



Memorial University of Newfoundland

Guide For

Scientific Diving



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Memorial University of Newfoundland
DIVING SAFETY MANUAL

Scope and Application

This diving safety manual is designed to provide Memorial University scientific divers with standards and procedures for safe diving. It details a minimum standard and in the case of any omission or conflict with respect to the Canadian Association for Underwater Science *Standard of Practice for Scientific Diving* (3rd Edition, October 1998). The Canadian Association for Underwater Science standard must prevail.

This manual only applies to Memorial University's scientific diving operations that include diving and diving related training by university employees or its registered students as part of their research, occupation or instruction in connection with scientific research. This manual does not cover students or staff engaged in diving for non-university purposes.

This manual does not apply to any diving performed as part of a commercial diving contract with Memorial University. Such contracts shall provide for the requirements of the Occupational Health and Safety branch of the Newfoundland and Labrador provincial government's Code of Practice for Diving Operations.

DISCLAIMER

Memorial University and its Board of Regents or appointees shall NOT be liable for any injury (fatal or otherwise), loss or damage sustained in scientific diving, either directly or indirectly, including injury, loss or damage suffered as a result of Memorial University's negligence.

Each diver shall engage in diving operations strictly voluntarily and shall assume all risks, consequences and potential liability for his/her own actions and the hazards inherent in diving related research.

MEMORIAL UNIVERSITY OF NEWFOUNDLAND DIVING SAFETY MANUAL FOR SCIENTIFIC RESEARCH

Introduction

The purpose of this manual is to set forth policy and standards for the organization and conduct of Memorial University's Diving Safety Program and to establish safety procedures in the university's diving operations.

The objectives of Memorial University's Diving Safety Program are:

- a) To enhance health and safety in university diving operations by ensuring that all divers comply with all applicable regulations, standards and procedures;
- b) To facilitate use of diving in scientific study and research; and
- c) To encourage and promote reciprocity nationally and internationally in scientific diving programs.

1 **SCOPE**

1.1 **Definition**

This manual applies to scientific diving for Memorial University falling under the following definition:

Scientific diving performed to collect specimens or data for scientific use under the auspices of an educational or research institute operating in accordance with the Canadian Association for Underwater Science *Standard of Practice for Scientific Diving*. This includes diving and diving related training by University employees or it's registered students as part of their research, occupation or instruction in connection with scientific research.

This manual does not apply to students or staff engaged in diving for non-university purposes nor to any diving performed as part of a commercial diving contract with Memorial University.

1.2 **Memorial University Diving Safety Manual**

The contents of this manual include:

- a) Diver qualification and administration requirements for Memorial's scientific diving

- program;
- b) Competency requirements for divers;
- c) General dive procedures;
- d) Scuba procedures and equipment requirements; and
- e) Incident and accident reporting

2 **DEFINITIONS**

The following definitions shall apply to the terms used:

Approved means acceptable to the Diving Control Board.

Approved - acceptable to the regulatory authority having jurisdiction.

Bailout system – an independent breathing gas supply carried by the diver, of sufficient quantity to return the diver to the surface, bell or emergency supply in the event of a malfunction of the primary gas supply.

Bottom time means the total elapsed time, measured in minutes, from the time a descending diver leaves the surface to the time the diver begins final ascent.

Bottom time – the period commencing when a person begins pressurization or descent for a dive and terminating when the person commences decompression or ascent in accordance with decompression tables used.

Breathing gas means air or other gas mixture whose use has been approved.

Breathing mixture – air or other gas mixture used for human respiration; includes pure oxygen and therapeutic mixture.

Buddy system means the system of assigning diving partners who are responsible for maintaining effective communication with each other and rendering assistance when necessary.

Buddy system - the system of assigning diving partners, buddy pairs, in which divers stay in close proximity to one another (within sight of each other) and are capable of rendering assistance when necessary.

Contaminated environment – a workplace that contains a chemical, biological or radioactive material in sufficient concentration that should any quantity of it be ingested, absorbed or inhaled, it will likely endanger the health and safety of a worker.

Competent - capable because of knowledge, training and experience to carry out

required duties in accordance with this manual.

Decompression sickness - a disease caused by the formation of gas bubbles in the blood or body tissues because of pressure reduction.

Dive table - the set of profiles of depth-time limits and ascent rates to be followed after a specific time-depth exposure or set of exposures (see Section 14).

Dive team - divers and immediate support personnel who are involved in a diving operation.

Dive tender - a competent person at the dive site who tends the diver(s) and monitors the progress of the dive (see Section 12.6.2).

Diver - a person involved in a diving operation under the auspices of Memorial University who is medically fit to dive and who is competent to complete the objective of the diving operation.

Diver-in-charge - a diver who has been designated by the diving project director to be in charge of the dive site (see Section 5.2).

Diver-in-training - a person who has completed an approved initial training course and is continuing to train in an on-the-job capacity (see Section 8.1.2).

Diving mode - the specific equipment, procedures and techniques chosen.

Diving officer - a competent person appointed by the president of Memorial University to administer and supervise the diving program and ensure operational compliance with the diving safety manual (see Section 4).

Diving operation - the carrying out of a dive through on-site actions and procedures pursuant to a diving project governed by this manual.

Diving program - the assemblage of operational and administrative measures taken by Memorial University in conjunction with the diving project accomplished under its auspices and includes diver certification, diving project approval, and record keeping.

Diving project - any undertaking which utilizes or involves diving under the auspices of Memorial University in accordance with the scope of Memorial's scientific diving program defined in Section 1.1.

Diving Project Director - the person who is in charge of the diving project (see Section 5.1).

Diving and Boating Safety Control Committee - a committee of competent persons appointed by the Memorial University to recommend procedures, policy and standards for diving operations, and to act as a board of review and appeal (see Section 3).

Hyperbaric chamber - a pressure vessel and associated equipment designed for the purpose of subjecting humans to greater than atmospheric pressure.

Manual - this manual for Memorial University scientific diving operations.

Memorial or Memorial University or university - Memorial University of Newfoundland established pursuant to the *Memorial University Act*.

No decompression limit - in accordance with the dive table in use for the depth and duration of the dive, no decompression stop is required during the ascent.

Reciprocity - the process under which divers from another agency are granted equivalent diving privileges by another, under equally acceptable training and certification standards (see Section 17).

SCUBA - self-contained underwater breathing apparatus.

Standby diver - a diver who is trained and equipped to operate at the depths and in the circumstances in which the diving operation is operating, and able to enter the water within one minute (see Section 12.6.1).

3 MEMORIAL UNIVERSITY DIVING AND BOATING SAFETY CONTROL COMMITTEE

3.1 Membership

The membership of the Diving and Boating Safety Control Committee should comprise a small group that are knowledgeable about diving, diving safety and scientific research. The membership shall include the diving officer and a reasonable number of representatives from university departments.

3.2 Responsibility

The Diving and Boating Safety Control Committee shall act as an advisory committee to the diving officer in matters pertaining to scientific diving and diving safety. The committee shall meet annually and more often as required. (See Appendix A for additional responsibilities and duties).

3.3 Terms of Reference

As outlined in the Terms of Reference in Appendix A attached, the Diving and Boating Safety Control Committee is responsible to:

- a) issue, reissue or revoke diving certificates;
- b) review and approve diving projects; and
- c) review diving practices and to exercise authority to restrict, prohibit, or suspend any diving operations, programs or practices it considers unsafe.

