Guide for Diving Safety

College of William & Mary
Virginia Institute of Marine Science
School of Marine Science

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Section 1

General Policy

1.10 Purpose

1.11 This Guide for Diving Safety

The purpose of this *Guide for Diving Safety* or diving safety manual is to ensure that all diving under the auspices of the Virginia Institute of Marine Science, School of Marine Science, College of William & Mary (VIMS/SMS) is conducted within applicable state and federal rules and regulations and that all scientific diving is conducted in accordance with standards established by the American Academy of Underwater Sciences (AAUS). VIMS/SMS is a member organization of AAUS. This diving safety manual also is required under Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910 Subpart T) to gain exemption from commercial diving regulations. These federal regulations are included in regulations of the Commonwealth of Virginia (Virginia Occupational Safety and Health - VOSH) as administered by the Department of Labor and Industry.

1.12 The AAUS Standards

The AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs were developed and written by members of AAUS and represent a compilation of policies in several university, private, and governmental diving programs. These programs share a common heritage with the scientific diving program at the Scripps Institution of Oceanography. Adherence to the Scripps standards has proven both feasible and effective in protecting the health and safety of scientific divers since 1954. It is the excellent safety record and self-governing nature of the program which allowed the AAUS to gain the educational/scientific diving exemption form OSHA’s commercial diving regulations.

1.13 The Diving Safety Program

The purposes of the diving safety program are to insure that all diving under the auspices of VIMS/SMS is conducted in a manner designed to minimize accidental injury or occupational illness and to set forth rules, regulations, and standards for training and authorization which will allow a working reciprocity between VIMS and other colleges, universities, and state and federal agencies engaged in scientific diving.

1.14 Liability

In adopting the policies set forth in this guide, VIMS/SMS, the VIMS Diving Control Board, and the AAUS assume no liability not otherwise imposed by law. Every diver is assumed under this policy to be performing voluntarily activities for which the diver assumes all risks, consequences, and potential liabilities.
1.15 Content

In addition to meeting the minimum standards required by the VIMS/SMS Diving Safety Program as a member of the AAUS, this guide includes the following as required by OSHA:

- safety procedures for diving operations
- responsibilities of dive team members
- procedures for equipment use and maintenance,
- local diving concerns, and
- emergency procedures.

1.16 Supplementary Institute Guides and Materials

The Diving Control Board may issue supplementary Institute guides or manuals to cover specific situations or equipment. However, the regulations set forth in the Guide for Diving Safety are basic and should be observed whenever and wherever diving is conducted under the auspices of VIMS.

1.20 Operational Control

1.21 Diving Defined

The word *diving* as used in this guide refers to the activity of an individual working in water using an underwater apparatus which supplies compressed breathing air at ambient pressure.

1.22 Scientific Diving Defined

Scientific diving is diving performed that is necessary to and part of a scientific research or educational activity in conjunction with a project or study under the jurisdiction of any public or private research or educational institution or similarly recognized organization, department or group. OSHA defines scientific diving in 29 CFR 1910.402 as “diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as: Placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.”

1.23 Certification Types

The AAUS requires that no person shall engage in scientific diving unless that person holds a recognized, valid certification issued by a member organization pursuant to the provisions of this guide. Recognized certifications include:

- Diver-in-Training Permit: This permit signifies that a diver has completed and
been certified as at least an open water diver through a nationally or internationally recognized certifying agency, scientific diving program, or equivalent.

- **Scientific Diver Certificate:** This is a permit to dive, usable only while it is current and for the purpose intended, the parameters for which are indicated on the certificate or the current diving roster.
- **Temporary Diver Permit:** this permit constitutes a waiver of some specific requirements and is issued only following a demonstration of required proficiency in diving. It is valid only for a specified time determined by the Diving Officer or Diving Control Board.

### 1.24 Equipment

All diving equipment used by scientific divers and trainees while engaged in scientific diving, regardless of ownership, shall conform to the standards set forth in this guide. (See section 6)

### 1.25 Reciprocity

The certification of any diver currently certified under the auspices of any AAUS member organization in good standing shall be recognized by any other member organization. The diver will follow the standard operating procedures (SOPs) of the host organization.

### 1.26 Waiver of Requirements

The Diving Control Board may grant a waiver for specific requirements of training, examinations, depth certifications, and minimum activity to maintain certification.

### 1.30 Scope

#### 1.31 Institute Auspices

Diving under the auspices of VIMS/SMS is limited to diving in connection with:

- research,
- academic work (instructional),
- training and authorization requirements, and
- other activities as approved by the Diving Control Board.

#### 1.32 Sites

The regulations herein shall be observed at all locations where diving is conducted under the auspices of VIMS/SMS.
1.33 Training and Authorization

Any person diving under VIMS/SMS auspices is required to observe the provisions of this guide. Diving under the auspices of VIMS/SMS is not authorized until the individual has met the requirements for diving pertinent to the level of the proposed activity or has been granted an appropriate waiver by the Diving Control Board as noted above.
Section 2

Institute Organization

Both AAUS and OSHA (VOSH) regulations require that an organization which operates a Scientific Diving Program appoint a Diving Officer (DO), sometimes referred to as Diving Safety Officer (DSO), and a Diving Control Board (DCB).

The following is the administrative chain-of-command for the VIMS/SMS scientific diving program.

```
Dean and Director
     |        |
    Diving Control Board
     |        |
   Diving Officer
     |        |
(Assistant Diving Officer)
```

2.10 Director

The Dean & Director of VIMS/SMS has the ultimate authority for the scientific diving program and its related activities.

2.20 Diving Control Board

2.21 Establishment

The Diving Control Board is appointed by the Dean & Director as is the Chair of the Diving Control Board.

