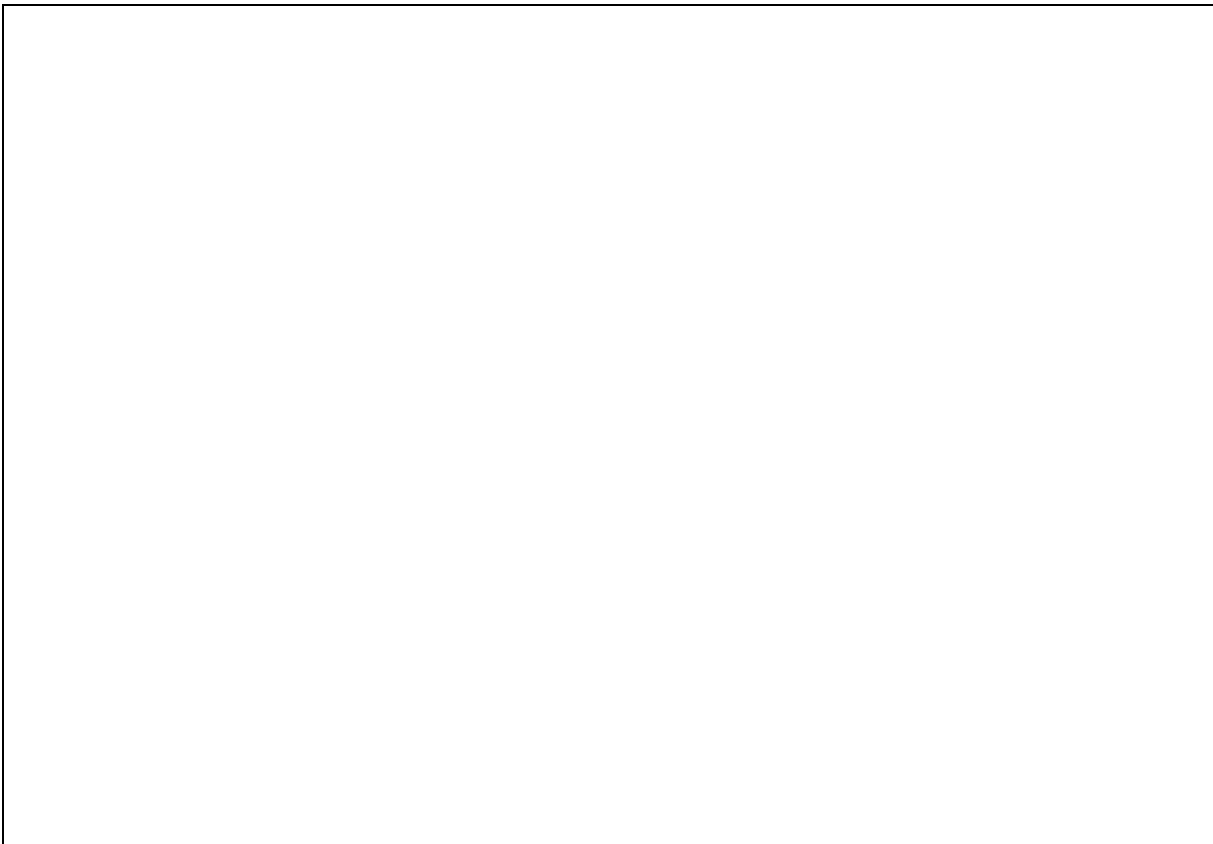
End Dive: RG: O₂ pressure: Diluent pressure:

Date	SI since last dive	Time In	Time Out	Max. Depth	Bot. time (min)	Tot. time (min)	Deco (time/depth)

Dive Profile (please record time of each ascent to surface, and subsequent descent): Repetitive Group and repetitive factor at end of dive - RG: RF:

--	--	--	--	--	--	--	--	--	--

RG calculation: Effective Bottom Time = (RF) x (BT) = min. RG: RF:



Appendix 6 UTAS Diving Procedures Statement of Understanding

NB: All Personnel with access to the UTas Field Operations Management System should complete the on-line version of this SOU as part of their Personnel Registration. The paper form here is not required where this is done.

No diver may be listed as a diver on the University of Tasmania Diver Register until they have completed a copy of this form and received confirmation that they have been by the University Diving Officer (ph. 6226 2608).

PLEASE READ THIS DOCUMENT CAREFULLY, AND ENSURE YOU HAVE MET ALL REQUIRED CRITERIA BEFORE SIGNING

I (please enter name in full) hereby declare that I have read in full the University of Tasmania (UTAS) Diving Procedures Manual and have a clear understanding of its scope and contents, as well as my responsibilities as a **UTAS Diver / Dive Coordinator / Site Diving Officer** (delete whichever is not applicable) as outlined therein. I have undergone an induction process with the individual named below, which covered at least the following topics (please tick applicable boxes):

- Use and content of UTAS Diving Procedures Manual;
- Responsibilities of UTAS Divers;
- The University risk assessment process;
- Use of the DCIEM short form decompression tables; and
- Use of University vehicles, vessels and equipment, including towing.
- Responsibilities of UTAS Dive Coordinators (where applicable), including but not limited to:
 - Use of the UTAS Field Operations Management System, including:
 - Field operation registration;
 - Risk Assessment, emergency plans, and implementation of emergency protocols;
 - UTAS Dive Permission, Dive Record and Post Dive procedures;
 - Field trip registration;
 - Requirements for Nominated Contacts;
 - The need for dive briefings and equipment checks each day, with all divers;
 - Defective equipment tagging and reporting procedures.

I declare that I have a good working knowledge of the DCIEM decompression tables, and I understand that these tables are to be used to govern all air dives I undertake for the University, except where any factor suggests that a more conservative dive should be undertaken. The intent is to ensure the safety of all UTAS Divers, and Diving operations.

I agree that at all times I will follow safe diving practices as outlined in the UTAS Diving Procedures Manual, and will observe the directions given in the Manual and any other directions that may be given to me by the University of Tasmania Diving Officer or a University of Tasmania Site Diving Officer, provided I feel that it is safe to do so.

On my addition to the University Diver Register, I wish to be rated to dive using the following methods, and have submitted documentation to allow the UDO to determine my eligibility for this.

SNORKEL SCUBA (AIR) SCUBA (EANx) SSBA (LP) SSBA (HP) REBREATHER

Signed Date

(Signature)

Induction By Date

(Name)

Witnessed By Date

(Signature)

Witness' Name in Full

Appendix 7 UTAS Nominated Contact Registration Form

NB: All Personnel with access to the UTas Field Operations Management System should complete the on-line version of this Nominated Contact form as part of their Dive Permission application. The paper form here is not required where this is done, provided the Dive Coordinator ensures that the Nominated Contact has actually received the required information via e-mail.

VERY IMPORTANT: When asked to be the nominated contact for a field trip, you **must** ensure you are given (or at least have access to) all of the details listed below regarding that trip. NB: the Field Leader for the trip should have also left these details on a *Field Trip Registration Form*, which should be centrally located in your School.

Trip Details:

Names of all personnel on the trip (including a home phone number for each individual):

.....

Intended date/time of the groups departure for the field:

.....

Exact Destination, including map ref. if possible, and launching site if boating:

.....

Transport to/from site, including vehicle registration numbers and/or boat type (if applicable):

.....

Means of contact while in the field (radio, mobile phone etc), including relevant contact no's. or radio frequencies:

.....

Planned date and time of return from trip:

Uni. Contact Details:

Diving Officer: **Simon Talbot** Ph. **6226-2608 (w), 6267-2003 (h), 0418-120-705(m)**

Director/Head of School: Ph.

Laboratory Manager: Ph.

Project Supervisor: Ph:

Emergency contacts:

Nearest Police Station to site: Ph:

Hobart Police Radio Room: **6230-2407 or 6230-2290 or 6230-2274**

Tasmanian Emergency Services (police, ambulance, fire): **000**

The Nominated Contact for any University field trip must take the following actions if personnel from a trip for which he/she is responsible have not returned, or checked in, by **2 HOURS** after the nominated time on this form if the trip was a terrestrial field trip, or **1 HOUR** if the trip involved boating field (including freshwater boating).

1. Call the home phone numbers of all other personnel on the trip (should be listed above) to see if any of them are home yet, or if others have any news of the trip
2. For boat trips/walking trips, if possible (if not too far away) check the point of departure, i.e. boat ramp, launching site or parking area, to see if the tow/transport vehicle is still at the site
3. If no contact, and no sign of the group are found, notify the University Diving Officer and/or Head of Department and/or Supervisor
4. **If none of the above can be contacted, call the Tasmania Police Radio Room (phone numbers above). The Police will require all necessary details, so you will need to have these at hand when making the call**

Appendix 8 UTAS Volunteer Indemnity/Induction Form

This form is to be completed by all persons who wish to undertake voluntary projects with the University of Tasmania. The volunteer, in association with the relevant Project Supervisor (member of staff), must complete this form and forward a copy to the School Employee Safety Representative, before any work may be commenced.

Name of Volunteer:

Address:

Telephone Contact Number: BH AH

E-mail:

Emergency Contact:

Telephone Contact Number: BH AH

PROJECT INFORMATION:

Budget Centre:

Project Title:

Project ID # (from Field Ops Management System):

Project Supervisor (UTAS Staff Member):

Primary Researcher (if different from above. e.g. student):

Start date: End Date:

Description of work tasks to be performed by volunteer:

.....