4 DIVING OFFICER

Memorial University shall appoint a diving safety officer to supervise and administer its University's Diving Safety Program.

4.1 Responsibility

The diving safety officer shall report to the Diving and Boating Safety Control Committee.

4.2 Responsibilities and Duties

The diving safety officer shall have experience in and be responsible for:

- a) the safety of all diving operations;
- b) the establishment and/or approval of diver training programs;
- c) providing advice on the suitability of new equipment to be used on university diving programs
- d) knowledge of diving equipment for purchase prior to issuance of purchase order;
- e) the general surveillance of all diving projects and recommendations to the Diving and Boating Safety Control Committee for changes in, and/or additions to, policy to promote diving safety;
- f) maintaining the records of all test schedules of diving equipment;
- g) maintaining the records of all breathing air tests;
- h) approving the commercial sources of breathing air;
- i) the custody and audit of all diving program records including inventory;
- j) serving as a member of the Diving and Boating Safety Control Committee;
- k) participation in Canadian Association for Underwater Science (CAUS).
- l) providing representation on diving to different government agencies and other institutions.

4.3 Authority

The diving safety officer shall have authority to restrict, prohibit or suspend any unsafe diving operations, programs, projects or practices.

5 ORGANIZATION AND RESPONSIBILITIES OF PERSONNEL

Responsibility for health and safety on diving projects shall be in accordance with the following organizational plan:

5.1 Project Level: Diving Project Directors

5.1.1 Directors of research or study projects or programs, instructors of courses, field trips or like instructional components, department heads, and persons in charge of any other scientific, research or educational undertaking, any of which utilize or involve diving, shall be responsible for ensuring that all individuals engaging in a diving project are aware of and comply with this manual.

5.1.2 Personnel in charge at this level shall be designated as diving project directors and shall have the authority to restrict, prohibit or suspend diving operations under their charge. When such person does not have the required diving knowledge and experience to perform the duties as director, the diver-in-charge shall be designated the diving project director.

5.2 Operations Level: Diver-in-Charge

5.2.1 Each diving operation undertaken as part of a diving project shall have a designated Diver-in-Charge at the dive site or location with experience and training in the conduct of the planned operation. The Diver-in-Charge shall have charge of all aspects of the operation and shall serve as its coordinator and supervisor.

5.2.2 The diving project director or a person appointed shall be designated as the diver-in-charge. The diver-in-charge must ensure that a dive plan is constructed for each dive and is responsible for briefing the crew with respect to this dive plan.

5.2.3 The diver-in-charge must also ensure that all necessary equipment is available and in good operating condition, and must be familiar with the standards, procedures and regulations that pertain to the diving operation.

5.2.4 The diver-in-charge shall have the authority to restrict, prohibit or suspend any unsafe diving operations, programs, projects or practices under his charge.

5.3 Dive Team Level: Dive Team Members

5.3.1 Divers and immediate support personnel selected or approved by the diving project director or designate to be involved in a diving operation shall be considered members of the dive team(s) of that operation.

5.3.2 It shall be the dive team member's right, responsibility and duty to refuse to dive or engage in diving support activity if he/she:

- a) feels unfit or inadequately trained or unprepared for the activity;
- b) judges that the conditions are unsafe; and/or
- c) feels that engaging in the activity would violate the precepts of his/her training or the requirements set forth in this manual.

5.4 Emergency Deviation from the Standard

The diver-in-charge may deviate from the requirements of this manual to the extent necessary to prevent or minimize a situation that is likely to cause death, injury or major environmental damage. In such cases the diver-in-charge must:

- a) notify the diving project director and diving officer as soon as possible after the onset of the emergency situation indicating the nature of the emergency and extent of the deviation from the prescribe standards, and
- b) submit such information in writing as soon as possible thereafter.

6 AUTHORIZATION FOR DIVING

No persons shall engage in a diving project or operation unless he/she holds a valid authorization issued by the diving officer pursuant to the provisions of this manual or is authorized to engage in training prescribed herein.

6.1 Entry into the Program

6.1.1 Registration and Certification

Prior to acceptance into the university's Diving Safety Program and participating in any diving operations, all divers and dive tenders must register with the diving officer by completing the Diver Information Form in Appendix C and must also meet the following criteria:

6.1.2 Age

The applicant for training and certification shall normally be at least 18 years of age.

6.1.3 Medical Requirement

6.1.3.a Medical Examination

All divers must be (I) declared medically fit by a licensed physician approved by the

diving officer to be knowledgeable in diving medicine in accordance with ACSA Standard Z275.4-02 " Competence Standard for Diving Operations, and (ii) be found free of any defect that would prohibit the type of diving in which they engage.

6.1.3.b Renewal

The medical examination and approval is required every two years up to age 39, and annually thereafter, or more frequently as determined by the examining physician, or:

- (1) after any major illness or injury; or
- (2) at the request of the diving officer or diver-in-charge.

6.1.3.c Medical Record

The results of medical examinations are to be maintained in the file of the examining physician in accordance with accepted medical practice. A statement must be forwarded to the diving officer certifying medical fitness to dive and a copy of the approval must be kept on file by the diving officer.

6.1.3.d Release and Waiver

All eligible university employees and registered students wishing to participate in Memorial's Diving Program shall sign a Release and Waiver contained in Appendix D holding the administration harmless from any claims that might arise in connection with any diving operation.

6.2. Obtaining Authorization

6.2.1 In addition to the requirements in Section 6.1, the following documents and procedures must be submitted to the diving officer and/or successfully completed to obtain authorization to participate in the Diving Program:

- a) Open water check-out dive (7.8) and swim test (7.7);
- b) Written examination (7.6);
- c) Current certificates in CPR, Emergency First Aid (7.4) and Oxygen Therapy (7.5);
- d) Personal diving log;
- e) Diver certification card (8.1.1);
- f) Review of this manual and completion of the Acknowledgment Form in Appendix E.

6.2.2. The diving authorization will permit the recipient to dive to the depth and conditions indicated on the authorization. Authorization must be maintained in accordance with Section 6.4.

6.3 Discretion to Deny Authorization

Any applicant who does not appear to possess the judgment necessary under diving conditions to ensure the safety of the diver and his/her team may be denied authorization.

6.3.1 Revocation of Authorization

A diver's authorization may be revoked or restricted for cause. The diver shall be informed of the reasons for revocation, and will be given an opportunity to present a case for reinstatement to the Diving and Boating Safety Control Committee.

6.3.2 Violation of Regulations

Failure to comply with the standards procedures and regulations set out in this manual shall be cause for the University Diving Officer to revoke a diver's authorization.

6.4 Maintenance of Authorization

6.4.1 Term of Authorization

- a) All University diving certificates shall expire one year from the date of last diving medical examination.
- b) All University diving certificates shall expire six months after last dive. (If due to illness or absence from the University and no diving has been done, this period may be extended by one month by the Diving Officer.)
- c) All University diving certificates shall expire when the holder fails to meet the requirements of the Diving Program as set forth in this Manual.

6.5 Re-certification

If a diver allows his/her certificate to expire by failing to meet the requirements of 6.4.1.(a) or (b) of this manual, he/she may apply in writing to the university diving officer, stating reasons why the certificate was allowed to lapse and stating reasons for requesting it's renewal.