2.22 Composition

The membership of the Diving Control Board consists of the Diving Officer, a representative from each of the major scientific departments engaged in diving activities, a representative of the Graduate Student Association, and such other persons as the Dean & Director chooses to appoint. The Assistant to the Dean & Director for Safety and Environmental Programs (VIMS/SMS Safety Officer) is an ex-officio member of the DCB.
2.23 Responsibilities

The responsibilities of the Diving Control Board are delegated by the Dean & Director and include charges to

a: administrate the local diving program through approval (or denial) of dive plans and projects,
b: review and recommend appropriate changes in this guide and general dive policy to the Dean & Director,
c: recommend policy changes to AAUS in the institutional role as a member organization,
d: submit the budget requests for the Diving Program to the appropriate VIMS/SMS administrative officer,
e: manage the Diving Program’s budget allocation,
f: establish and/or approve training programs through which applicants for diving certification can satisfy the requirements of this guide,
g: issue, re-issue, or revoke diving permits and certifications,
h: suspend diving projects considered unsafe or unwise,
i: establish criteria for equipment selection and use,
j: recommend new or different equipment or techniques for use,
k: establish and/or approve facilities for the inspection and maintenance of diving equipment,
l: ensure that the VIMS/SMS Diving Program’s air stations meet appropriate air quality standards,
m: sit as a board of investigation to inquire into the nature and cause of diving accidents or violations of diving policy or regulations,
n: sit as a board of appeal for diver related problems,
o: review the Diving Officer’s program and performance and convey the results of those reviews to the Diving Officer’s administrative supervisor, and
p: annually nominate persons to be considered by the Dean & Director for appointment to the Diving Control Board.

2.30 Diving Officer

2.31 Appointment

The Diving Officer is appointed to the position by the Dean & Director after considering the advice of the Diving Control Board.

2.32 Qualifications

The Diving Officer shall
a: be a full time employee of VIMS/SMS,
b: remain a current scientific diver and a member as defined by AAUS,
c: have varied and documented experience and diving qualification using self contained and surface supplied diving equipment,
d: hold a nationally accredited certificate as a diving instructor, and
e: satisfy the Diving Control Board that he/she has a through knowledge of diving theory, safety practices, operational procedures and the ability to lead a safe and effective diving program at VIMS/SMS.

2.33 Responsibilities

The Diving Officer shall

a: be responsible, through the Diving Control Board, for the conduct of the Diving Program with special attention to safety,
b: assure the implementation of all applicable VIMS/SMS policies and procedures,
c: provide surveillance and coordination of all diving programs (instructional and scientific),
d: provide supervision of instruction and evaluation of all training programs leading to certification,
e: maintain records concerning diver training, medical approvals, diver certifications, and official logbooks,
f: establish and/or approve training programs thorough which applicants for diving certification can satisfy the requirements of this guide
g: participate as a voting member of the AAUS representing VIMS/SMS in the development, modification, and implementation of policies and procedures pertaining to scientific diving,
h: provide initial and ongoing evaluation of equipment and equipment maintenance programs, including arranging for tests of breathing gases and the approval and/or certification of all VIMS/SMS sources of breathing gases,
i: oversee the purchase of diving equipment,
j: issue appropriate diving equipment for planned field activities,
k: provide field supervision of diving activities which warrant special attention,
l: remain abreast of changing technologies, equipment, and procedures by attending diver training workshops, diving medicine seminars, and related educational programs,
m: suspend diving operations considered unsafe or unwise and inform the Diving Control Board of such actions, and
n: suspend diving permits or certifications as deemed necessary, such suspensions will remain in effect until the permit or certification is reinstated by the Diving Control Board.
2.40 Assistant Diving Officer

2.41 Appointment

Assistant Diving Officers are appointed by the Diving Control Board.

2.42 Qualifications

An Assistant Diving Officer shall have such qualifications and experience that he or she can act for the Diving Officer should the Diving Officer be unavailable.

2.43 Responsibilities

An Assistant Diving Officer acts for the Diving Officer should the Diving Officer be unavailable. The responsibilities include but are not limited to reviewing dive plans, issuing equipment, and calling for the suspension of diving activities the Assistant Diving Officer determines to be unsafe or unwise. The purpose of the position of Assistant Diving Officer is to assure the continuity of safety in the scientific diving program especially in the absence of the Diving Officer.
Section 3

Diving Regulations

3.10 General Policy

3.11 Requirement for Active Diver Status

No person shall engage in scientific diving operations under the auspices of the VIMS Diving Program unless he/she holds a current permit or certificate pursuant to the provisions of this manual. Life support equipment will be issued only to current members of the VIMS Dive Team, or those in sanctioned training exercises towards authorization.

3.12 Requirement for Medical Approval

No person shall use life support equipment under the auspices of the VIMS Diving Program, to include training towards the above required permits or certifications, unless that individual has on file in the Diving Safety Office, a medical approval form signed by a licensed physician attesting to the individuals medical fitness for diving (see Appendix 2).

3.13 Liability Waiver by Students and Unpaid Individuals

No student or other individual in an unpaid capacity shall be issued life support equipment, for training or otherwise, unless that individual has on file in the Diving Safety Office, a Release and Waiver form against Institute liability. It must be realized by those individuals involved in diving operations, that Workers Compensation regulations and coverage do not apply. These individuals are advised to obtain independent insurance coverage, applicable to diving, in the event of a diving related accident (see Appendix 14).

3.14 Liability Waiver by Non-Employees

No visiting scientist, cooperating investigator, or other individual not specifically employed by VIMS/College of William and Mary shall be issued life support equipment, for training or otherwise, unless that individual has on file in the Diving Safety Office, a Release and Waiver form against Institute liability. It must be realized by these individuals involved in diving operations, that regulations and coverage applicable to regular employees may not apply. These individuals are advised to assure themselves that sufficient insurance coverage exists, or is obtained, applicable to diving in the event of a diving related accident (see Appendix 14).

3.20 Diving Procedures

This manual primarily addresses dives involving the use of SCUBA. At present, SCUBA is the only mode of diving supported within the VIMS Diving Program. The use of alternate
modes (hookah, mixed gas, surface supply, etc.) therefore must be conducted under guidelines of the host organization. General procedures and sources of training for alternate modes are available from the Diving Safety Office.