.....

Has the volunteer been fully briefed in relation to all aspects of the project? **YES / NO**

MEDICAL PROCEDURES:

Does the volunteer have a pre-existing medical condition or injury that would preclude him/her from carrying out all of the duties of the position (such conditions might include, but not be limited to: diabetes, epilepsy, peptic ulceration, asthma, allergies, pregnancy etc)? **YES / NO**

If the answer to the above question was **yes**, please provide details of the condition (these will remain confidential)

.....

Is the volunteer on any medication that could affect the operation of the project? **YES / NO**

NB. The Project Supervisor and the Primary Researcher (if not the same) must be advised of any medication volunteers are taking before they are allowed to assist on the project.

If the answer to either of the above questions was yes, please provide details

.....

.....

If a volunteer is injured or has an accident during the operation of the project he/she must report it immediately to his/her Supervisor. The Supervisor and/or Primary Researcher must ensure that any injuries/accidents are formally recorded on the appropriate University of Tasmania Accident/Incident Report form.

List Facilities and Equipment to be used by Volunteer (eg: laboratories, boats, FRV Challenger, computers, workshop equipment, field equipment)

.....
.....

Has the volunteer used the above equipment before, or similar equipment elsewhere? **YES / NO**
If the answer is **YES**, what experience does the volunteer have?

.....
.....

If **NO**, what training does the volunteer need before they can use equipment, **or** take part in the project?

.....
.....

SAFETY CHECKLIST (to be completed by Supervisor and Volunteer). If the answer to any of the following questions is NO then a brief explanation must be provided:

Has the volunteer been made aware of or given copies of (as applicable):

1. The University of Tasmania's Occupational Health and Safety policies and procedures (refer to http://www.admin.utas.edu.au/hr/ohs/pol_proc/index.html)? **YES / NO**
2. All Risk Assessments relating to the project **YES / NO**
3. Safety Issues relating to: **YES / NO**
4. Has safety equipment been issued to the volunteer? **YES / NO**
5. Does the volunteer understand how to use and operate the safety equipment? **YES / NO**
6. Have all emergency exits been pointed out to the volunteer? **YES / NO**
7. Have all evacuation procedures been explained to the volunteer **YES / NO**
8. Is the volunteer to use specialised equipment, which would require training in its use? **YES / NO**
9. Type of equipment to be used:
10. If the answer to question **8** above was **YES**, what training is to be provided?
.....

11. Has the volunteer been advised of the correct manual handling skills required to undertake the project? **YES / NO**

Signed (Project Supervisor):

Must be a UTAS Staff Member

Signature

.....

Date

.....

GENERAL CONDITIONS:

The volunteer must be advised that they will not be covered by University workers compensation, public liability, or accident insurance as they are not an employee of the University.

Volunteers must be strongly encouraged to take out appropriate personal accident insurance for the period of the volunteer work to ensure that they are adequately covered during the project.

Volunteers will not receive any remuneration for volunteer work.

Volunteers must not sub-contract work to any other person.

Volunteers are to obey all reasonable requests made by the Supervisor. If a dispute arises, the volunteer should discuss the issue with the Head of School to which the project relates.

Volunteers are to be supervised at all times, unless the Supervisor and volunteer are satisfied that the volunteer is capable of safely working alone and the Volunteer is happy to do so.

Volunteers must comply with all security and office regulations in place at the location of the project.

Volunteer workers shall not represent themselves as an employee of the University of Tasmania.

The University of Tasmania may terminate volunteer work projects with one day's written notice.

DECLARATIONS:

I, *(Volunteer's name)* have read and understand the above document in relation to volunteer work projects for the University of Tasmania. As requested, I have completed all sections of the document in company with the Primary Researcher or the Project Supervisor for the project/s I will be working on *(Supervisor's name)*

I acknowledge that I will **NOT** be covered by University of Tasmania workers compensation public liability or accident insurance whilst engaged as a volunteer.

IN CONSIDERATION of the University of Tasmania (UTAS) accepting me (the Releasor) as a volunteer member of the University AND SUBJECT TO THE LAW:

I HEREBY for myself, my heirs, my administrators, executors and assignees RELEASE AND FOREVER DISCHARGE UTAS (including any instrumentality thereof), its employees, servants and agents from all liability, claims, demands, actions or possible causes of action whatsoever for or on account of any loss or injury of whatsoever nature sustained by or to my person (including death) or property suffered at any time during my participation in the program and relating, whether directly or indirectly, to the involvement of the UTAS, it's employees, servants and agents in the program.

AND HEREBY INDEMNIFY AND AGREE TO KEEP INDEMNIFIED UTAS, its employees, servants and agents, and the participants and members of the program against all actions, proceedings, claims and demands whatsoever that may be brought, made or prosecuted against them or any of them by any person or persons in respect of any loss, injury or damage arising out of any action of mine during the program and against all costs, charges and expenses that may be incurred by the above in defending or settling such actions, proceedings, claims and demands.

DATED the day of 20.....

Signed, Sealed and delivered by the Releasor:
Signature of the Volunteer

in the presence of:
Name of witness *Signature of witness*

Appendix 9 Risk Assessments for UTAS Diving Operations

A9.1 OVERVIEW

The University of Tasmania is committed to continuously improving the management and standards of Occupational Health and Safety. This procedure describes how the risks involved with planned activities are assessed and how controls are selected. It addresses project or task risks rather than specific hazards identified in the workplace.

A9.2 DEFINITIONS

A9.2.1 Accountable Person:

An individual, who assumes responsibility for the health or welfare of any other person in a workplace by providing instruction, direction, assistance, advice or service, is deemed an accountable person in accordance with the *Workplace Health and Safety Regulations 1998*. All management and supervisory staff (which includes those with responsibility for students) are therefore considered "Accountable Persons".

A9.2.2 Employee:

For the purposes of this Policy, employee refers to any staff member, student, contractor or visitor.

A9.2.3 Hazard:

Hazard - a situation, activity or task with the potential to cause injury or damage. Hazards can include substances, machinery, work methods and other aspects of work organisation.

A9.2.4 Responsible Officer:

Deans, Heads of Division, Heads of School and Administrative Sections have been designated as Responsible Officers under the Workplace Health & Safety Act 1995.

A9.2.5 Risk:

Risk - a situation, activity or task with the actual likelihood of harm or damage. Risk is initially assessed by determining both the level and likelihood of harm that a particular hazard could cause in a worst-case scenario – without controls. e.g.. the potential severity.

A9.2.6 Risk Assessment:

Risk assessment may be defined as identification of all foreseeable hazards present in any undertaking, combined with an estimate of the level of associated risk for each - taking into account whatever controls are already in place. It is essentially a four-stage process.

- Identification of hazards;
- Evaluation of the level of risk involved with each hazard identified;
- Identification and implementation of measures to control the risks; and
- Re-evaluation of each hazard's level of risk AFTER the implementation of risk control measures.

As many diving and terrestrial field operations may be subject to widely variable environmental conditions, certain portions of the risk assessment MUST be reviewed on site – both immediately before, and during each diving operation.

Risk assessment cannot be expected to cover risks that are not reasonably foreseeable.

A9.3 RESPONSIBILITIES

A9.3.1 Accountable Persons:

Ensure these procedures are implemented within their areas of responsibility. Provide information and training in relation to Project/Task Risk Assessment & Control.

A9.3.2 Responsible Officers:

Provide suitable facilities and resources to ensure the effective implementation of this policy.

A9.4 PROCEDURE

The Risk Assessment for any planned UTAS project or task should be performed by the Accountable Person (UTAS Dive/Project Coordinator) or, as a minimum, where the assessment has been prepared by another employee it must be reviewed by the Accountable Person. Where applicable, it should also be reviewed by the Supervisor of the Accountable Person, particularly where they are a student.

The Accountable Person or other employee shall perform a Risk Assessment on each section of any task to be undertaken, and document their findings on the Workplace Risk Assessment and Control form below or on the UTAS Filed Operations Management System. This can be achieved by addressing the following steps:

Step 1. **Column A:** systematically list each step in the operation, specific task or item of work scope. Evaluations should include items such as training, communication of safety information to work teams, site access etc

Step 2. **Column B:** identify potential incidents/accidents, hazards or consequences that may arise from specific tasks/activities.