6.6 Annual Project Description Forms

All diving projects must be outlined on the Project Description Form in Appendix F and submitted to the diving officer for review by the Diving and Boating Safety Control Committee before the beginning of any diving operation. All divers involved should have the appropriate depth and environmental certifications and exhibit endorsements (if necessary) for the planned dives.

7 COMPETENCY REQUIREMENTS

Memorial University divers and diving courses shall meet the Competency Standards of the Canadian Association of Underwater Science Standard of Practice for Scientific Diving. The basic scuba certification shall meet ACUC, PADI Open Water, or equivalent requirements.

7.1 Policy

It is the policy of the Diving Training Program to teach the fundamentals of diving to university students, faculty and staff in a safe and prudent manner in accordance with this manual.

7.2. Purpose

It is the purpose of the Diver Training Program to provide the students, faculty and staff with a means of learning diving in a safe manner. It shall also be the purpose of the Diver Training Program to provide the university with a nucleus of qualified divers.

7.3 Diver Rescue Training

Memorial University divers shall be required to have training in diver rescue procedures. The rescue training requirement may be waived in cases where the diver has been certified in diver rescue in the last two years by an approved diving agency or has obtained an equivalent diver rescue certificate.

7.4. First Aid/CPR Certification

University divers are responsible for maintaining current Basic First Aid and CPR certification. Proof of such certification must be filed with the diving officer.

7.5 Oxygen Therapy

Each diver shall possess current certification in oxygen first aid for diving injuries.

7.6 Diving Theory

The diver must demonstrate knowledge in and understanding of the following topics through written examination and/or demonstration:

- (1) diving physics;
- (2) diving physiology, medical considerations, decompression tables;
- (3) diver communication;
- (4) underwater hazards;

- (5) compressor and relevant equipment;
- (6) legislation and standards; and
- (7) environment and diving mode;

and divers must earn a mark of 75 per cent or higher on the written exam to demonstrate competency

7.6.1 Diving Physics

The diver must have knowledge of the physical laws governing diving operations including the states of matter, the properties of gases, liquids and the units of measurement. The diver must understand and demonstrate knowledge of the:

- a) relationship between pressure and volume (Boyle's Law) and the calculations showing volume changes with changing depths;
- b) relationship and calculations between pressure and temperature;
- c) partial pressure of gases (Dalton's Law);
- d) solubility of gases in solution (Henry's Law);
- e) solubility effect of gases in liquids and the need for decompression;
- f) buoyancy (Archimedes' Principle);
- g) effects of salt and fresh water on buoyancy;
- h) effect of diving at altitude;
- i) units of measurement in common use; and
- j) calculation of air consumption rates for any given dive.

7.6.2 Diving Physiology, Medical Considerations, Decompression and Therapeutic Recompression Procedures

The diver must understand and demonstrate knowledge of:

- a) the relevant anatomy and physiology of the human body as it relates to the hyperbaric environment, with emphasis on the respiratory, circulatory and central nervous systems;
- b) the physiology of thermal balance and the uptake, distribution and elimination of gases by the body, the diver must know the toxic effects of gases on the body;
- c) the principles governing compression and decompression of divers and the implications for routine operations, emergencies and therapeutic recompression;
- d) the causes, effects, symptoms and treatment of pressure related diseases, including but not limited to the following:
 - decompression illness,
 - nitrogen narcosis,
 - gas embolism and pulmonary barotrauma,
 - carbon dioxide poisoning,
 - carbon dioxide retention,
 - carbon monoxide poisoning,

- oxygen toxicity,
 - anoxia and hypoxia,
 - dysbaric osteonecrosis,
 - barotrauma of the ears, sinuses and vestibular organs (including squeezes and blocks),
 - drowning (and near drowning), and
 - vomiting under water.
- e) the management of a diving accident scene, including transfer of casualty to an emergency medical assistance, and
- f) the interpretation and use of decompression and therapeutic tables.

7.6.3 Diver Communication Systems

The diver must have the knowledge and skill to safely and effectively use hand and line signals as well as any wired or wireless modes of underwater communication used during the dive.

7.6.4 Underwater Hazards

The diver must have a working knowledge of the potential hazards involved and appropriate safety actions required, associated with diving from vessels, environmental hazards (including adverse weather conditions), underwater entrapment, contaminated environments, hazardous water flows, differentiated water pressures, underwater mechanisms, hazardous sea life, fish nets and the limitations and operational restrictions of scuba.

7.6.5 Compressors and Associated Equipment

7.6.5.a If using high-pressure compressors, the diver must understand and demonstrate knowledge in the principles and operation of such apparatus, associated equipment and applicable safety requirements.

7.6.5.b The diver must understand and demonstrate knowledge in:

- (1) compressor safety, maintenance and operation,
- (2) charging and decanting air cylinders,
- (3) the applicable regulations and relevant guidelines on compressed air standards,
- (4) use and maintenance of air filtration equipment,
- (5) air purity and air analysis,
- (6) basic requirements of CSA Standard Z 180.1 - Compressed Breathing Air

7.6.6 Legislation and Standards

The diver must have an understanding of the relevant diving regulations and knowledge in the following areas is required:

- a) The Canadian Association for Underwater Science Standard
- b) Memorial University Guide to Diving Safety
- c) Any other relevant regulations, standards or guidelines that may apply.

7.6.7 Environment and Diving Mode

Attention shall be given to the development of proficiency under the specific environmental conditions under which the diver is expected to work effectively. Diving under hazardous conditions or using any mode other than Scuba requires special training and specific approval by the Diving and Boating Safety Control Committee (see Appendix B ASpecial Modes and Environmental Conditions@).

7.7 Swimming and Watermanship

Prior to taking part in scientific diving activities the candidate will perform a rescue tow of 100 m with both participants fully geared with the appropriate thermal protection.

The participant will also complete one of the following tasks:

- a) demonstrate a survival swim/ float without any aids for not less than 20 minutes;
- b) swim 200 m without swim aids;
- c) snorkel 400 m using mask, fins and snorkel;
- d) conduct a head first surface dive to retrieve an object in 3 m of water.

7.8 General Diving Skills

Prior to participating in scientific diving, a documented evaluation of a diver's competency is required. A performance evaluation must include but not limited to:

- a) pre-dive planning including emergency contingencies and evaluation procedures;
- b) local environment orientation and hazard assessment;
- c) dive planning procedures to be implemented to counter any known hazards;
- d) briefing procedures;
- e) appropriate dressing in and equipment assembly procedures;
- f) pre-dive safety check;
- g) appropriate entry techniques;
- h) maintenance of the buddy system;
- i) underwater navigation skills;
- j) diving skills circuit-may be conducted in a confined or open water setting and must include:
 - (1) proper weighting;
 - (2) proper decent/ascent techniques;
 - (3) proper buoyancy techniques;
 - (4) mask removal and replacement;

- (5) scuba unit removal and replacement;
- (6) regulator recovery and clearing;
- (7) weight belt removal and replacement;
- (8) options for out of air emergencies;
- (9) free flowing regulator;
- (10) dry suit over-inflation procedures;
- (11) appropriate exit techniques;
- (12) appropriate dressing down and equipment disassembly procedures;
- (13) post dive debriefing;
- (14) dive log requirements.