3.21 Solo Diving Prohibition

All SCUBA diving conducted under the auspices of VIMS shall be planned and executed in such a manner as to ensure that every diver maintains constant, effective communication with at least one other comparably equipped, authorized diver in the water. This buddy system is based upon mutual assistance, especially in the event of an emergency. If loss of effective communication occurs within a buddy team, all divers should surface and reestablish contact. Exceptions to this procedure can be made, upon approval, in the following situations:

- Tethered SCUBA Diving: Instances best served by a single diver (low visibility, extreme currents) warrant special consideration. Guidelines for this technique are available from the Diving Safety Office as a publication entitled Tethered SCUBA Diving. These guidelines require as a minimum a diver-to-surface communication system and a standby diver prepared to assist within one minute. Individuals are required to receive special training in this procedure. (Consult Diving Safety Office for further information.)

- Extreme Shallow Water: Instances where SCUBA is used in shallow depths (less than 5 feet) simply as a matter of convenience, also warrant special consideration. Provisions are hereby made to allow a single diver on SCUBA, provided the depth is 5 feet or less, and an individual prepared to enter the water (or already in the water) remains in the immediate vicinity to assist in the event of difficulty.

3.22 Enclosed or Confined Spaces

Diving in an enclosed or confined space (to include ice diving or overhead environment) requires special training.

3.23 Diver's Flag

A diver's flag, international code flag "A" shall be displayed prominently whenever diving is conducted under circumstances where required or where water traffic is probable. It is recommended the standard diving flag (red with diagonal white stripe) also be displayed.

3.24 Flotation

Each diver shall on every dive possess the capability of attaining and maintaining positive buoyancy.

3.25 Timing Devices and Depth and Pressure Gauges
Each dive must have an underwater time-keeping device, an approved depth indicator, and a submersible tank pressure gauge, unless the depth of water is 5 feet or less.

3.26 Dive Tables

A set of appropriate diving tables must be available at the dive location.

3.27 Safety Equipment Requirements

The following shall be available at the dive location

- A copy of this Guide to Diving Safety (with OSHA regulations);
- Written procedures for emergency evacuation to appropriate medical facility;
- First Aid Kit; and
- Oxygen resuscitator

3.28 Depth/Time Limits

All dives shall be no-decompression dives, within no-decompression limits as set forth on U.S. Navy Dive Tables (or their equivalents), unless specifically authorized by the Diving Control Board.

Approved diving computers may be used provided the user has been specifically trained in their use and follows guidelines available from the Diving Safety Office. If used, the diver must alter decompression profiles as dictated by the computer.

Dives greater than 60 feet are allowed only by approval of the Diving Control Board. Application for approval shall be in writing and shall describe the preparation, planning, diver selection, and purpose of the dive.

The diving authorization permit/certificate will authorize the holder to the depth indicated. The permit/certificate must bear the signature of the Diving Safety Officer.

An authorized diver diving under the auspices of VIMS shall not exceed his/her depth certificate, unless accompanied by a diver certified to a greater depth. Under these circumstances the diver may not exceed his/her depth limit by more than one step.

3.29 Refusal to Dive/Termination of Dive

The decision to dive is that of the diver. A diver may refuse without fear of penalty to dive whenever he/she feels it unsafe to make the dive (see 3.33).

The ultimate 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 unfavorable or if he/she would be violating the precepts of his/her training or the regulations
of this guide.

It is the responsibility of the diver to terminate the dive, without fear of penalty, whenever he/she feels it unsafe to continue the dive, unless the termination of the dive compromises the safety of another diver already in the water (see 3.33).

The dive shall be terminated while there is still sufficient tank pressure to permit the diver to safely reach the surface. In all but extreme circumstances there should be 500 PSI remaining in the cylinder.

3.30 Diving Operations

3.31 Lead Diver (Designation and Responsibilities)

For each dive, one individual shall be designated as lead diver. The lead diver shall be at the dive location for the entire diving operation. In normal circumstances, the lead diver is the most experienced diver participating in the operation. The lead diver shall be responsible for

A: Coordination (pre-dive)
- Submission of dive plans in a timely fashion for Diving Control Board approval and reservation of requested equipment (see 3.32).
- Selection of authorized divers appropriate for the operation considered.

B: Briefing (onsite)
The dive team members shall be briefed on:
- dive objectives,
- unusual hazards or environmental conditions likely to affect the safety of the diving operation,
- modifications to diving or emergency procedures necessitated by the specific diving operation, and
- reporting any physical problems or physiological effects (including symptoms of pressure-related injuries).

C: Supervision (onsite)
The lead diver shall supervise:
- bottom times and turnaround times,
- air pressures and turnaround pressures, and
- repetitive dive schedules.
D: Debriefing (post-dive)
Through counsel with the dive team members involved, the lead diver must:
• assure the health and well being of all divers and
• implement emergency procedures where necessary.

E: Coordination (post-dive)
• the clean-up and return of borrowed equipment and
• submission of dive logs to the Diving Safety Office (see 3.41).

3.32 Dive Plans

Prior to the commencement of any diving operation an approved Dive Plan form must be on file in the Diving Safety Office. The preparation and submission of this document is the joint responsibility of the Lead Diver and the Principal Investigator, as is responsibility for accuracy of information therein. Deviation from an approved plan becomes the responsibility of the individual submitting the plan. In addition to dates, locations, and depths the Dive Plan form (available from the Diving Safety Office) contains information on:

A: Divers
Divers selected for a proposed diving operation must:
• hold a current permit/certification,
• be authorized to the depth indicated (see 3.28), and
• be sufficiently trained to the level of the proposed activity.

B: Lead Diver
Responsible for duties listed in Section 3.31.

C: Purpose of Dive
A reasonable explanation of the tasks intended to be accomplished underwater. Example: "To meet the requirements of NSF Contract # 854," would be insufficient. Dive Plans are approved based on the qualifications of the divers selected to perform specifically defined tasks underwater.