Step 3. **Column C:** use the 'Severity Scale' at Table 1 below to allocate a 'Severity Rating' for each listed hazard. *NB: The 'worst case' severity will always be the same if the incident happens – regardless of whether controls have been implemented or not.*

A9: Table 1 – Severity Table

Level	Severity	Example of Impact
6	Extreme	Multiple deaths or permanent or severe health effects for employees and members of the public.
5	High	Permanent or severe health effects for an employee or member of the public; or shutdown of a major facility; or public/media outrage; or investigation; legal proceedings very likely; or huge financial loss
4	Moderate	Extensive or multiple injuries; or extended absence of one or more employees; public/media concerns; or reputation damaged; or external investigation; or loss of production capability; or shutdown of facility; or major financial loss
3	Minor	Medical treatment required (over 3 day injury); or high financial loss; or internal investigations; or major refit/repair of a facility needed
2	Low	1st aid treatment (under 3 day injury); or medium financial loss; or minor refit/repair of facilities needed; or minor delay caused by damage or faulty equipment
1	Insignificant	No significant injuries; or low financial loss; or minor delays

Step 4. **Column D:** identify the likelihood of the listed incidents, accidents, hazards or consequences occurring, and use the 'Likelihood Scale' at Table 2 below to allocate a 'Probability Rating' for the listed item should no control measures be implemented. *NB: Although the 'worst case' severity will always be the same if the incident happens –appropriate controls should reduce the probability of occurrence.*

A9: Table 2 – Likelihood Table

Level	Likelihood	Example of Likelihood
6	Almost Certain – almost always occurs	The event is expected to occur in most circumstances; constant exposure to risk; high probability of damage; clear history of occurrence
5	Frequent – expected to occur weekly/monthly	The event will probably occur in most circumstances; frequent exposure to risk; substantial probability of damage; some history of occurrence
4	Probable - monthly to yearly	The event should occur at some time; regular or occasional exposure to risk; moderate probability of damage
3	Possible - yearly to five yearly	The event could occur at some time; infrequent exposure to risk; low probability of damage; little or no history at this site
2	Remote - 5 yearly or less often	The event may occur only in exceptional circumstances; rare exposure to risk; very low probability of damage
1	Improbable – so unlikely the probability is close to zero	Have never actually heard of it happening, though the possibility exists

Step 5. **Column E:** once the above values have been determined, plot them on the Risk Matrix on the next page by multiplying the probability rating and the severity rating to obtain a risk rating and score **should no control measures be implemented.**

A9: Table 3 – Risk Ratings

		SEVERITY SCALE					
PROBABILITY OF OCCURRENCE		6	5	4	3	2	1
	6	36	30	24	18	12	6
	5	30	25	20	15	10	5
	4	24	20	16	12	8	4
	3	18	15	12	9	6	3
	2	12	10	8	6	4	2
	1	6	5	4	3	2	1
		RISK RATING					

Colour Code	Risk Ranking	Description of Ranking
	24-36	Presents extreme risk to personnel and equipment. No work is to be undertaken and alternate work methods MUST be formulated
	13-23	Presents an unacceptable risk to personnel and equipment Team will need to further evaluate and devise control measures
	1-12	The assessed risks are deemed to be acceptable and no modification of current controls are necessary to safely undertake the task

Step 6. **Column F:** Using the 'hierarchy of control' table below as a guide, insert in column "F" all your intended control and safety measures. Any implemented control must reduce the risk to personnel and equipment to a level that is deemed acceptable (as defined below). These are listed in priority order (with more detail provided on the following page).

A9: Table 4 – Hierarchy of Control

1	Elimination	Where the level of risk cannot be controlled to an acceptable level a task must not take place. The team must reassess the work to be undertaken.
2	Substitution	The task is performed using an alternate work method to control or eliminate the identified risk.
3	Design	Plant & work procedures are designed to reduce an identified risk to an acceptable level.
4	Isolation	Personnel are isolated or separated from the identified hazard/s.
5	Administrative	Dive planning takes the identified hazard/s into account, and addresses those hazards or risks with a view to minimising the divers and crews exposure.
6	PPE	Personal protective equipment used to guard against the hazard or reduce the level of risk.

Note: Proof should be able to be provided that a higher order level of control is not practicable. The risk matrix provides guidelines on what action should be taken to control hazards where risks are assessed as high, significant, moderate or low.

Priority 1 – Elimination

The best way to eliminate the risk is to remove the hazardous equipment or discontinue the hazardous process.

Don't use the equipment. Don't use the process.

Priority Two - Substitution

Substitute the hazardous part of the equipment or hazardous part of the process with a safer option.

Find a safer piece of equipment or better way to perform the process.

Priority Three – Isolation

Isolate the people from the equipment or process. For example, put the equipment or perform the process in a booth or a separate room. Provide remote activation / control of the equipment or process.

Keep the hazard away from people.

Priority Four - Engineering Controls

Engineering controls involve the use of measures to change the equipment or the environment in which the process is undertaken. Control measures may include:

- Modifying the design of a piece of equipment
- Modifying the workplace layout in which a process is carried out
- Installing guarding to prevent exposure to the hazardous parts of a piece of equipment or process.
- Providing enclosures, fume cupboards, local exhaust ventilation or automation.

Engineer a better way to do the job

Priority Five - Procedures and Training

Systems of work or safe work procedures can often help to reduce risk associated with equipment and processes. All staff and students must be trained in the safe systems of work or safe work procedures. Periodic inspections and audits should be conducted to ensure that the systems or procedures are being followed.

Examples include:

- Performing the task out of normal hours or restricting access to a certain area.
- Reducing the duration or frequency staff or students perform a specific task.
- Good housekeeping

Ensure you have adequate training to safely do the job

Priority Six – Personal Protective Equipment (PPE)

PPE can include clothing, such as overalls, aprons, footwear, gloves, as well as items such as wetsuits, safety glasses, face shields and respirators. PPE can often be used in combination with other risk controls to further reduce exposures to hazardous parts of equipment and processes. However, if PPE are used as the only control measure they should be generally regarded as a short-term solution or a last resort.

Staff and students must be trained in correct fit use and maintenance of the PPE. In addition, you should ensure that any equipment used is appropriate for the job and readily available.

A9: Table 5: Examples of control

Hazard	Type of Control	Description
Cold water	Substitution	Replace wetsuits for drysuits, thicker wetsuits or hot water suits
Barotrauma	Admin. /training	Ensure divers are adequately trained and experienced, and able to cope with foreseeable emergency situations
Blue Green Algae	Design	Separate diver from the hazard using a drysuit and a lock on helmet. Use decontamination procedures.
Current/Tide	Elimination/ Design	Dive only at slack water if tidal current. Use adequate harness and lifeline in all cases. Buoy divers if free swimming, and work vessel 'live'.
CO poisoning	Elimination	Ensure that plant is set up in such a way that CO poisoning risk is removed. e.g. use SCUBA instead of SSBA compressor supplied air.

Step 7. **Column G:** Once control mechanisms have been detailed for each hazard, the severity of the risk POST CONTROL must be re-evaluated by the individual performing the risk assessment, and listed on the Workplace Risk Assessment and Control form into column G.

Step 9. **Column I:** after all control measures have been listed, insert the revised Risk Rating (multiplied severity and probability factors) into column I.

A9: Table 6 – Risk Ratings POST control implementation

PROBABILITY OF OCCURRENCE	SEVERITY SCALE					
	6	5	4	3	2	1
6					12	6
5					10	5
4				12	8	4
3			12	9	6	3
2	12	10	8	6	4	2
1	6	5	4	3	2	1
	RISK RATING					

After implementation of all possible control measures in "Column F" and a revision of both the severity of any incident/accident in "Column G" and the probability of that incident/accident occurring in "Column H" the revised risk ranking MUST fall within the acceptable (green) limits zone on the WRAC evaluation graph above.

Note: If the revised risk ranking does not fall within the acceptable range of 1-12 then the specific task will need to be re-evaluated and further control options investigated.

If no further controls can be implemented then the evaluation team will need to consider utilisation of remote intervention or that the task cannot be safely undertaken by the work team and abandonment of the task must be considered as an option.

Step 10. Project/Task Risk Assessments must be submitted to the University Diving Officer for approval, and operations must not commence until approval has been received.

Step 11. Risk Assessments must be reviewed when circumstances change that may impact on the outcomes of the assessment and/or the documentation becomes invalid, or at a minimum at least every year.

Records

Copies of completed Risk Assessments must be retained by the workplace, and a copy should be available at the work site and made available to all employees undertaking the activity or task detailed on the assessment.