8 UNIVERSITY DIVING CERTIFICATION

8.1 Types

- (1) Scientific Diver in Training
- (2) Scientific Diver I
- (3) Scientific Diver II
- (4) Diver In Charge
- (5) Surface Safety Attendant

8.1.1 The Basic Certificate

The basic diving certificate from ACUC or PADI shall constitute evidence of successful completion of a diver training course.

8.1.2 Scientific Diver-In-Training

This classification is a limited permit authorizing diving in a training capacity only and requires that a diver have previously completed a scuba certification course and have 12 open water scuba dives and 4 hours underwater (ACUC open water or equivalent). The Diver-In-Training must fulfill all basic entry requirements, and must undertake training as outlined in 7 to 7.8. Prior to conducting research activities, the Diver-In-Training must also be familiar with the diving techniques and diving problems associated with their proposed underwater activities. The Diver-In Training may engage in scientific dives with the following restrictions:

- a) must have completed the General Diving skills evaluation - see 7.8
- b) maximum diving depth of 20 m;
- c) must dive with Diving Officer or Scientific Diver I or II.

8.1.3 Scientific Diver I

This university certificate shall be awarded to those individuals who have successfully completed an approved diver training course and have completed a minimum of 25 dives as a scientific diver-in-training and are restricted to a maximum depth of 20 m. In addition to achieve the Scientific Diver I rating, the diver must:

- a) all basic entry requirements as outlined in section 7;
- b) demonstrate competency as outlined in 7 to 7.8;
- c) accumulate a minimum 25 logged dives and 15 hours bottom time (with at least 15 of these dives accomplished as a Diver-In Training or have equivalent knowledge or experience acceptable to the diving safety officer).
- d) plan and execute a minimum of 4 working dives to the anticipated depth under the direct supervision of the Diving Officer or designate.
- e) satisfactory completion of 8.1.3 (a)-(d)' evaluated by the Diving Officer or designate.

A Scientific Diver I is limited to a maximum diving depth of 20 m.

8.1.4 Scientific Diver II

To achieve a Scientific Diver II rating the diver must:

- a) be a certified Scientific Diver I;
- b) completed an exam with a minimum grade of 75% in the physics and physiology of deeper diving;
- c) plan and execute a minimum of 4 working dives to the anticipated depth under the direct supervision of the Diving Officer or designate or have equivalent knowledge or experience acceptable to the diving officer.
- d) demonstrate proficiency in areas including but not limited to:
 - (1) deep diving pre-dive planning including breathing gas consumption calculations;
 - (2) selection and use of redundant air systems;
 - (3) briefing procedures including narcosis awareness , gas and time monitoring dive termination criteria;
 - (4) appropriate dressing in and equipment assembly procedures for deep extended dives;
 - (5) pre-dive and in-water safety checks;
 - (6) maintenance of the buddy system;
 - (7) ascent rates, safety stops, post dive activities.

A scientific Diver II must observe the following restrictions:

- a) maximum diving depth of 40 m;
- b) must dive with Diving Officer or another Scientific Diver II when deeper than 20 m.

8.1.5 Diver-In-Charge

To achieve a diver-in-charge rating a diver must:

- (1) be a certified Scientific diver I or II;
- (2) have a minimum of 1-year experience and 50 logged dives;
- (3) Previous experience in the field of scientific diving, specific to the depth, task and environment.

8.1.6 Surface Safety Attendant

A diver's tender or surface safety attendant shall:

- (1) be trained in CPR and First Aid and Oxygen Provider;
- (2) have knowledge of diving equipment, systems and procedures and accident management.

8.2 Depth Certification

8.2.1 20 m Certification

The awarding of this university certificate shall certify the holder to a depth of 20 m. unless otherwise designated by the diving officer.

8.2.2 20 m to 40 m Certification

A scientific diver I holding a 20 m. Certificate for a minimum period of six months may qualify for certification between 20 m and 40 m after successfully completing within this period, 25 logged dives at the depth to 20 m.

8.2.3 Depth Limitations

No diver may exceed his depth of certification unless he is accompanied by a diver who is certified to a greater depth.

8.2.4 Maximum Depth

Scientific Divers using Scuba can conduct only one dive in a 12-hour period between the depths of 30 m and 40 m.

* Dives over 30 m requires special permission from the office of Diving Safety.

8.3 Scuba Limitations for Scientific Diving

Scuba will not be used in the following diving operations, which are also not part of scientific diving

- a) Underwater burning and welding;
- b) Salvage operations;
- c) Demolition;
- d) Handling explosives; or
- e) Jetting and suction dredging.

9 EQUIPMENT

9.1 Diving Equipment

All diving equipment must be of a standard acceptable to the diving officer, and inspections and servicing must be done in accordance with manufacturers' recommendations.

9.2 Maintenance and Inspections

Scuba tanks must receive a visual inspection every year and hydrostatic testing every five years in accordance with Canadian Transport Commission regulations. Tank valves must be serviced every two years and regulators must be serviced every year. Gauges (depth and pressure) and buoyancy devices must have a functional check every six months.

9.3 Use of Diving Equipment

All diving equipment, regardless of ownership, shall conform to the standards of this manual if used on diving projects or operations. Diving equipment must also be used and maintained in accordance with the manufacturer's recommendations. At no time shall equipment be used in modified form unless modification has been specifically approved by the diving officer or by an agency acceptable to the diving officer.

9.4 Equipment Procedures

9.4.1 Scuba Diving Equipment

Each scuba diver must use:

- a) Open-circuit scuba, complete with demand regulator and tank with quick release harness;

- b) Face mask;
- c) Swimming fins;
- d) Suitable knife;
- e) Depth gauge, compass, pressure gauge;
- f) Exposure suit;
- g) Inflatable buoyancy device;
- h) Underwater watch with elapse time indicator, bottom timer or dive computer
- i) Weight belt with quick release buckle ;(j) Underwater light and back up light when night diving.
- j) When risk of entrapment is present, one complete spare set of underwater breathing apparatus with fully charged cylinder must be assembled at the dive site.
- k) When diving in open water, each free-swimming diver must carry an audible or visual locating device such as a diver's flag, whistle, flare or strobe light.
- l) Alternate air source (such as, pony bottle, or ASpare Air@); and
- m) Any other equipment as may be required by the diving officer.

9.4.2 Digital Dive Computers

Divers may use digital dive computers during university diving operations provided:

- a) that the DCIEM dive tables attached in Appendix I are adhered to at all times;
- b) personnel using dive computers have thoroughly reviewed the manufacturer's manual and are familiar with the features and limitations of the computer.

9.5 Inspection of Equipment in Preparation for Diving

Before commencing a diving operation, the diver-in-charge shall ensure that all diving systems and equipment used in connection with the diving operation are of an approved type and design, are in operating condition, and free of defects.

9.5.1 Immediately before each dive, each diver shall check that he/she has all the required equipment, and such equipment is properly fastened in place and all apparatus functioning. Before descent, the same check shall be conducted in the water.

9.6 Compressors and System Requirements

9.6.1 All tanks, fixtures and fittings used in connection with compressors must meet the appropriate requirements of CSA Standard B 51-m81, Code for the Construction and Inspection of Boilers and Pressure Vessels.