D: Equipment Required
A list of all diving equipment required to accomplish the mission. Diving equipment is reserved on a "first come first served" basis upon approval of the submitted plan.

E: Diving Control Board Approval
The approval of a Dive Plan for depths greater than 60 ft. shall be witnessed by the signature of at least two Diving Control Board members. In the event the individual submitting the Plan is a Control Board member, the approval will be signed by other members of the Board.
3.33 Pre-dive Safety Checks

A: Diver's Responsibility:
- Decision to/termination of (see 3.29),
- Each diver shall conduct a functional check of his/her diving equipment in the presence of the lead diver, diving buddy or tender (see 3.33 B),
- No dive team member shall be required to be exposed to hyperbaric conditions against his/her will, except when necessary to prevent or treat a pressure-related injury,
- No dive team member shall be permitted to dive for the duration of any known condition which is likely to adversely affect the safety and health of the diver or other dive team members.

B: Equipment Evaluations:
- Each diver should perform a check of the breathing regulator, submersible pressure gauge, timing device, and depth gauge prior to the dive.
- Each diver shall have the capability of achieving and maintaining positive buoyancy.
- Each diver must wear sufficient thermal protection, and be trained in its use, to protect against hypothermia for the duration of the proposed exposure.

C: Diver's Qualifications:
Each diver shall be currently authorized, trained, and qualified for the diving mode being used, and each dive team member shall have experience or training in the following:
- Use of the instruments and equipment appropriate to the diving activity being conducted,
- Dive planning and emergency procedures,
- CPR,
- Oxygen Administration
- Diver rescue techniques and first aid, and
- Diving-related physics and physiology, recognition of pressure related injuries, and the appropriate emergency treatment.

3.34 Post-dive Safety Checks

- After the completion of a dive, it is the responsibility of the diver to report any physical problems, symptoms of pressure related injuries, or equipment malfunctions.
- When diving near or accidentally exceeding no-decompression limits, the diver should remain awake and in the company of a dive team member prepared to initiate emergency procedures if necessary for at least one hour after diving.
- In the event travel by air is necessary following diving, the current recommendation is to allow 24 hours to elapse between completion of the dive and the flight (Divers’ Alert Network), however an absolute minimum of 12 hours
must elapse before ascending to altitude (AAUS Standards).

3.35 Emergencies and Deviations from Regulations

Any diver may deviate from the requirements of this manual to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage. A written report of each action must be submitted to the Diving Control Board in a timely manner explaining the circumstances and justifications.

3.36 Consequences of Violations of Regulations by VIMS as AAUS Member Organization

Failure to comply with the regulations of this standard may be cause for the revocation or restriction of Member Organization recognition by the AAUS.

3.37 Consequences of Violations of Regulations by Authorized Divers

Failure to comply with the regulations of this manual may be cause for the revocation or restriction of the diver's authorization by the Diving Control Board. In addition violators are subject to such other disciplinary action as the Diving Control Board may promulgate.

3.40 Record-keeping and Requirements

3.41 Personal Diving Log

Each authorized diver shall log every dive made under Institute auspices and is encouraged to log all other dives. Standard forms are available from the Diving Safety Office and through the computer system (contact the Diving Safety Officer for specific information). Log sheets shall be submitted in a timely fashion to the Diving Safety Officer for inclusion in the diver's permanent file. The Diving Log includes the following:

- Name of diver,
- Names of the diving buddy and lead divers,
- Date, time, and location,
- Diving mode used,
- General nature of diving activities,
- Approximate surface and underwater conditions,
- Maximum depths, bottom time, surface interval time, and number repetitive dives,
- Dive tables or computer used,
- Detailed report of any accidents or potentially dangerous incidents, and
- Detailed report of any equipment malfunctions.

If pressure related injuries occur or are suspected, or if symptoms are evident, the following additional information will be recorded and retained, with the record of the dive, for a period of five (5) years:
• Complete accident report,
• Description of symptoms, including depth and time of onset, and
• Description and results of treatment.

The Diving Control Board shall investigate and document any incident of pressure-related injury and prepare a report which is forwarded to the Dean and Director and the AAUS.

3.42 Record Maintenance

The Diving Officer shall maintain permanent records for each authorized diver. The file shall include evidence of certifications, log sheets, results of current physical examinations, waivers, reports of disciplinary actions by the Diving Control Board, and other information deemed necessary.

Medical records shall be available to the attending physician of a current or former diver when released in writing by that individual.

Records and documents required by this standard shall be retained in the Diving Safety Office as follows:
• Physician's written reports of medical examinations for dive team members - 5 years.
• Manual for Diving Safety - current document only,
• Records of dives - 1 year, except 5 years where there has been an incident of pressure-related injury.
• Pressure-related injury assessment - 5 years.
• Equipment inspection and testing records - current entry or tag, or until equipment is withdrawn from service.

Should the VIMS Diving Program withdraw, terminate, or let expire the organizational membership status with the AAUS, a summary of diving activity for the past 5 years shall be forwarded to the AAUS.

3.43 Required Accident Reporting

All diving accidents requiring recompression or resulting in serious injury shall be reported to the Diving Officer, Diving Control Board and the AAUS. Regular procedures for non-diving accident reporting also must be followed.

The Diving Control Board shall record the occurrence of any diving-related injury or illness which requires any dive team member to be hospitalized for 24 hours or more, in which a diver experiences an episode of unconsciousness related to diving activity, or which requires treatment in a recompression
chamber following a diving accident. The report will specify the circumstances of the incident and the extent of any injuries or illnesses.

Section 4

Entry Level Training Requirements

This section describes training for the non-diver applicant, previously not certified for diving.

4.10 Evaluation

4.11 Medical Examination

The applicant for training under the auspices of the VIMS Diving Program shall be certified by a licensed physician to be medically qualified for diving before proceeding with the training as designated in Sec. 4.20 (see Sec. 7.00 and Appendices 1 through 6).