WORKPLACE RISK ASSESSMENT AND CONTROL FORM - EXAMPLE

Tasks/Issues		Potential Incident/Accident	Initial Assessment			Control Measures	Final Assessment		
			SEVERITY	PROBABILITY	RISK RATING		SEVERITY	PROBABILITY	RISK RATING
A	B		C	D	E	F	G	H	I
1	Ensure all personnel are familiar with procedures	Failure to follow set operating procedures resulting in incident/accident or dangerous occurrences	6	3	18	All staff shall be inducted and familiar with relevant UTAS Policies & Procedures; consult Dive Manual and follow set procedures; consult with other Dive Coordinators for past experience; Dive Permission form/dive plan to be lodged with UDO and approved prior to departure. Plan to be followed when in filed. Variations to plan must be discussed and agreed to by all personnel.	6	2	12
2	Training	Incident due to inexperience or lack of specific training	6	3	18	All divers shall be registered and current on the UTAS Field Ops Managements System and hold experience appropriate to the dive sites to be visited and tasks to be performed. If restricted divers are present, Dive Coordinator is to ensure they are only permitted to observe proceedings, or assist in a minor tasks that will not distract them regarding checking air status etc	6	2	12
3	Communication	Incident due to lack of information specific to the task or site; Failure to adequately explain the task	5	3	15	Comprehensive briefing of field team to be held prior to departure on trip, and a dive briefing to be conducted immediately prior to each dive. Divers all told they are expected to be familiar with and follow standard procedures in Dive Manual, and requirements of the Dive Plan.	5	2	10
4	Driving to and from site; towing boat	Vehicle accident; risk increased by towing	5	3	15	Vehicles all UTAS owned and approved; All staff familiar with and will abide by UTAS Driving Policy/Procedures; individuals performing driving duties experienced at towing vessels in all conditions, or if gaining experience will be under close supervision in 'safe' circumstances (eg. on minor roads in good conditions, or as otherwise deemed safe by Supervisor).	5	2	10
5	Boating operations	Boating accident; engine breakdown;	4	3	12	Use UTAS vessels in current survey; UTAS coxswain in control of vessel; all personnel on vessel familiar with location and operation of safety equipment in vessel (inductions done prior to departure for new personnel); weather forecast checked prior to departure, and monitored during day/trip; effective recall devices to be carried in all vessels ('jingle' chain) and divers to be recalled if conditions deteriorate or other risk is identified.	4	2	8
6	Access	Injury due to inadequate site access; slip trip; overhead obstructions	4	3	12	Provide dive door or ladder/platforms and rails for divers and attendants; divers encouraged to take gear OFF prior to climbing into boat; attendant to take care lifting equipment into boat.	4	2	8
7	Assessment of equipment	Failure to select correct equipment for a specific task; equipment inadequate for task; equipment poorly maintained or otherwise non-functional	4	3	9	Consult UTAS Dive Manual or UDO for advice on correct equipment selection, if doubt exists as to capacity; consult with other Dive Coordinators for past experience; ensure equipment is in service (check on FOMS); equipment to be checked for functionality prior to departure, and again prior to dive during buddy check	4	2	8
8	Assessment of site conditions	Diver/personnel placed in jeopardy due to worse conditions than planned for, or deterioration of conditions during dive	4	2	8	Carry out onsite risk assessment prior to commencement of diving operations – Surface Attendant to be briefed on circumstances that might require diver recall, and instructed to monitor weather and site conditions for changes; do not dive if conditions deemed unsafe for any of the divers (based on fitness/experience of divers), or cease diving, if conditions become less safe than initially identified; effective recall devices to be carried in all vessels ('jingle' chain) and divers to be recalled if conditions deteriorate or other risk is identified	4	2	8
9	Set-up of equipment; Loading issues	Manual handling accidents; slip trip hazards; gear set-up deficiencies; exhaust contamination of air intakes	6	3	18	All staff familiar with UTAS Manual Handling Procedure and abide by them; equipment loading performed appropriately; onsite risk assessment prior to commencement of dive operation; equipment sited safely; monitor site conditions continuously for changes; surface attendants all trained on and familiar with equipment being used.	6	2	12
10	Conduct of planned diving operations – free swimming SCUBA	General diving safety issues; diver separation	4	2	8	All divers to be familiar with UTAS Diving Procedures Manual, and follow it and the approved dive plan; Surface Attendant to monitor divers bubbles wherever possible, to determine location of operations and status of divers; if bubbles may not be visible then surface buoy to be deployed either from divers (if moving locations frequently) or from worksite (if divers will be remaining in vicinity at all times); divers to maintain visual contact with each other, and follow lost buddy procedure in case of separation (to be covered in all pre-dive briefings); all staff trained in O2 administration and 1 st aid, and appropriate equipment carried to allow treatments.	4	2	8
11	Diving operations	Hypothermia	5	4	20	Adequate exposure protection to be worn by all divers. Drysuit in winter (if appropriate). If any diver feels more than just 'cold', they are instructed to cease operations, exit water, and rewarm.	5	2	10
12	Dive Ops – transect deployment/search	Entanglement	4	2	8	All divers to carry an easily accessible sharp knife or other effective cutting tool; divers always operating in pairs, so able to render assistance to each other if required; only unrestricted divers or higher to handle line deployment unless close supervision carried out (in case of restricted divers doing such tasks)	4	1	4
13	Diver exit from water	Slip trip incidents; manual handling accident	4	4	16	Provide suitable ladder/platform for diver; diver to hand equipment up to SA prior to exit from water; SA to use correct manual handling techniques to remove equipment from water	4	2	8
14									

UTAS On-site Risk Assessment & Hazard Checklist

To be completed on-site before diving operations commence, and re-evaluated prior to each dive

Date: Time: Site:

FOMS DP# : Dive Coordinator:
Name Signature

Environmental Factors	Sev.	Prob.	Comments and Controls	Risk
Wind (strength/direction)				
Predicted weather changes?				
Current/tide (strength/direction)				
Underwater visibility				
Maximum depth of worksite				
Water temperature				
Atmospheric temperature				
Dangerous marine animals				
Sea state				
Sufficient trained personnel				
Lifeline entanglement				
Diver experience				
Diver fitness pre-dive				
Sufficient O2 for divers				
Diver dehydration				
1 st aid kit present?				
Drugs/alcohol				
Exercise during dive				
Exercise post dive				
Sleep deprivation				
Repetitive diving				
Multi-day diving				

Appendix 10 Hazard Checklist – DIVING

The following checklist of hazards and other items should be considered when planning diving work:

Task related factors

- free-swimming survey work
- quadrat survey work
- transect survey work
- lifting with lift bags
- suction sampling with air lift
- sample collecting
- enclosed diving (caving/wrecks)
- hydraulic/pneumatic tools
- explosive tools
- cutting or welding
- photography (cold)
- boat handling/unguarded propellers
- shipping movement
- manual handling
- pressure differentials/suction
- entrapment
- entry/exit methods
- lifeline entanglement
- dive profiles
- sufficient trained personnel

Fauna & Flora

- stinging animals (marine)
- other dangerous marine animals
- handling of small animals
- handling of large animals

First Aid requirements

- first aider in group?
- first aid kit in tow vehicle
- first aid kit in boat
- oxygen kit in boat
- O2 cylinder (adequate size?)
- any additional items required?

Pre/post dive clothing

- sun hat
- towel
- winter clothing (all year)
- trousers/overalls
- wet weather equipment
- appropriate footwear

Pre & post dive factors

- pre dive fitness
- fatigue
- dehydration
- drugs/alcohol
- exercise
- sleep deprivation

Dive Team

- size
- composition
- experience of each individual
- fitness
- individual medical conditions

Personal protection

- adequate exposure protection (e.g. exp. suit, gloves, boots, hood)
- harness (SSBA/tethered SCUBA)
- overgloves
- lycra suit
- overalls over wetsuit/drysuit
- welding visor
- adequate clothing for Dive Attendant

Personal

- sunburn
- Heat/cold stress
- manual handling, lifting
- striking and grasping
- slips and trips
- mental stress
- personal security and safety
- individual medical conditions?

Transport

- tow vehicles and vessels
- aircraft
- fuel requirements
- launch and retrieval of vessel
- tow vehicle size/capability
- vessel size
- vessel engine size
- safety equipment aboard?
- secure from theft?
- radio and operator present?
- driver/cox'n licensing
- flying after diving
- sea conditions on way to site
- road travel to altitude after diving

Underwater Navigation

- training
- diver experience
- visibility
- compass

Communication

- between participants
- with locals
- with nominated contact
- training and experience
- equipment types available?
- underwater radio comms?
- lifeline comms. - familiarity with standard signals

Tides and Weather – general

- tide data
- met. bureau forecasts
- radio broadcasts

Essential site information

- wind and sea state
- current/tide at site/ on way to site
- air and water temperatures
- time of day
- maximum depth of site
- maximum depth of dive/s
- contaminants/biological hazards
- entrapment hazards
- underwater terrain
- isolation/remote sites
- floating hazards
- sun/ice
- altitude

Fire Risks

- extinguisher in vessel/vehicles
- combustibles on vessel
- explosive substances?
- flammable substances
- Oxygen handling

Emergency Response Factors

- location/availability of emergency medical system
- emergency response/evacuation plan
- trapped/lost diver
- communications

Hyperbaric/Physiological Factors

- barotraumas of ascent/descent
- decompression illness
- hypothermia
- hyperthermia
- CO poisoning
- CO2 poisoning
- Nitrogen narcosis
- O2 toxicity
- drowning
- exhaustion
- cross infection

Thermal hazards

- cryogenic fluids
- hypothermia
- heatstroke

Electrical

- high voltage equipment e. g. generator
- 240v electrical equipment

Overseas fieldwork

- disease
- vaccinations
- political climate
- Evacuation issues

Other (specify)

Appendix 11 Diving Risk Table

The following checklist of hazards/risks and other items may be of assistance when planning diving work:

RISK FACTOR	LOWER RISK	MODERATE RISK	HIGHER RISK
Weather and sea	Calm, settled□weather pattern	Calm, unsettled□weather pattern	Rough
Site exposure	Sheltered		Exposed
Time of day	Start and finish□In full daylight	Start at/before dawn and finish near/after dusk	Night diving
Current at site	Nil to weak	Moderate	Strong
Depth at work site	< 18m	18m – 30m	> 30m
Site location	Location not remote Sheltered embayment□with uniform bottom profile		Exposed site□and remote location
No. of personnel	2 – 3 divers (multiples)□1 Boat Handler per team	2 – 3 divers (multiples)□No Boat Handler	Single diver
Diving experience□of personnel	> 50 hrs	20 – 50 hrs	< 20 hrs
Duration of dive	At least 2 repetitive groups□less than no-deco limit	1 repetitive group less than no-deco limit	Dive to no-deco limit
Dive profile	'Ideal' profile	'Square' profile	'Reverse' or 'sawtooth' profile
Multiple ascents	None	One or two	Three or more
Local knowledge	Know site well	Some experience with or knowledge of site	Little knowledge of site
Effect of boat traffic□On dive site	Infrequent traffic Depth > 5m	Some traffic Depth > or < 5m SSBA dive	High traffic/shipping lane Depth < 5m SSBA dive
Entrapment hazards	Unobstructed ascent		Obstructed ascent
Medical assistance?	< 30 min. Away	0.5 – 2 hrs away	> 2hrs away
Repetitive diving	No more than 2 dives/day	3 – 5 dives/day	> 5 dives day
Time since last dive	< 3 months	3 – 6 months	> 6 months
Handling marine life	General observation	Observation of dangerous animals Spear fishing	Manipulation of dangerous or venomous animals
Task related risks	Use of slates, cameras etc	Use of handheld pneumatic tools and/or small lift bags	Use of heavy tools/frames and/or large lift bags

Appendix 12 Dive Coordinator's Pre-Dive Briefing

The Dive Coordinator for each dive is responsible for conducting a pre-dive briefing in the presence of the entire dive team (including Dive Attendants and Divers). Each team member has a responsibility to give their full attention during the briefing, as in the event of an incident any team member may be required to initiate and/or control emergency procedures.