9.6.2 Compressor systems required to supply air to a diver must meet the requirements of CSA Standard Z 180.1-M85, Compressed Breathing Air.

10 RECORDS

10.1 Diver's Personal Log

- (1) The university shall supply the diver with a personal logbook, which must be kept by every diver. The diver shall maintain the logbook such that it:
 - a) is permanently bound
 - b) has numbered pages;
 - c) contains the diver's signature and photograph; and
 - d) contains any factor relevant to the diver's safety and health.
- (2) Divers shall retain their personal logbook for five years after it's completion.
- (3) Divers shall have their personal logbook at the dive site and available for inspection.
- (4) Divers shall have entered in or attached to their personal logbook,
 - a) a record of any certificates or qualifications obtained that are currently valid;
 - b) a certificate confirming successful completion of any diving course; and
 - c) a record of the divers training experience.
- (5) The personal logbook shall show all entries in chronological order and shall include,
 - a) an entry witnessed and signed by the diving supervisors for each dive; and
 - b) for any entries for medical recompression or hyperbaric exposures, the entries shall be witnessed by the presiding physician or diving supervisor.
- (6) The personal logbook shall contain for each dive the following:
 - a) the type of diving apparatus used;
 - b) the gas medium breathed;
 - c) the time the diver left the surface;
 - d) the time the diver reached the bottom;
 - e) the maximum depth attained;
 - f) the time the diver left the bottom;
 - g) the time of the surface interval,
 - h) if a repetitive dive undertaken;
 - i) the decompression table used;
 - j) the date;
 - k) the name of the diver;
 - l) the name of the tender(s);
 - m) the name of the standby diver;
 - n) any unusual incidents;

- o) the dive location;
- p) the environmental condition; and
- q) the signature of the diving supervisor.

10.2 Diving Log Summary

10.2.1 The diving officer shall retain the daily record and any accident or incident reports for a period of five years.

10.2.2 All divers are to submit every four months a copy of their filled diving logs to the office of the diving officer.

10.2.3 An individual training record will be maintained in the diving office for each diver in the program. This record shall include all diving certifications; safety training certificates; signed waivers; medical certifications and depth certifications.

10.3 Equipment log

Tanks, valves, regulators, gauges and compressors must have adequate service logs or service records indicating the dates and results of servicing. In addition, a copy of the itemized records from an authorized repair agency must be submitted annually to the Diving Safety Officer.

10.4 Period of Maintenance

All maintenance records shall be kept for a period of five (5) years.

11 DIVING PROJECTS

11.1 Approval Required

All diving projects shall be approved by the diving officer prior to the commencement of the diving activities.

11.2 Application for Approval

A Project Description and Approval Form (contained in Appendix F) shall be completed and submitted to the Diving Safety Officer for approval prior to the start of any diving operations.

This approval form also includes a Task Based Risk Assessment form. This risk assessment must outline the project step by step, identifying the hazards and mitigating factors for each step. This would include, but not limited to, selection of personnel and equipment, mobilization, travel to the site, and the diving activities to be conducted.

11.3 Project Report

At the completion of the project, a summary of the project report shall be submitted to the diving officer.

12 DIVE PROCEDURES

12.1 Planning of Diving Operations

12.1.a The Lead Diver in Charge or the Supervisor shall complete a written Dive Plan for each diving operation. This dive plan must be completed on a daily basis if crew, conditions or work scope changes. The dive plan must be communicated to all members of the diving crew on a daily basis and documented in the daily tool box meeting form.

12.1.b The information on the dive plan shall include the following:

- a) Lead Diver in Charge or Supervisor
- b) Date
- c) Location
- d) Description
- e) Diving procedure
- f) Type of diving equipment
- g) Dive crew and assignments
- h) Hazard assessment completed
- i) Pre-Dive checklist completed
- j) Tool box meeting completed
- k) Air purity analysis onsite
- l) Diver logs and dive tables onsite
- m) Emergency services and contact information available
- n) Diver rescue plan and emergency procedures available

12.1.c Each diver must satisfy the diver-in-charge that he/she completely understands the signals and procedures in use.

12.1.d A list of locally operational recompression chambers, medical: facilities A and emergency evacuation agencies shall be available at the dive site.

12.1.e For each dive location a procedure shall be established for transporting an injured diver to a medical facility/recompression chamber.

12.2 Adherence to Planned Depth Procedures

Except in the case of an emergency, a diver must not be permitted to remain at any depth longer

than the maximum time planned for that depth during that dive.

12.3 Termination of Dive

A dive shall be terminated in accordance with the dive plan or when:

- a) the diver-in-charge directs the dive be terminated;
- b) a diver requests termination;
- c) a diver loses contact with or fails to respond correctly to communications from a buddy team member;
- d) a diver's pressure gauge reads approximately 500 psi or 33 Bars;
- e) a diver is aware of any sign of malfunction of gear or sign or symptom of distress;
- f) a member is aware of any unusual or unplanned situation that threatens the health or safety of any dive team member; or
- g) on receipt of recall signal.

Note: As appropriate to the conditions, diving activity may be resumed in item (c) given restoration of proper communication between buddy team members.

12.4 Dive Site Requirements

12.4.1. First Aid Kit

An Occupational Health and Safety First Aid Kit including an oxygen therapy unit of sufficient capacity to reach emergency medical services must be located at the dive site. A listing (including addresses, telephone numbers and radio frequencies, as appropriate) of locally operational recompression chambers, medical facilities and emergency evacuation agencies shall be available in the first aid kit at the dive site.

12.4.2 Emergency Communication System

A means of providing effective voice communication with emergency assistance personnel must be on site while diving operations are in progress.

12.4.3 Dive Tables

DCIEM (Defense and Civil Institute of Environmental Medicine) shall be followed during all diving operations. A copy of the DCIEM tables must be at every dive site.

12.4.4 Signed Medical Evaluation

A copy of the form "Medical Evaluation of Fitness for SCUBA Diving" signed by the examining physician must accompany each diver whenever diving operations are undertaken at a site other than a pre-approved or normal site

12.4.5 Standards, Procedures and Regulations

A copy of this manual, the provincial Occupational Health and Safety Code of Practice for Diving Operations, The university Guide for Diving Safety, and the Protocol for Diving Emergencies, all of which are attached to this Manual, must be present at the dive site.

12.4.6 Identification of Dive Site

When open water diving operations are in progress, warning devices shall be displayed as follows:

- a) Buoys, flags, lights, lamps or flares to define the limits to be kept clear of any equipment other than that connected with the diving operation; or
- b) In navigable water, flags and lights in accordance with the requirements of the appropriate authority;
- c) Unless otherwise indicated by the appropriate authority, when diving is conducted from a boat or pier or under any circumstances in which marine traffic is probable, the recognized diver's flag* shall be prominently displayed. If diving is conducted in international water, the International Code Alpha**flag shall be flown; and
- d) flags and signals employed for dive site identification shall be displayed only while diving operations are in progress.

*Recognized diver's flag - a red square having a white diagonal stripe from the upper left to the lower right

**International Code *Alpha* - a white and blue pennant

12.5 Communications

Each diver shall:

- a) be in constant audio communications with the surface; or
- b) be tendered on a lifeline by a diver's tender; or
- c) employ the buddy system whereby the divers shall remain, at all times, in visual or physical contact with each other. In accidental or unavoidable circumstances, they shall both surface immediately.