Individuals who seek their entry-level training outside the Institute shall follow the requirements of the nationally accredited certifying agency where medical examinations are concerned.

4.12 Swimming Evaluation

The applicant for training shall successfully perform the following tests, or their equivalent, in the presence of the Diving Safety Officer, or an examiner approved by the Diving Safety Officer.

a: Swim underwater without swim aids for a distance of 25 yards without surfacing.
b: Swim 400 yards in less than 12 minutes without swim aids.
c: Tread water for 10 minutes, or 2 minutes without the use of hands, without swim aids.
d: Without the use of swim aids, transport another person of equal size a distance of 25 yards in the water.

4.20 SCUBA Training

4.21 Practical Training

At the completion of training, the trainee must satisfy the Diving Safety Officer or the instructor of his/her ability to perform the following, as a minimum, in a pool or in sheltered water:

a: Enter water with full equipment.
b: Clear face mask.
c: Demonstrate air sharing, including both buddy breathing and the use of alternate air source, as both donor and recipient, with and without a face mask.
d: Demonstrate ability to alternate between snorkel and SCUBA while kicking.
e: Demonstrate understanding of underwater signs and signals.
f: Demonstrate simulated in-water mouth-to-mouth resuscitation.
g: Rescue and transport, as a diver, a passive simulated victim of an accident.
h: Demonstrate ability to remove and replace equipment while submerged.
i: Demonstrate watermanship ability that is acceptable to the instructor.

4.22 Written Examinations

Before completing training, the trainee must pass a written examination that demonstrates knowledge of at least the following:

a: Function, care, use and maintenance of diving equipment.
b: Physics and physiology of diving.
c: Diving regulations and precautions.
d: Near-shore currents and waves.
e: Dangerous marine animals.
f: Emergency procedures, including buoyant ascent and ascent by air sharing.
g: Currently accepted decompression procedures.
h: Demonstrate the proper use of dive tables.
i: Underwater communications.
j: Aspects of freshwater and altitude diving.
k: Hazards of breath-hold diving and ascents.
l: Planning and supervision of diving operations.
m: Diving hazards.
n: Cause, symptoms, treatment, and prevention of the following: near drowning, air embolism, carbon dioxide excess, squeezes, oxygen poisoning, nitrogen narcosis, exhaustion and panic, respiratory fatigue, motion sickness, decompression sickness, hypothermia, and hypoxia/anoxia.

4.23 CPR Training

The trainee must provide proof of training in cardiopulmonary resuscitation (CPR) within the past 12 months.

4.24 Open Water Evaluation

The trainee must satisfy an instructor, approved by the Diving Safety Officer, of his/her ability to perform at least the following in open water:
a: Surface dive to a depth of 10 feet in open water without SCUBA.
b: Demonstrate proficiency in air sharing, including both buddy breathing and the use of alternate air source, as both donor and receiver.
c: Enter and leave open water and surf, or leave and board a diving vessel, while wearing SCUBA gear.
d: Kick on the surface 400 yards while wearing SCUBA gear, but not breathing from the SCUBA unit.
e: Demonstrate judgment adequate for safe diving.
f: Demonstrate, where appropriate, the ability to maneuver efficiently in the environment, at and below the surface.
g: Complete a simulated emergency swimming ascent.
h: Demonstrate clearing of the mask and regulator while submerged.
i: Demonstrate ability to achieve and maintain neutral buoyancy while submerged.
j: Demonstrate techniques of self-rescue and buddy rescue.
k: Navigate underwater.
l: Plan and execute a dive.
m: Successfully complete 5 open water dives for a minimum total time of 3 hours, of which 1 ½ hours cumulative bottom time must be on SCUBA. No more than 3 training dives shall be made in any one day.

4.30 Diver-in-Training Permit Level

This permit signifies that a diver has completed a minimum of 40 hours of training with at least 5 ocean or open water dives, and possesses a nationally recognized diving certificate.

The VIMS Diving Program is conducted primarily in an estuarine environment. Limited to zero visibility and considerable current are normal diving conditions. These conditions vary dependent upon actual location within the Chesapeake Bay or its tributaries. Therefore, authorization for a Diver-In-Training to participate on dives will be made on a case-by-case basis by approval of specific dive plans.

4.31 Restrictions

In general, the following restrictions are imposed on a Diver-In-Training:

a: depth limit of 30 feet.
b: locations approved for diving shall be similar to the environment in which the diver was trained, or had qualifying experience.
c: diving equipment used (including thermal protection) must be similar to equipment used for initial Open Water certification, unless qualifying experience has been documented with supplementary equipment.

4.40 Institute Recognition of Open Water Certifications
Divers who cannot attest to the completion of all previous requirements of this section, but who possess an Open Water certification, will be required to demonstrate proficiency in these requirements prior to Institute recognition of these certificates.

In instances where the period of time between certification and application for the Institute dive team are lengthy, or where long periods of inactivity are evident, divers likely will be required to demonstrate proficiency in any or all of the previous requirements.

The diver's personal log book is the most reliable proof of currency in diving skills. It is also the best indicator of the type of conditions a diver is accustomed to. Any and all additional training requirements imposed on a diver will be based upon examination of recent and past diving history, in the form of a log book, by the Diving Safety Officer.

In most instances, a local orientation dive and a written examination (see 4.22) will be required of a diver prior to the issue of any research or scientific permits/certifications as outlined in Section 5.
Section 5

Scientific Diver Certification

5.10 Certification Types

5.11 Scientific Diver Certification

This is a permit to dive, usable only while it is current and for the purpose intended.

5.12 Temporary Diver Permit

This permit constitutes a waiver of the requirements of Sec. 5.0 and is issued only following a demonstration of the required proficiency in diving. It is valid only for a limited time, as determined by the Diving Safety Officer. This permit shall not be construed as a mechanism to circumvent existing standards as set forth in this manual.