The content of this briefing must include at least the following information, and must be modified to take account of any other details specific to the particular diving operation being considered:

- a) Notification of the designated Dive Coordinator (they would normally be the person giving the briefing) and Dive Leader/s for the dive/s (may or may not be the dive Coordinator);
- b) Nomination of Divers, Standby Divers and Dive Attendants for the dive, where applicable;
- c) Details of equipment to be used during the dive/s, including SCUBA/SSBA (LP compressor or bottle bank), oxygen equipment, 1st aid/safety equipment and any other specific items needed;
- d) Allocation and description of tasks of each dive team member, outlining all procedures for the diving operation;
- e) Full details of the dive plan, specifically including depth and duration of the dive, dive termination procedures, 'in water' emergency procedures and communication procedures;
- f) Confirmation with Dive Attendant/s and Standby Diver/s of their duties, including keeping visual contact with diver/s or their bubbles and knowledge of protocols for recovery of injured divers from the water, rescue procedures, and out of water emergency/evacuation procedures;
- g) A briefing of each individual regarding their specific tasks, and for divers, a check on their fitness to dive (i.e. asking about tiredness, or any colds, flu's or injuries they may have);
- h) Details of expected 'in water' conditions, including currents, visibility, seafloor conditions etc (NB. these must be confirmed once at the dive site);
- i) Recall signals;
- j) Dive termination points e.g. low air/minimum air limits, time in water, fatigue, cold etc.
- k) Answers to any queries.

Once at the dive site, the Dive Coordinator must perform the following tasks:

- a) Re-evaluate the site, conditions, depth and consequent duration of the dive;
- b) Reconfirm all Diver's and Standby Diver's health, air supply etc;
- c) Ensure all required information is recorded on the 'Dive Record' Form (may be delegated to another person);
- d) Ensure conduct of a final functionality check of all divers' equipment and dress, including requiring a 'bailout' contents check & activation drill be performed by any diver wearing 'bailout' equipment.

After every dive, the Dive Coordinator must conduct a post-dive debrief with all dive personnel on the trip including the following:

- a) Checking the health of all divers, and recording details of any issues or incidents encountered, including discussing whether risk assessment controls were effective;
- b) Noting all tasks achieved and any irregularities described by the diver/s;
- c) Recording equipment problems encountered, and ensuring the equipment is tagged OUT OF SERVICE;
- d) Notifying each diver of their dive details as recorded;
- e) Notifying each diver of their repetitive group designator, and the time they left the water;
- f) Detailing any post dive restrictions to each diver, including altitude, heavy work, exercise or showering restrictions, and ensure the divers understand these.

As well, the Dive Coordinator should:

- a) Check each diver's health 1 - 2 hours after the dive;
- b) Ensure they and the Dive Leader (if other than Dive Coordinator), sign the Dive Record Form/s for the day.

Appendix 13 Tasmanian Medical Facilities And 'Diving Doctors'

A13.1 Diving Doctors *

A complete list of medical practitioners with training in diving medicine is maintained by the South Pacific Underwater Medicine Society (SPUMS), and is available from their website at <http://www.spums.org.au/Divedocs/tas.htm>.

All commercial diving medicals undertaken by individuals wishing to be listed on the UTAS Diver register must be done through one of these SPUMS accredited doctors.

A13.2 Medical Centres and Contacts - Hobart and General

Diving Emergency Service / Diver Alert Network (D.A.N.) if diving related <i>This number is attended 24 hours/day. Toll free for calls within Australia.</i>	1800 088 200
State Emergency Service & Ambulance (they will notify the Royal Hobart Hospital Hyperbaric Unit on instruction). NOTE: IF YOU CALL AN AMBULANCE FOR A DIVING ACCIDENT YOU <u>MUST</u> STRESS THAT IT IS FOR A DIVING EMERGENCY	000 (112 on some mobiles)
Royal Hobart Hospital Hyperbaric Unit	03 6238 8322 03 6238 8193 03 6238 8308
Tasmanian Marine Police (radio room)	03 6230 2111
University Diving Officer (leave message on answering machine if unattended)	0418-120-705 03 6226 2608 (W) 03 6265 2658 (H)

A13.3 Medical Centres - North West Coast Area

Smithton Hospital. The North West Regional Hospital is located off Britton's Road, Smithton, which is on the eastern approach to the town. The Accident and Emergency Department is staffed and equipped to handle initial treatment, trauma management and emergency care.	03 6452 1351
Smithton Medical Centre.	03 6452 2555
Burnie - North West Regional Hospital, Brickport Road. All facilities, but no hyperbaric unit.	03 6430 6666

A13.4 Medical Centres - Northern Area

Launceston General Hospital. Charles Street. Has all facilities except a Hyperbaric Unit.	03 6430 6666
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A13.5 Medical Centres - North East Coast Area

St. Helens Hospital. Circassion Street (main Road on left as heading north). Attended 24 hrs, with three doctors on call. Outpatients and Emergency room, & volunteer ambulance.	03 6376 1222
Scottsdale NESM Hospital. Cameron Street (on road to Bridport, right hand side, long driveway). Attended 24 hrs. Doctors on call. Outpatients and Emergency room, and volunteer ambulance.	03 6352 2222

A13.6 Medical Centres - West Coast Area

Queenstown Hospital. McNamara Street. Attended 24 hrs, with doctors on call. Outpatients and Emergency room, & volunteer ambulance.	03 6471 3300
Strahan Medical Centre (annexe to Queenstown Hospital). Attended 24 hrs. Doctors on call. Ambulance on call.	03 6471 7152

A13.7 Medical Centres - East Coast Area

Triabunna Medical Centre, Esplanade, (turn right at the Police Station). Open from 0900 - 1215 hrs, and 1400 - 1700 hrs. Doctor on call 24 hrs.	03 6257 3124
Orford Medical Centre, Tasman Highway. Adjacent to East Coast Seafood (opposite Roadhouse). Doctor available Tuesday, Wednesday all day, and Thursday and Friday afternoons.	03 6257 3124
Sorell Medical Centre, 42 Cole Street, Sorell. Doctor on call 24 hrs. Ambulance on call.	03 6265 2341

A13.8 Medical Centres - Southern Area

Dover. Esperance Multi-Purpose Health Centre, Chapman Ave., Dover. Across road from the RSL Club (top of the hill). Attended 24 hrs, with one doctor on call. Outpatients and Emergency room, & volunteer ambulance.	03 6298 1599
Huonville. Huon District Hospital, Main Rd. Franklin. Attended 24 hrs. Doctor on call. Outpatients and Emergency room, and volunteer ambulance.	03 6266 3201

Appendix 14 Sample Undergraduate Dive Protocol

Participation in any diving activity by undergraduate students (including snorkel diving) is at the discretion of the University Diving Officer, and on site, by the staff member present who is acting as Dive Coordinator. Non-compliance with any reasonable rule or instruction given by the Dive Coordinator or the UDO will automatically lead to the person(s) concerned being excluded from further diving activities.

1. No alcohol is to be consumed within the 12 hours prior to diving. Excessive alcohol consumption at any time will result in the person concerned being banned from all diving.
2. Students must only dive in their assigned teams, and staff must appoint a Dive Leader for each team. Dive Leaders shall be responsible for the other members of their team, and for ensuring all divers in their team abide by any instructions. Dive Leaders are also responsible for ensuring all compressor duties are fulfilled (i.e. cylinder filling), and all equipment is adequately washed in fresh water at the end of the diving day.
3. During any dive, each dive team present must be marked with a buoy, and all team members must maintain visual contact with all other members at all times. If visual contact is lost with any diver, then all diver(s) must surface and the team reform.
4. Dives are restricted to a depth of less than 12 metres, and a maximum time of 1 hour.
5. No diving or snorkelling is permitted at night.
6. Adverse weather or water conditions will be avoided, and may result in the cancellation or termination of any dive.
7. It is the responsibility of each diver to ensure that his or her "Time In", "Time Out" and "Maximum Depth" are recorded by the Dive Coordinator/Diver's Attendant.
8. No dive team may leave the assigned area or location during the course of a dive. Entering caves, tunnels or crevices is not permitted.