12.5.1 Where the buddy system is employed, in open water or areas free of obstructions, one of the divers shall be attached to an identifiable float located on the surface and visually monitored from the location that allows for immediate assistance rendered to the submerged divers in the event of an emergency.

12.6 Minimum Crew

Subject to clauses in 12.4 the requirements for all dive sites are:

- a) a sufficient number of workers are present for each diving operations to ensure, so far as is reasonably practical, that the operation can be undertaken safely; and
- b) a minimum of three workers are present at each dive site, one of whom is a diver, one a standby and one a diver's tender; or
- c) two divers using the buddy system, with a dive tender.

12.6.1 Standby Divers

A standby diver shall be on hand, ready to go into the water, when:

- a) dives that require, or may require, decompression are being carried out;
- b) a person is doing his/her first open water dive;
- c) by the very nature of the dive, there is an added risk involved;
- d) night diving is being carried out;
- e) diving in the vicinity of ice or under ice.

12.6.2 Dive Tender

During scientific scuba - diving operations only, the person-in-charge on the surface need not have the diving experience of a functional diver or a diving supervisor. He/she is required however, to be competent in all aspects of the diving operation, including emergency response as outlined in 8.1.

12.7 Crew Responsibility

12.7.1 Diver

Responsibility for safety rests with the individual diver. It is the diver's responsibility and duty to refuse to dive if, in his/her judgement, conditions are unsafe or if he/she would be violating the precepts of his/her training or this manual.

12.7.2 Diver-in-Charge

The diver-in-charge has complete and direct responsibility for the diving operation and is knowledgeable and competent with the diving equipment, diving operations in progress, emergency diving procedures, diving physics and physiology and medical aspects of diving.

The diver-in-charge is responsible for the safe diving operations of the project. This includes identification, evaluation and control of all hazards associated with the project. Responsible to communicate the hazards and mitigating factors to all crew members

involved in the project.

The diver-in-charge must know the dive plan, brief the crew, ensure all equipment is in good operating condition, supervise the entire operation and ensure the standards, procedures and requirements of all applicable underwater diving regulations are met.

12.7.3 Standby Diver

The primary responsibility of the standby diver is to provide assistance underwater in the event of a diving emergency, and must be readily available to render assistance in the event of an emergency. A standby diver on the surface may also perform other duties which do not compromise the safety of the diving operation.

12.7.4 Dive Tender

The dive tender is responsible for the maintenance of visual, auditory or tactile contact with the diver(s) through appropriate means and must be able to report the diver's location to the diver-in-charge when required. The dive tender must ensure that divers using umbilical, hookah, tethers or other such equipment are in constant contact with the surface and remain free of entanglements and hazards.

13. NIGHT DIVING

All night dives shall be carried out in accordance with the Guide for Diving Safety.

13.1 Prior Approval

Approval from the university diving officer shall be obtained prior to night diving.

13.2 Lights

Each diver shall carry an underwater dive light and spare, as well as fluorescent sticks and a whistle.

14 DECOMPRESSION DIVES

All decompression dives have to be approved by the diving officer and carried out in accordance with the DCIEM air tables and in accordance with the provisions of this guide, and the additional regulations.

* Scuba is not to be used for diving operations which exceed the no decompression limits.

14.1 Prior Approval

Approval, in writing, from the university diving officer shall be obtained prior to a decompression dive

14.2 Location

- a) Dives requiring decompression shall be carried out max. 20-km from St. John's
- b) Dives requiring decompression beyond the 20-km limit shall have a portable decompression chamber.

14.3 Supervision

Dives requiring decompression shall be carried out only under the supervision of a qualified individual designated by the diving officer.

14.4 Descending/ Ascending Lines

All ascents from dives requiring decompression shall be carried out on a line appropriately marked in 10-foot Increments measured from the surface to two increments deeper than the first stop.

15 BOATS

Boats shall be used as a diving platform:

- a) on all dives requiring decompression;
- b) on all dives where marine traffic is probable;
- c) on all dives where, in the opinion of the divers, the distance from shore is too great to swim.

15.1 Boat Tenders

When diving is conducted from a boat, a boat tender shall remain with the boat at all times. Boat tenders shall have sufficient training to operate the boat and tend the divers safely. The boat tender must be familiar with the emergency communication system present on the vessel and must be able to contact emergency assistance personnel if required. The boat tender may act as the dive tender.

16 RECREATIONAL DIVING

Equipment and compressed air will be made available to divers and those in training in

order to obtain certificates and remain proficient in diving, but for no other purpose.

17 VISITING RESEARCHERS

Visiting researchers must comply with all the provisions of this manual. In addition, they shall show proof of logged dives.

17.1 Visiting Divers

Before being authorized to dive, visiting divers must provide evidence of certification, medical clearance, and experience. Visitor authorization shall be valid under the restrictions stipulated by the diving officer, and diver competency.

18 ICE DIVING

Written approval from the university diving officer shall be obtained prior to any ice diving as defined in this manual.

18.1 Supervision

Ice diving shall be carried out only under the supervision of a qualified individual designated by the university diving officer and in accordance with the provisions of this manual.

18.2 Attendant

In addition to a standby diver, a topside attendant is required for each pair of divers that enter the water. If there is only one pair, he/she may be the diver-In-charge.

18.2.1 Special Equipment and Procedures

- (1) Listed below is the special equipment required for ice diving.
 - a) Ice saw, axe or auger;
 - b) Environmentally-protected regulators (preferred);
 - c) Buoyant tether lines for each diver (both the same length);
 - d) Tether line for the standby diver shall be:
 - (i) of high visible colour,
 - (ii) 5 meters longer than the tether used by other divers, and
 - (iii) made of a material that floats, and have a minimum breaking strength of 2000 lbs.

(2) Procedures

- a) The minimum requirement for ice diving is scientific diver level I.
- b) Before divers enter the water, a safety line shall be attached to each diver's harness.
- c) Only one pair of divers shall dive through the same hole at any one time.
- d) Ice diving should not be attempted in ice fields composed of separate pans of ice.
- e) The hole through which the divers enter and exit the water shall be at least four feet square and shall be well-marked around the perimeter.
- f) On completion of the dive, if possible, the ice which was removed from the hole should be replaced and the site visibly marked as a warning of dangerous ice to all persons.
- g) All scientific divers must have special training before ice diving is undertaken.

18.3 Diving in the Vicinity of Icebergs

18.3.1 Prior Approval

Written approval from the university diving officer shall be obtained prior to any diving in the vicinity of icebergs, as defined in this manual. The dive will be made in accordance with the provisions of this manual.

18.3.2 Supervision

Diving in the vicinity of icebergs shall be carried out only under the supervision of a qualified individual designated by the university diving safety officer.

18.3.3 Special Equipment and Procedures

Equipment

- a) Boat on site
- b) Regulators with pressure gauges, depth gauge and compass
- c) Only two divers shall be in the water at any one time
- d) Divers should not swim on the surface within 18.3 m of the iceberg.

19 DIVING IN THE VICINITY OF INLETS, OUTLETS AND CULVERTS

Scuba diving operations shall not take place in the vicinity of inlets, outlets, culverts, water control structures or any other area with the potential for pressure differential.