Requirements of Sec. 5.31 and 5.32, except medical, may be waived by the Diving Safety Officer if the person in question has demonstrated proficiency in diving and can contribute measurably to a planned dive. A statement of the temporary diver's qualifications shall be submitted to the Diving Safety Officer as a part of the dive plan. Temporary permits shall be restricted to the planned diving operation and shall comply with all other policies, regulations, and standards of this manual, including medical requirements.

5.13 Diver-In-Training Permit

This permit signifies that a diver has completed and been certified as at least an open water diver through a nationally or internationally recognized certifying agency, scientific diving program, or its equivalent (Section 4.0).

5.20 General Policy

The following are considered minimal standards for scientific diving authorization. Applicants to the VIMS Dive Team will be authorized/certified to dive in accordance with the standards of this section.

5.21 Eligibility

Only VIMS personnel, or visiting or cooperating investigators diving under VIMS auspices, are eligible for scientific diving authorization or application to the VIMS Dive Team. Visiting or cooperating investigators possessing current scientific diving certifications from member organizations in good standing of the AAUS are considered to have met these minimal standards.
5.22 Application

Application for certification/authorization, or for training up to certification/authorization, shall be in writing to the Diving Control Board in the following format:

a: type of research requiring diving;
b: level of certification necessary to accomplish research objectives;
c: division/department sponsoring individual for certification; and
d: date by which certification is necessary.

5.23 Medical Examination

Each applicant for diver certification shall submit a statement from a licensed physician, based on an approved medical examination, attesting to the applicant's fitness for diving (see Sec. 7.0 and Appendices 1-6).

5.24 Qualifications

Each applicant for diver certification must hold a recognized Open Water certification issued by a nationally accredited certifying agency, or, demonstrate acceptable proficiency in all skills listed in Sec. 4.0, in the presence of an examiner approved by the Diving Safety Officer.

5.30 Requirements for Scientific Diver Certification

Submission of documents and participation in aptitude examinations does not automatically result in certification. The applicant must convince the Diving Safety Officer and members of the Diving Control Board that he/she is sufficiently skilled and proficient to be certified. This level of skill will be acknowledged by the signature of the Diving Safety Officer. Any applicant who does not possess the necessary judgment, under diving conditions, for the safety of the diver and his/her partner, may be denied organizational member scientific diving privileges. Minimum documentation and examinations required are as follows:

5.31 Documents

a: Application for certification.
b: Medical approval.
c: Proof of diver-in-training permit level of proficiency or its equivalent.
d: Documentation of completion of a nationally recognized CPR course within the preceding 12 months.
e: Oxygen administration training
f: Release and waivers where appropriate (see 3.13 and 3.14, form in Appendix 7).
g: Log book of diving experience (see 3.41 and 4.40).

5.32 Training
The diver must complete additional training beyond that required for the diver-in-training permit level in theoretical and aspects practical for a minimum cumulative time of 100 hours.

a: Theoretical aspects should include principles and activities appropriate to the intended area of scientific study. Suggested topics may include, but are not limited to:

- diving first aid,
- oxygen administration,
- accident management,
- field neurological exam,
- dive rescue,
- recognition of DCS and AGE,
- data gathering techniques,
- collecting common biota,
- behavior, installation of scientific apparatus,
- use of chemicals,
- site selection,
- site location and relocation,
- organism identification,
- ecology,
- tagging,
- photography,
- videography,
- archaeology,
- scientific dive planning,
- coordination with other agencies,
- appropriate governmental regulations,
- AAUS scientific diving regulations,
- small boat operation,
- theoretical training in diving technology,
- specialized equipment to be used,
- blue water diving,
- diving in confined spaces,
- zero visibility diving,
- research vessel diving,
- aquarium diving,
- animal handling,
- polluted water diving,
- cold water diving,
- special gas mixes, and
- decompression theory and its application.

b: Practical training shall include at least 12 supervised ocean or open water dives in a variety of dive sites and diving conditions, for a cumulative bottom time of 6
hours. No more than 3 of these dives shall be made in one day. Suggested training dives follow the logical sequence made by diver training agencies. Dives involving natural navigation, compass navigation, night diving, search and recovery, and deep diving (all contained in an Advanced Open Water class) are appropriate. Also appropriate are training classes in the use of variable volume dry suits, pinger location techniques, etc. Applicants should inquire for these and other training opportunities within the VIMS Diving Program.

5.33 Examinations

a: Written examination for the certificate level.
b: Examination of equipment.
c: Open water check-out dives to appropriate depths with evaluation of the skills in Sec. 4.24 and Appendix 9.

5.40 Depth Certifications

5.41 Maximum Depth

Diving is not permitted beyond a depth of 190 feet.

5.42 Depth Certification Levels

a: Certification to 30 ft. depth. This is the initial permit level, approved upon the successful completion of training listed in Sec. 4 and Sec. 5.3.
b: Certification to 60 ft. depth. A diver holding a 30 ft. certification may be certified to a depth of 60 ft. after successfully completing, under supervision, 12 logged training dives to depths between 31 and 60 ft., for a minimum total time of 4 hours.
c: Certification to 100 ft depth. A diver holding a 60 ft. certification may be certified to a depth of 100 ft. by logging four dives approaching 100 ft.. These qualification dives shall be planned and executed under close supervision of a diver certified to this depth. These qualification dives shall be verified by the signature of two individuals authorized by the Diving Safety Officer who are certified to at least the same depth. The diver shall demonstrate proficiency in the use of the appropriate decompression tables, knowledge in the special problems of deep diving, and special safety requirements.
d: Certification to Depth Over 100 Ft.. Requests to exceed a 100 ft. depth certification will be handled on a case-by-case basis, subject to such restrictions as the Diving Control Board may impose.
5.43 Progression to the Next Depth Level

A certified diver diving under the auspices of the organizational member may exceed his/her depth certification only if accompanied by a diver certified to a greater depth. Under these circumstances the diver may exceed his/her depth limit by one step.