NB: The above is intended as a sample protocol only. Any diving protocol must be developed taking into consideration all relevant factors, including but not limited to the abilities of the divers involved, the number of divers involved, the task/s to be undertaken, the location of the site, and the likely conditions at the site during the dive/s. [Section 4](#) of the University Diving Procedures Manual (Dive Planning) should be consulted during the formulation of any such protocol or dive plan.

Appendix 15 Diving Emergency Protocols

As all divers should be aware, many diving medical problems require immediate hyperbaric treatment if they are to be successfully resolved. In the field, or during transport to a recompression facility, the best first aid that can be administered for injuries/illnesses such as DCI or air embolism (and others) is oxygen delivered at as close to 100% as possible.

The flow chart on the next page may be used by Dive Coordinators as a basic template to design a site specific Emergency Response Protocol. The flow chart would slot into place along with the other steps required during an emergency, for example:

- a) **DRABC.** Recall all divers/swimmers to the boat or shore. If possible recover all equipment after any accident, and separate it from other equipment for subsequent examination. The Dive Leader may decide not to recover equipment if doing so would be unsafe or cause undue delay;

DANGER	Is there a hazard still present?
RESPONSE	Is the victim conscious?
AIRWAY – look for signs of life	Is the airway obstructed?
BREATHS	Give 2 Rescue Breaths
COMPRESSIONS	30 Compressions (almost 2/sec)
DEFIBRILLATION	Attach AED as soon as possible

- b) **Seek appropriate medical assistance**¹³ and follow any directions you are given. [Appendix 12](#) provides a list of Tasmanian medical facilities and doctors trained in diving medicine;
- c) **Check** that other members of the dive team are not at risk and that all divers are present; It must be remembered that the buddy of any diver who develops symptoms of decompression sickness, even on a dive apparently carried out according to the tables, may also develop symptoms at a later time and require recompression. In such a situation, the dive buddy should be kept under observation for at least 24 hours after the incident
- d) **Ensure** that in the emergency, no equipment has been left in a dangerous condition;
- e) **Organise evacuation** to the nearest hospital or vacant recompression chamber as dictated by the circumstances, the casualty's condition, or medical advice (NB. In Tasmania it is recommended that you contact the ambulance and stress that it is for a diving emergency. If you ring the Royal Hobart Hospital Hyperbaric Unit directly (**6222-8322** or **6222-8193**), or the national Diving Emergency Service (DES) on **1-800-088-200**, confirm whether they will organise the evacuation or not);
- f) **Record** details of the casualty's dive immediately, including where the accident occurred, and the sequencing of treatment. Conditions of the emergency can often lead to neglect in completing the diving log/record, which may make it impossible afterwards to determine the time for which the diver was in the water. Such a record is extremely useful to the doctor treating the casualty, in the construction of a therapeutic profile, and in helping with the understanding and avoidance of future diving accidents;
- g) Ensure the diver's dive record sheets (and if possible their log book/s) are available for the doctor, particularly if recompression is required. Details of the diver's last medical examination may be useful if these can be obtained quickly. Contact the UDO to facilitate this. The UDO's contact no's are **6226-2608 (w)**; **0418-120-705 (m)** and **6225-2658 (h)**;
- h) **After the event:** When the immediate emergency has passed and all necessary steps have been taken to assist the casualty, a full record of the incident must be compiled by the Dive Coordinator (or by the UDO in the event the Dive Coordinator is incapacitated). To help with this, all personnel involved in the incident should endeavour to make notes on what happened as soon as possible after the incident, obtaining details from other divers, noting exact times etc;

¹³ **Important:** Any call for medical assistance will be improved if you are able to provide important information such as your location, the type of emergency, number of people affected, their approximate age and sex, signs and symptoms and vital signs (descriptions of pulse, breathing, consciousness level), first aid given and any changes in patient's condition. If a diving incident, you must stress to the ambulance dispatcher that it is a **DIVING EMERGENCY**. This should help ensure that the Hyperbaric Unit is involved immediately.

DIVING EMERGENCY FLOWCHART



Give immediate first aid as required. e.g. DRABC, Oxygen etc.



Ideally collect the essential information below before calling assistance, but DON'T WASTE TIME!

Calling assistance is the priority

- Number of patients (if suspected DCI, even if dive buddy is not symptomatic they should also be placed on O2 and observed)
- Condition? i.e. conscious? Require resuscitation? Obvious major injury/problem?
- Progressive state of patient/s e.g. stable, good colour, getting worse?
Consult Field Neurological Assessment chart in DAN kit.
- Brief diving history relating to incident?
- Medical equipment on site?



Get Someone Else to Record Details of:

- Patient's full recent diving history for at least the preceding 48 hours
- Recent and longer term medical history of patients e.g. colds, previous injuries, any medications being taken etc
- Names, addresses and medical training of people on site



**Contacts using
Phone or Radio**



PRIMARY CONTACT

Emergency Phone/Radio Frequency:
Frequency:

Make contact with Hyperbaric Chamber, Diving Doctor, DES

Give location and landmarks:

Latitude:

Longitude:

SECONDARY CONTACT

Emergency Phone/Radio

University Diving Officer
Ph. 0418-120-705

Same as primary



**Provide a brief summary
of the incident**



Stand-by for instructions

Appendix 16 Field Neurological Assessment Test

A16.1 Five-Minute Neurological Exam

Examination of an injured diver's central nervous system soon after an accident may provide valuable information to the physician responsible for treatment. The Five-Minute Neuro Exam is easy to learn and can be performed by individuals with no medical experience. The examination can be done whilst reading from this manual. Perform the following steps in order, and record the time, and the results for each test.

1. Orientation

- Does the diver know his/her name and age?
- Does the diver know the present location?
- Does the diver know what time, day, or year it is?

Even though an individual may appear alert, answers to these questions can reveal confusion. Do not omit them.

2. Eyes: Have the diver count the number of fingers you display, using 2 or 3 different numbers of fingers. Check each eye separately and then together. Have diver identify a distant object. Tell diver to hold head still - or you gently hold it still - while placing your other hand about 18 inches (slightly less than 0.5 m) in front of the face. Ask diver to follow your hand. Now move your hand up and down, then side to side. Diver's eyes should follow your hand and should not jerk to one side and return (called nystagmus). Check that the pupils are equal in size.

3. Face: Ask the diver to whistle or purse their lips. Look carefully to ensure both sides of the face have the same expression whilst whistling. Ask them to grit their teeth & feel their jaw muscles to confirm they are contracted equally. Instruct the diver to close his/her eyes while you lightly touch your fingertips across their forehead and face. Confirm that sensation is present, and feels the same everywhere.

4. Hearing: Evaluate the diver's hearing by holding your hand about two feet from the individual's ear and rubbing your thumb and finger together. Check both ears by moving your hand closer until the diver hears it. Check several times and compare with your own hearing. NB. If the surroundings are noisy, this test is difficult to evaluate. If necessary, ask any bystanders to be quiet and turn off unneeded machinery.

5. Swallowing Reflex: Instruct diver to swallow while you watch their "Adam's apple". Ensure it moves up/down.

6. Tongue: Instruct diver to stick out their tongue. It should come out straight in middle of the mouth without deviating to either side.

7. Muscle Strength: Instruct the diver to shrug their shoulders while you bear down on them, to observe for equal muscle strength. Check the diver's arms by bringing their elbows up level with their shoulders, hands level with the arms, and touching their chest. Instruct the diver to resist while you pull their arms away, push them back, and move them up and down. The strength should be approximately equal in both arms in each any direction. Check leg strength by having the diver lie flat and raise and lower their legs while you resist the movement.

8. Sensory Perception: Check on both sides by touching lightly as was done on the face. Start at the top of the body and compare sides while moving downwards to cover the entire body. The diver's eyes should be closed during this procedure. The diver should confirm the sensation in each area before you move to another area.

9. Balance and Coordination: Be prepared to protect diver from injury when performing this test. Have diver stand up with feet together, close their eyes and stretch out their arms. The individual should be able to maintain balance if the platform is stable. Your arms should be around, but not touching the individual, in case they fall. ***Be prepared to catch a diver who starts to fall.***

Check coordination by having diver move an index finger back and forth rapidly between their nose and your finger - held approximately 18 inches (slightly less than a half meter) from their face. In another test of coordination, instruct the diver to slide the heel of one foot down the shin of the other leg while lying down.

Conduct these tests on both right and left sides, and observe carefully for differences between the two sides. Tests 1, 7, and 9 are the most important, and should be given priority if not all tests can be performed.

The diver's condition may prevent the performance of one or more of these tests. Record any omitted test, and the reason. If any of the tests appear abnormal, injury to the central nervous system should be suspected. The tests should be repeated at frequent intervals while awaiting assistance, to determine if any change occurs. Report the results to the emergency medical personnel responding to the call.

Good diving safety habits would include practicing this examination on normal uninjured divers, to gain proficiency in use.