20 FLYING AFTER DIVING

1. The risk of decompression sickness after diving or other subsection to raised atmospheric

pressure is increased by flying in an aircraft pressurized to a pressure other than that equivalent to ground level or by being in an unpressurized aircraft or otherwise exposed to high altitude.

2. For the maximum safety, a minimum of 24 hours should elapse between diving and flying.

21 INCIDENT AND ACCIDENT REPORTS

21.1 Duties of the Diver-in-Charge

The diver-in-charge of a diving operation shall notify Regulatory Authorities, Memorial University Department of Health and Safety and the Diving Project Director as soon as possible after the occurrence of any accidents or incidents involving the health and safety of diving personnel or the integrity of the environment, and shall complete and submit to the diving officer a report of such accident or incident within 48 hours of the occurrence.

21.2 Scope

For the purposes of this manual, accidents and incidents warranting reporting shall include but not be limited to the following:

- a) death;
- b) injury, including squeezes, lacerations and fractures;
- c) convulsions, or serious impairment of consciousness during or after a dive;
- d) decompression sickness;
- e) dysbaric gas embolism, pneumothorax, subcutaneous emphysema or mediastinal emphysema;
- f) any serious illness which results from a diving operation;
- g) any serious mishap (entrapment, entanglement, etc.), even though the dive team member escapes actual injury, or any series of incidents prior to, during or after a diving operation that make approved procedures or equipment suspect; and
- h) any serious mishap or series of incidents that threaten the integrity of the environment or the general health and safety of personnel.

21.3 Content of Report

The facts shall be established with care and recorded on an accident incident report form as soon after the accident or incident as possible. The report shall include the following information:

- a) the place, date and time of the accident or incident;
- b) the names and duties of persons involved, including any injured;
- c) the names of witnesses;
- d) a detailed description of the accident or incident including the dive profile (as

- appropriate) and all relevant details, however remote;
- e) a statement of the sequence of events which preceded the accident or incident;
 - f) identification of any unsafe conditions, acts or procedures which contributed in any manner to the accident or incident; and
 - g) any further comments including (if appropriate) any corrective actions which might prevent similar accidents or incidents.

21.4 Disposition of Records

Copies of the report shall be kept on file in the Diving Safety Office diving records for a period of 5 years

Appendix A

University Diving and Boating
Control Committee

Terms of Reference

Terms of Reference

The purpose of the University Diving and Boating Control Committee is to:

- a. Promote safe diving practices within the university.
- b. Write and periodically update university diving regulations. Such regulations should be written in a manner compatible with standards and regulations of the Canadian Standards Association, the Canadian Association for Underwater Science, and the American Academy of Underwater Science, and with regulations and standards legislated provincially and federally. Submit regulations for approval to the senior Executive committee.
- c. Keep current on legislation and standards related to diving, especially those relevant to scientific diving and advise accordingly the University and its employees, faculty and students involved with diving.
- d. Upon request, serve as university representation to government and other agencies involved in formulating regulations or standards as they relate to university diving operations.
- e. Advise the president, through his delegate, on matters related to university diving.
- f. Investigate alleged violations of university diving regulations.
- g. Participate in the investigation of any accidents, near accidents, alleged unsafe practices, employee or student concerns and any other incidents related to diving under the auspices of the university which may have implications for safety.
- h. Review periodic reports and recommendations from the university diving officer concerning diving operations and practice.
- i. Promote safe boating practice within the university.
- j. Write and periodically update university boating regulations.
- k. Advise the president, through his delegate, on matters related to boating.
- l. Report to the president and the senior Executive Committee through the Director

of Facilities Management.

- m. Investigate alleged violations of university boating regulations.
- n. Participate in the investigation of any accidents or other concerns related to boating safety.

Authority and function:

- a. The committee will have full authority to suspend any diving or boating operations under university auspices that it believes to be unsafe or in violation of university diving regulations or university boating regulations.
- b. The committee will have authority to call for any documents or reports necessary to fulfill its purpose, and to summon witnesses if required
- c. the university diving officer will be delegated by the committee to review, assess, prohibit or approve any proposals involving diving activities, to ensure compliance with university diving regulations.
- d. The committee will have authority to prohibit any individual from diving under university auspices who does not meet the terms and conditions of (and subject to the appeals procedure specified in) the university diving regulations.
- e. The committee may require an individual in particular or divers in general, to undergo further training, medical evaluation, or assessment of knowledge and skills prior to any university diving in order to ensure safe diving practices.
- f. The committee will advise on the need for additional or Arefresher@ training of divers, and may (subject to funding restrictions) arrange periodic courses, meetings or lectures for this purpose.
- g. The university boating officer will be delegated by the committee to oversee safety aspects of all boating under university auspices.
- h. The committee will submit an annual report to the president, through his delegate, on its activities.

Appendix B

Special Modes and Environmental Conditions

Appendix B

Special environmental conditions

- Diving under ice
- Altitude diving
- Deep diving (deeper than 40 m/130 feet)
- Decompression diving
- Diving in zero visibility
- Diving in contaminated water
- Night diving
- Diving in caves, shipwrecks, pipes, tunnels or other enclosed spaces
- Blue-water diving (no bottom)

* Special training is required and authorization from the diving safety officer before any of the above dives is undertaken.

Special Diving Modes and Equipment

- Tethered scuba diving
- Umbilical diving
- Re-breathing apparatus (closed and semi-closed circuit)
- Mixed gas diving (includes use of oxygen)
- Bells (open and closed)
- Saturation diving
- Habitats
- Chamber diving
- Submersible vehicles (includes atmospheric diving systems)
- Diver lock-out vehicles
- Compressors
- Power tools
- Explosives
- Electrical equipment

* Special training is required as well as authorization from the diving safety officer.

Appendix C

Memorial University Diver Information Form

Memorial University Diver Information Form

Name: _____

Address

(Office): _____

(Home): _____

Tel. No.(Office): _____ Home _____

Fax No.: _____ E-mail _____

Faculty: _____ Staff _____ Student: _____

Year of basic scuba diving certification: _____

Instructor: _____

Certifying agency: _____

Advanced scuba diving courses completed: _____

Number of open water dives: _____

Maximum depth of deepest dive.: _____

Date of last diving medical.: _____

Doctor's name.: _____

Safety courses, (Dates of completion).: CPR _____ First Aid _____ O² Provider _____

Other specialty courses or skills.: _____

Signature _____

Date _____

Appendix D

Memorial University Release and Waiver Form

**MEMORIAL UNIVERSITY OF NEWFOUNDLAND
RELEASE AND WAIVER**

I, _____, on behalf of myself, my executors and administrators, do hereby confirm that I am participating in the underwater phase of a research or training program with Memorial University of Newfoundland with the full knowledge of the ordinary risk's incidental thereto. I accept these risks and release Memorial University of Newfoundland from and against all claims and demands which I or my executors and administrators may have, excepting benefits accruing by reason of coverage under insurance programs pertaining at Memorial University of Newfoundland, arising out of, or as a consequence of, my participation in underwater activities

Dated this _____ day of _____ 20_____

Witness _____

Signature _____

Appendix E

Memorial University of Newfoundland Diving Safety Manual Acknowledgment Form

**Memorial University of Newfoundland
Guide for Diving Safety Acknowledgment Form**

I, _____ have fully reviewed Memorial University of Newfoundland's Guide for Diving Safety and do acknowledge and understand its contents and having full awareness of the hazardous risks of scientific diving will abide by the policies laid down in this document.