5.50 Continuation of Certification

5.51 Minimum Activity to Maintain Certification

During any 12 month period, each certified scientific diver must log a minimum of 12 dives. At least one dive must be logged near the maximum depth of the diver's certification during each 6 month period. Failure to meet these requirements may be cause for revocation or restriction of certification.

5.52 Requalification of Depth Certification

Once the initial certification requirements of Sec. 5.41-5.44 are met, divers whose depth certification has lapsed due to a lack of activity may be requalified by procedures adopted by the Diving Control Board, available from the Diving Safety Officer.

5.53 Medical Examination

All certified scientific divers shall pass a medical examination at the intervals specified in Sec. 7.13. After each major illness or injury, as described in Sec. 7.13, a certified scientific diver shall receive clearance to return to diving from a physician before resuming diving activities.

5.60 Revocation of Certification

A diving certification may be revoked or restricted for cause by the Diving Safety Officer or the Diving Control Board. Violations of the regulations set forth in this manual, or other governmental subdivisions not in conflict with this manual, may be considered cause. The Diving Safety Officer shall inform the diver in writing of the reason(s) for revocation. The diver will be given the opportunity to present his/her case in writing for reconsideration and/or recertification. All such written statements and requests, as identified in this section, are formal documents which will become part of the diver's file.

5.70 Recertification

If a diver's certification expires or is revoked, the diver may be recertified after complying with such conditions as the Diving Safety Officer or the Diving Control Board may impose. The diver shall be given an opportunity to present his/her case to the Diving Control Board before conditions for recertification are stipulated.
Section 6

Diving Equipment

6.10 General Policy

All equipment shall meet standards as determined by the Diving Safety officer and the Diving Control Board. All Diving equipment used under Institute auspices shall conform to standards set forth in this section, whether privately owned, departmentally owned, or issued by the dive locker. Every effort will be made to notify users of private and departmentally owned equipment of routine inspection and servicing; however, submission of equipment for inspection and servicing is the responsibility of the diver.

Equipment that is subject to extreme usage under adverse conditions requires more frequent testing and maintenance.

Life support equipment (tanks, regulators), buoyancy compensators, and diving computers will be issued only to members of the Dive Team or to those individuals participating in sanctioned training to meet the requirements of this manual.

All equipment shall be examined regularly by the person using it.

6.20 Record Keeping

Each equipment modification, repair, test, calibration, or maintenance service of

- SCUBA cylinders,
- regulators,
- submersible pressure gauges,
- depth gauges,
- cylinder valves,
- compressors,
- air filtration systems, and
- air storage cylinders

shall be logged documenting the date and nature of the work performed, serial number of the item, and the name of the person performing the work.

6.30 Life Support Equipment

Only makes and models of life support equipment specifically approved by the Diving officer and the Diving Control Board shall be used.
6.31 Regulators

SCUBA regulators shall be inspected and tested prior to the first use and every twelve (12) months thereafter. Regulators will consist of a primary second stage and an alternate air source (such as an octopus second stage or redundant air supply).

6.32 SCUBA Cylinders

Scuba cylinders shall be designed, constructed, and maintained in accordance with the applicable provisions of the Unified Pressure Vessel Safety Orders. The following schedule of testing shall apply to SCUBA cylinders:

- SCUBA cylinders must be hydrostatically tested in accordance with Department of Transportation standards. At present hydrostatic tests are required every five (5) years with the validations stamped on the neck of the cylinder.
- SCUBA cylinders must have an internal inspection at intervals not to exceed twelve (12) months. Validation stickers are applied by the testing facility.
- SCUBA cylinder valves shall be functionally tested at intervals not to exceed twelve (12) months.

SCUBA cylinders without validation of hydrostatic and/or visual inspections will not be filled.

6.33 Buoyancy Compensation Devices

Buoyancy compensators, personal flotation systems, dry suits, or other variable volume buoyancy compensation devices shall be equipped with an exhaust valve. These devices shall be functionally inspected and tested at intervals not to exceed twelve (12) months. Each diver shall have the capability of achieving and maintaining positive buoyancy.

6.34 Diving Computers, Dive Tables

A set of diving tables approved by the Diving Control Board must be available at the dive location unless all divers are using approved diving computers.

Diving computers may be used in place of diving tables and must be approved by the Diving Control Board.

Diving computers will be serviced (batteries etc.) as required by factory servicing (depth calibration, pressure testing, etc.), generally on an annual basis. See Appendix 12 for AAUS recommendations on using diving computers.
6.40 Auxiliary Equipment

All auxiliary equipment shall be of a type approved by the Diving Safety Officer and/or the Diving control board. The following regulations apply to auxiliary equipment.

- Backpacks and weight systems shall be examined regularly by the person using them.
- Submersible pressure gauges, depth gauges, and timing devices shall be inspected and tested before first use and every twelve (12) months thereafter. Each member of the diving pair must have an underwater timing device, an approved depth indicator, and a submersible pressure page.
- All weight systems and SCUBA backpacks (without flotation devices) worn by the diver shall be equipped with quick release devices designed to permit jettisoning the entire gear. The quick release must operate easily with a single motion from either hand.
- A First Aid Kit is required at the dive location. Kits should be checked for contents prior to first use and periodically inspected and resupplied.
- An oxygen resuscitator is required at the dive location. Personnel must be instructed in its use prior to issue. Oxygen cylinders should be filled to capacity at the time of issue.
- Hand-held underwater power tools and electrical tools and equipment used underwater shall specifically be approved for this use. Electrical tools and equipment supplied with power from the surface shall be de-energized before being placed into or retrieved from the water. Hand-held power tools shall not be supplied with power until requested by the diver.
- A Diver’s Flag shall be displayed prominently where marine traffic is probable.

6.50 Compressors for Breathing Air

6.51 General Policy

The Institute’s breathing air compressors shall be operated only by those individuals specifically trained in their use. The Diving Safety Officer will maintain a list of trained operators.