A16.2 RAPID FIELD NEURO EXAM RECORD FORM

Diver's Name: Name of Examiner: Date:

Initial Complaint:

TIME	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Mental Status: Does										
1. His/her name?										
2. Where he/she is?										
3. Time of day?										
4. Most recent activity?										
5. Speech is clear/correct?										
Sight:										
1. Correctly counts fingers?										
2. Vision clear?										
Eye movement:										
1. Move all four directions										
2. Nystagmus absent?										
Facial Movements:										
1. Teeth clench OK?										
2. Able to wrinkle forehead?										
3. Tongue moves in all										
4. Smile is symmetrical?										
Head & Shoulder										
1. Adam's apple movement?										
2. Shoulder shrug normal,										
3. Head movements normal,										
Hearing:										
1. Normal for that diver?										
2. Equal both ears?										
Sensations: Present, normal and symmetrical										
1. Face										
2. Chest										
3. Abdomen										
4. Arms (front)										
5. Hands										
6. Legs (front)										
7. Feet										
8. Back										
9. Arms (back)										
10. Buttocks										
11. Legs (back)										
Muscle Tone: Present, normal and symmetrical for:										
1. Arms										
2. Legs										
3. Hand grips										
4. Feet										
Balance and										
1. Romberg OK?										
2. Pulse										
3. Respiration										

Nystagmus – involuntary oscillation of the eyeball. Usually lateral, but sometimes rotary or vertical.

Romberg – Patient stands with feet together, arms extended in front with palms up, and eyes closed. Should be able to retain balance for 1 min.

Appendix 17 Communications

As per [Section 3.11](#) of this Manual - where UTAS divers are required to use a communications system, or wish to do so, the UDO should be consulted prior to diving and the guidelines below should be adopted.

A17.1 Lifeline Signals

In situations where University of Tasmania Divers are required to operate with lifelines tethering them to the boat, attended by a surface Diver's Attendant, those Divers and the Dive Attendant must be familiar with the standard communication signals used in this situation - as listed below.

These signals have been mainly developed for use by commercial divers, and can be complex and difficult to use. If using this system for communication, divers and attendants should attempt to keep signals as simple as possible, so they can be understood even in a stressful situation. Line signals may be given either by a Diver's Attendant to a Diver, via a lifeline, or diver-to-diver with a buddy line.

Line signals comprise either pulls or bells or a combination of both. A pull is a steady movement of the line, of at least 0.5 metres - always given singly. A bell is a sharp quick tug, always given in pairs where possible, eg five bells is given as:

1 pull to get the attention of the Dive Attendant/buddy; then 2 quick tugs (pause), 2 quick tugs (pause), 1 quick tug

It should be noted that one bell does not exist as a signal on its own.

Signals - Attendant to Diver

- | | |
|--------------------------------|---|
| a) 1 pull | to call attention. Are you OK? |
| b) 2 pulls | am sending down a rope's end (or as previously arranged) |
| c) 3 pulls | you have come up too far. Go down slowly till we stop you |
| d) 4 pulls | Come up |
| e) 4 pulls followed by 2 bells | Come up / hurry up. Come up, surface decompression |

Direction Signals

- | | |
|------------|---|
| a) 1 pull | Search where you are |
| b) 2 bells | Go to the end of distance line / jack-stay / lifeline |
| c) 3 bells | Face shot lifeline then go right |
| d) 4 bells | Face shot lifeline then go left |
| e) 5 bells | Come in to your shot, or turn back if on a jackstay |

Signals - Diver to Attendant

General Signals

- | | |
|--------------------------------|--|
| a) 1 pull | To call attention / Made bottom / Reached end of jackstay |
| b) 2 pulls | Send me down a rope's end (or as previously arranged) |
| c) 3 pulls | I am going down again |
| d) 4 pulls | May I come up? |
| e) 4 pulls followed by 2 bells | Assist me up / I want to come up |
| f) Succession of pulls (>4) | EMERGENCY SIGNAL (ONLY to be used in extreme emergency). Need not be answered, but must be obeyed IMMEDIATELY. |
| g) Succession of 2 bells | Am fouled and need the assistance of another diver |
| h) Succession of 3 bells | Am fouled but can clear myself if left alone |

Working Signals

- | | |
|------------|---|
| a) 1 pull | Hold on / stop |
| b) 2 bells | Pull up |
| c) 3 bells | Lower |
| d) 4 bells | Take up slack lifeline / you are holding me too tight |
| e) 5 bells | Have found, started, or completed work. |

A17.2 General Hand Signals

All UTAS divers should familiarise themselves with the hand signals most commonly required for SCUBA diving. These are shown below, and a sheet depicting them will also be given to all new UTAS divers by the University Diving Officer (this is available to other divers on request), or alternatively, the signals can be found in any 'Open Water Diver' manual - as released by diver training organisations



Distress/help



Buddy breathe/share air



Stop/hold it/stay there



OK/OK?



Danger



OK?/OK
(on surface at distance)



Go up/going up



Out of air/danger



Something is wrong



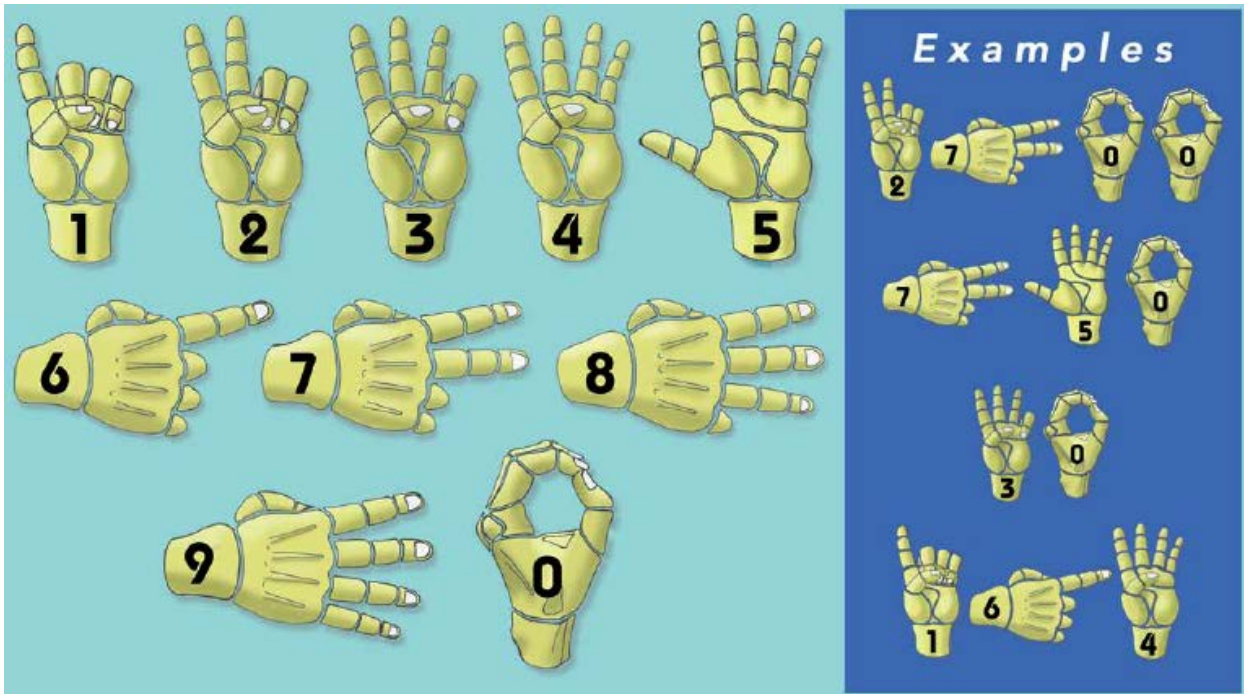
OK?/OK
(one hand occupied)



Go down/going down

A17.3 'One Hand Numbering' Hand Signals

Decompression time, depth and cylinder pressure are all examples of underwater communications that require numbers. In situations where a diver only has one hand available for some reason, familiarity with the 'one-hand' numbering system shown below can be invaluable.



A17.4 Voice Communication

There are a range of different voice communication systems available, but it should be noted that all voice communications equipment used for scientific diving must meet standards described in the Australian Standards for Occupational Diving AS2299.1 & AS2299.2.

It is particularly important where divers are intending to use, or are required to use, voice communication systems, that they be fully conversant with the particular equipment to be used prior to attempting any dive.

Familiarisation with equipment is especially important where full face masks are being used. In such a case, consideration should be given to performing a familiarisation dive, or dives, in sheltered waters prior to undertaking field operations.

On any dive where use of a voice communication system has been made conditional on the dive taking place, the dive must not take place without a backup communications system being employed (eg. a lifeline system), and all personnel involved in the operation being familiar with its use.

Appendix 18 UTAS Diving and Boating Safety Committee

The University of Tasmania Diving & Boating Safety Committee¹⁴ is a sub-committee of the UTAS OH&S Committee, and shall consist of active scientific divers plus one representative from UTAS Human Resources/OH&S.

Voting members shall include:

- The University Diving Officer as Chair
- A member of the University OH & S Unit
- Other representatives of the University of Tasmania diving community as determined from time to time.

Additionally, there shall be a Secretary – from UTAS HR/OH&S.

18.1 UTDBSC Terms of Reference

1. Provision of advice regarding oversight and administration of University diving and boating projects as requested, including compliance with relevant policies and operational procedures.
2. Development of policies and procedures associated with University of Tasmania Diving and Boating activities.
3. Recommendation of appropriate remedial action in the event of unsafe diving or boating activities by any individual or group within the University – if necessary including suspension of scientific diving/boating projects, or any individual's certification as a Scientific Diver within the University.
4. Investigation of all diving and/or boating accidents/incidents brought to their attention, and reporting of violations of the University's policies and procedures to the Occupational Health and Safety Unit.
5. Consideration of scientific diving/boating related problems encountered while diving or operating under the policies or procedures of the University's Diving Operations Manual and Boating Activity Policy.