Dated this _____ day of _____ 20 _____

Witness _____

Signature _____

Appendix F

Memorial University of Newfoundland Project Description form

Memorial University of Newfoundland

Project Description Form

Diving project directors complete this form, clarifying all specific safety procedures and preparations for this work area. All personnel designated to work on the project should review this document. Questions concerning diving operation should be directed to the Diving Safety Officer (local 737-4827)

Diving project director: _____
Telephone: _____ (W) _____ (H)

Project description: _____

Number of divers on crew: _____

Purpose of dive Open water - Ocean and freshwater environments
_____ Research
_____ Maintenance and repair
_____ Other _____

Signature _____

Date _____

Appendix G

Memorial University of Newfoundland Dive Log Sheet

Date _____ Log of Dive No.(s) _____ / _____
 Diver's Name _____ Faculty _____ MUN Cert. No. _____
 Diving Partner _____ Faculty _____ MUN Cert. No. _____
 Purpose of Dive _____
 Boat Dive _____ / Shore Dive _____ / Night Dive _____ / Ice Dive _____
 Dive Location _____ Time of Day _____
 Misc. Site Info. _____

Diving Information:

Equipment Used:

Suits _____ Dry _____ Wet/Tanks _____ Sg. _____ Dbl _____
 Scuba _____ Other _____
 (1) Cyl. Press Start _____ (1) Finish _____
 (2) Cyl. Press Start _____ (2) Finish _____

Gas Medium Used _____

Dive Profile:

(1) Rep. Gr. No.	Max Depth	RN2 Time	Act. BTM. Time	Total Time	Rep. Gr. No.

Surface. Int. _____ Rep.Gr.No. _____

(2) Rep. Gr. No Max. Depth RN2 Time Act. Btm. Time Total Time Rep. Gr. No

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

D/C Req. Yes _____ No _____

Surface Int. _____ Rep. Gr. No. _____

Environmental Conditions;

Depth Range	Turbulence	Vis	Water Temp.	Surface Temp.	Btm. Type

Collection Details:

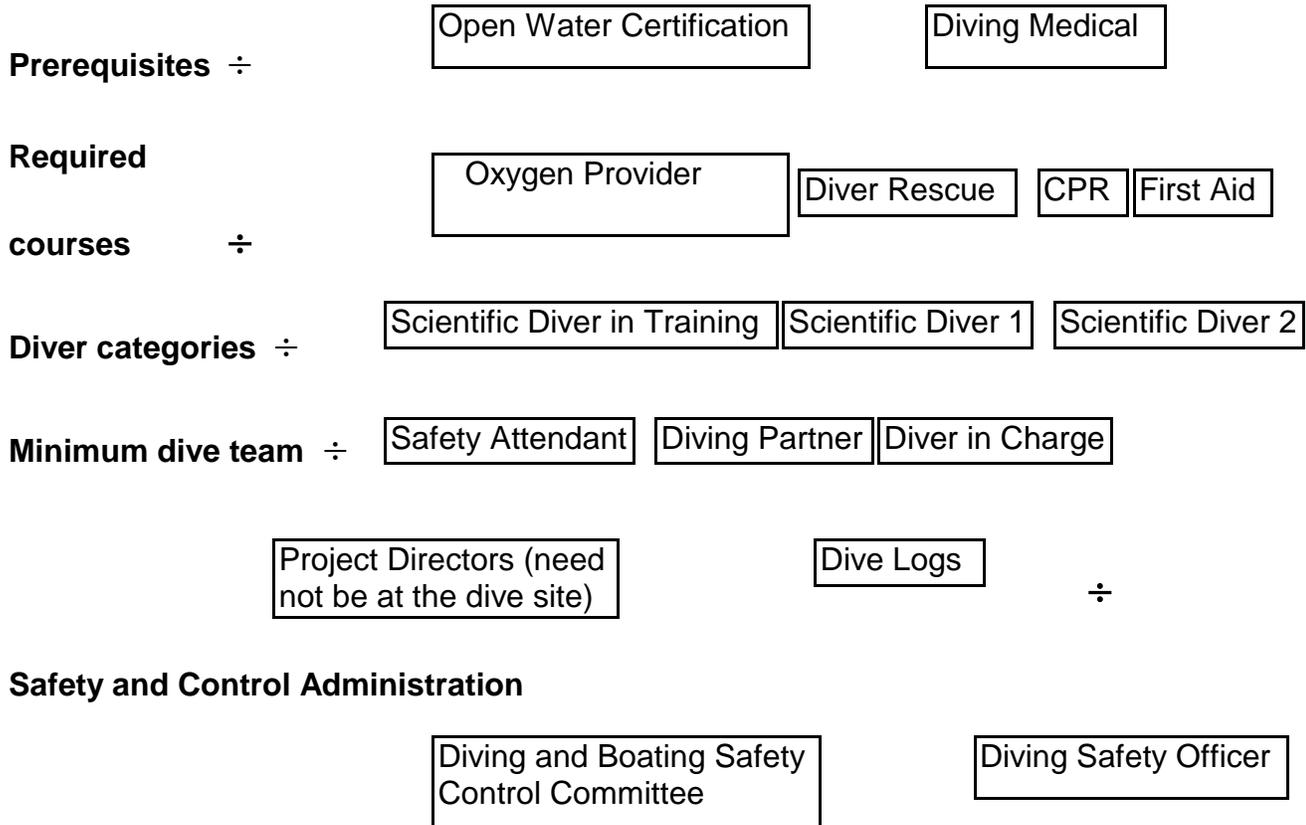
Supervisor
Signature _____

Diver
Signature _____

APPENDIX H

Diving Under Memorial University Auspices

Diving under Memorial University auspices



Recommended Resource Material

(Most material available from Best Publishing)

I STANDARDS

X Scientific Diving, A General Code of Practice, Edited by N. C. Flemming and M.D Max on behalf of the World Underwater Federation (CMAS).

X The American Academy of Underwater Science Standards for Scientific Diving Certification and Operation of Scientific Diving Program. Revised 1996.

X CSA Standard CAN/CSA-Z180.1-M85 Compressed Breathing Air and Systems

X CSA Standard CAN/CSA-Z275.2-92 Occupational Safety Code for Diving Operations

X CSA Standard CAN/CSA-Z275.3-M86 Occupational Safety Code for Construction Work in Compressed Air

X CSA Standard Z275.1-93 Hyperbaric Facilities

II MANUALS

X NOAA Diving Manual Diving for Science and Technology, U.S. Department of
Commerce

X BSAC Diving Manual

X U.S. Navy Diving Manual

X Canadian Forces Diving Manual CFP 380

X Royal Navy Diving Manual

X

IIITEXTS

X *Oxygen First Aid for Divers*, John Lippman

X *Treatment of Decompression Illness*, Moon and Sheffield

X *The Physiology and Medicine of Diving*, 4th Edition, Bennett and Elliott

X *Diving and Subaquatic Medicine*, 3rd Edition, Edmonds, Lowry and Pennifather

X *Medical Assessment of Fitness to Dive*, Edited by David Elliott