Tenure and frequency of meetings is not specified. The Committee meets as required.

18.2 UTDBSC Membership

Current membership of the University of Tasmania Diving and Boating Safety Committee comprises the following individuals:

University Diving Officer - UTDBSC Chair

Mr. Simon Talbot. Ph. 03-6226-2608

Deputy Diving Officer

Mr. Adam Stephens. Ph. 03-6226-7583

University Occupational Health and Safety Officer

Mr. Rodney Teague. Ph. 03-6226-7509

Diving Representative - School of Zoology

Professor Craig Johnson. Ph. 03-6226-2613 (reception)

Diving Representative – AMC

Dr. Natalie Moltschaniwskyj. Ph. 03-6324-3802

Diving Representative – TAFI Tarooma Marine Research Laboratories

Mr. Dane Jones. Ph. 03-6227-7253

UTDBSC Secretary

Ms. Rose Bullough. Ph. 03-6226-7294

Communications with the University of Tasmania Diving and Boating Safety Committee should be directed to either the UTDBSC Secretary or Chair in the first instance.

¹⁴ The University of Tasmania is a member of the American Academy of Underwater Sciences (AAUS), and as such, the UTAS Dive & Boating Safety Committee members are listed as the UTAS Diving Control Board (DCB) by the AAUS.

For the purposes of AAUS procedures, this subcommittee fulfils the same role as an AAUS Diving Control Board (DCB) and the UDO fulfils the same role as an AAUS Dive Safety Officer (DSO).

Appendix 19 Maximum Road Altitudes in Tasmania

This table is intended to allow a Dive Coordinator to determine the minimum delay period before divers can travel from any dive site to their base. It is by no means a comprehensive list, and is only intended to cover major routes. If investigating minimum delay periods you should also consider [Table 7.1](#) in [Section 3.7](#) (*Road Travel After Diving*) of these procedures.

It is the responsibility of the Dive Coordinator for a field trip to determine whether or not travel after the dive will exceed an altitude threshold, and to ensure correct delay before travelling after diving is observed.

Road	Max. Altitude
EAST COAST	EAST COAST
Eaglehawk Neck Hill (above Pirates Bay) - Arthur Highway at Hillcrest	190 m
Orford to Sorell – Bust-me-gall Hill	336 m
Orford to Sorell – Black Charlies Opening	366 m
Lake Leake Road	640 m
NORTHEAST COAST	NORTHEAST COAST
Elephant Pass/St. Mary's Pass	400 m
Weldborough Pass (to Scottsdale from St. Helens/Northeast coast)	600 m
NORTH COAST	NORTH COAST
Cethana Pass	440 m
Lake Cethana water level	221 m
SOUTH COAST	SOUTH COAST
Southern Outlet – Kingston to Hobart (Proctor's Road)	240 m
Dover to Huonville	< 300 m
Huon Highway – Huonville to Hobart (Vince's Saddle)	380 m
Huonville to Hobart – via Channel Highway (along coast all the way)	< 100 m
Huonville to Hobart – via Channel Highway (across Gardeners Bay Road)	200 – 300m
MIDLANDS	MIDLANDS
Midlands Highway – Spring Hill	488 m
Midlands Highway – St. Peter's Pass	462 m
Lake Leake Road	640 m
Lyell Highway (Queenstown to Hobart) - Mt King William	830 m

Appendix 20 NOAA Oxygen Exposure Limits

These limits must not be exceeded for any UTAS enriched air diving operation.

PO₂ (ATM)	Maximum Single Exposure (minutes)	Maximum Exposure per 24hr period (minutes)
1.60*	45	150
1.55*	83	165
1.50*	120	180
1.45*	135	180
1.40	150	180
1.35	165	195
1.30	180	210
1.25	195	225
1.20	210	240
1.10	240	270
1.00	300	300
0.90	360	360
0.80	450	450
0.70	570	570
0.60	720	720

* Note: Exposures of >1.4 atmospheres partial pressure of oxygen are not permitted during the 'bottom' part of any dive, and permission must be received from the UDO before they may be used for decompression stops – both safety stops and planned stops.

Appendix 21 UTAS Diving Compressor Training and Induction Guidelines

All individuals granted permission to use UTAS Diving Compressors must have completed a training and induction session covering at least the information detailed in these guidelines. Such sessions must be run by the UDO or their approved delegate/s, with details recorded on the compressor induction checklist attached. This checklist must be forwarded to the UDO and filed with the employees diving records.

The following information and instructions must be followed step by step as written, to comply with UTAS Diving Procedure Manual requirements.

21.1 Compressor Function

All personnel using UTAS diving compressors must have a good working knowledge of how diving compressors work, including maintenance requirements, troubleshooting and filtration requirements, and must sign off to acknowledge this.

21.2 Cylinder Storage

Full UTAS cylinders should always have a dust cap fitted to them, or have their valves taped. This not only reduces the risk of contamination of tank valves and regulators, but also serves as an indicator that the tank is full (although this MUST still be confirmed by the user prior to diving).

Prior to filling, cylinders should be stored in an area that is out of the way of passing 'traffic' – particularly if they are left standing upright.

Unless in the field, filled cylinders should be stored in a secure area, with each cylinder racked in it's own numbered slot to allow easy identification of cylinders that are 'out', or missing.

21.3 Cylinder Handling

Appropriate manual handling techniques should be followed when handling SCUBA cylinders. As a minimum, all diving and diving support personnel must be aware of the UTAS Manual Handling Policy and Procedures, and the requirements of this document must be followed at all times.

- When lifting tanks bend your knees and brace your stomach muscles to support your back.
- Avoid twisting awkwardly whilst lifting the tank and try and keep the weight of the tank near your centre of gravity.
- Under no circumstances swing or throw tanks

Full cylinders should always be stored in a secure area due to their potential for serious injury. In particular, long term diving equipment storage facilities should allow for each cylinder to be racked in it's own numbered slot, to allow easy identification of cylinders that are 'out', or missing. Such storage should ideally have access restricted by way of a programmable swipe card mechanism.

Employees Confirmation of understanding Signature:	
Date:	
Trainer's Approval Signature:	
Date:	

21.4 Compressor Start-up

1. Locate the compressor fill log. This should be stored at a location close to the compressor at all times.
2. Check oil in sight glass on compressor and check the following:
 - Oil should always be between the minimum and maximum levels
 - If not, unless you are familiar with contact the individual who maintains the compressor (usually either the UDO, a Site DO, or a workshop manager).
 - DO NOT turn on the compressor if the oil level shows as too low, or too high.
3. Locate the main power switch for the compressor on the wall, and turn this on.
4. Locate the power switch on the front of the compressor and turn this on.

21.2 Cylinder Storage

Full UTAS cylinders should always have a dust cap fitted to them, or have their valves taped. This not only reduces the risk of contamination of tank valves and regulators, but also serves as an indicator that the tank is full (although this MUST still be confirmed by the user prior to diving).

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Employees Confirmation of understanding Signature:	
Date:	
Trainer's Approval Signature:	
Date:	

Appendix 22 AAUS Request For Diving Reciprocity Form - Verification of Diver Training and Experience

A scientific diver that is currently certified under the auspices of an organisational member institution of the American Academy of Underwater Sciences (AAUS) shall be recognized by any other organisational member of AAUS and may apply for reciprocity in order to dive with the host organisation. Organisational members that are in good standing with AAUS operate, at a minimum, under the AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs (2003 edition). The visiting diver will comply with the diving regulations of the host organisation's Diving Safety Manual unless previously arranged by the Diving Control Boards of both organisations.

The host organisation has the right to approve or deny this request and may require, at a minimum, a checkout dive with the Diving Safety Officer (DSO) or designee of the host organisation. If the request is denied, the host organisation should notify to the DSO of the visiting diver the reason for the denial. The DSO for the visiting scientific diver has confirmed the following information:

Date

..... Written scientific diving examination
 Last diving medical examination
 Most recent checkout dive
 Scuba regulator/equipment service/test
 CPR training (Agency) Expires
 Oxygen administration (Agency) Expires
 First aid for diving (Agency) Expires
 Date of last dive

Number of dives completed within previous 12 months?

Depth certification

Any restrictions? (Y/N) if yes, explain:

Please check any pertinent specialty certifications:

..... Dry Suit	..... Rescue	..... Blue water
..... Dive Computer	..... Divemaster	..... Altitude
..... Nitrox	..... Instructor	..... Ice/Polar
..... Mixed Gas	..... EMT/DMT	..... Cave
..... Closed Circuit	..... Night	..... Dive Accident Management
..... Saturation	..... Chamber Operator	Other
..... Decompression	..... Lifesaving	.....

Name of Diver

Emergency Information: (To notify in an emergency)

Name Relationship

Telephone (wk) (hm)

Address

This is to verify that the above individual is currently a certified scientific diver at:

.....
(Name of AAUS Organisational Member)

Diving Safety Officer:
(Signature) *(Date)*

.....
(Print) *(Phone/fax/e-mail)*