6.52 Minimum Air Quality Standards

Breathing air for SCUBA shall meet the following specifications as set forth by the Compressed Gas Association (CGA Phamplet G-7.1) and referenced in 29 CFR 1910.134.
CGA Grade E Breathing Air

- Minimum oxygen ... atmospheric (20-22%)
- Maximum carbon monoxide ... 10ppm
- Maximum carbon dioxide ... 500ppm
- Total hydrocarbons ... 25ppm
- Water vapor ... 67ppm
- Oil/particulates ... 5mg/m³
- Odor ... none

6.53 Compressor Systems -- Institute Controlled

Installation and location considerations:

- Air intakes shall be provided with a filter and shall be located to ensure a supply of clean air, free from contamination by fumes, smoke, etc.
- The discharged, compressed air shall be passed to a compressed air holder through frequently cleaned and recharged filters designed to remove carbon monoxide, dust, droplets of oil and water, and to minimize other contaminants.
- Oil lubricated compressors shall be well ventilated to ensure against high temperature at which carbon monoxide is formed from oil.

Compressor Operation and Air Test Records:

- Operating procedures for the Institute’s primary compressor will be posted in the vicinity of the compressor.
- Operating instructions for the Institute’s portable compressors are contained in the user’s manual, which must be present whenever the portable compressor is used.
- Air tests shall be performed on each Institute owned breathing air compressor at intervals on no more than 100 hours of operation or six months, whichever comes first. The results of the tests shall be entered in a formal log.
- A log shall be maintained showing operation, repair, overhaul, filter maintenance, temperature adjustment, and results of air tests.

6.54 Compressor Systems -- Outside Institute Control

Air fill stations outside the control of the Institute must be evaluated by the diver obtaining the air. Every effort must be made to obtain fills from the most reputable sources. Earlier portions of this section will assist the diver in evaluating potential sources of compressed breathing air.
Section 7

Medical Standards

7.10 General Medical Requirements

The diver should be free of any chronic disabling disease and be free of any conditions contained in the list of conditions for which restrictions from diving are generally recommended. (Appendix 1)

7.11 Physical Examination Required

The organizational member shall determine that divers have passed a current diving physical examination and have been declared by the examining physician to be fit to engage in diving activities as may be limited or restricted in the medical evaluation report.

7.12 Physician

All medical evaluations required by this standard shall be performed by, or under the direction of, a licensed physician of the applicant-diver's choice, preferably one trained in diving/undersea medicine.

7.13 Frequency of Medical Evaluations

Medical evaluation shall be completed:

a: Before a diver may begin diving, unless an equivalent initial medical evaluation has been given within the preceding 3 years (2 years if over the age of 40), the member organization has obtained the results of that examination, and those results have been reviewed and found satisfactory by the member organization.

b: Thereafter, at three year intervals up to age 40 and every two years after the age of 40.

c: After any major injury or illness, or any condition requiring hospitalization for more than 24 hours requires clearance to return to diving from a physician. If the injury or illness is pressure related then the clearance to return to diving must come from a physician trained in diving medicine.

7.14 Information Provided Examining Physician

The organizational member shall provided a copy of the medical evaluation requirements of this standard to the examining physician. (Appendices 1-6).
7.15 Content of Medical Evaluations

Medical examinations conducted initially and at the intervals specified in section 7.13 shall consist of the following:

a: Applicant agreement for release of medical information to the Diving Safety Officer and the Diving Control Board (See Appendix 2).
b: Medical history (See Appendix 3)
c: Diving physical examination (Section 7.15 and Appendix 2).

7.16 Conditions for which Restriction from Diving is Recommended
(See Appendix 1).

7.17 Laboratory Tests Required for Diving Medical Examination:

a: Upon initial examination and first examination over age forty:

- Medical History
- Chest X-ray
- 12 lead EKG
- Pulmonary function
- Audiogram
- Visual acuity
- Complete blood count (CBC)
- Blood chemistry
- Urinalysis
- Any further test deemed necessary by the physician to qualify the patient for scuba diving.

b: Periodic re-examination (every 3 years up to age 40, every 2 years after age 40):

- Medical History
- Pulmonary function
- Audiogram
- Visual acuity
- Complete blood count (CBC)
- Blood chemistry
- Urinalysis
- Any further test deemed necessary by the physician to qualify the patient for scuba diving.
7.18 Physicians's Written Report.

a: After any medical examination relating to the individual's fitness to dive, the organizational member shall obtain a written report prepared by the examining physician, which shall contain the examining physician's opinion of the individual's fitness to dive, including any recommended restrictions or limitations. The report and recommendations will be reviewed by the Diving Control Board.

b: The organizational member shall make a copy of the physician's written report available to the individual.
APPENDIX I
DIVING MEDICAL EXAM OVERVIEW FOR THE EXAMINING PHYSICIAN

TO THE EXAMINING PHYSICIAN:

This person, ____________________________, requires a medical examination to assess his/her fitness for certification as a Scientific Diver for the _______________________________________. His /her answers on the Diving Medical History Form (attached), may indicate potential health or safety risks as noted. Your evaluation is requested on the attached scuba Diving Fitness Medical Evaluation Report. If you have questions about diving medicine, you may wish to consult one of the references on the attached list or contact one of the physicians with expertise in diving medicine whose names and phone numbers appear on an attached list. Please contact the undersigned Diving Safety Officer if you have any questions or concerns about diving medicine or the ______________________________________ standards. Thank you for your assistance.

____________________________________________________________________
Diving Safety Officer

__________________________
Date

____________________________________________________________________
Printed Name

__________________________
Phone Number

Scuba and other modes of compressed-gas diving can be strenuous and hazardous. A special risk is present if the middle ear, sinuses or lung segments do not readily equalize air pressure changes. The most common cause of distress is eustachian insufficiency. Most fatalities involve deficiencies in prudence, judgement, emotional stability or physical fitness. Please consult the following list of conditions which usually restrict candidates from diving.

(Adapted from Davis 1986:47-50, bracketed numbers are pages in Davis)

1. Tympanic membrane perforation or aeration tube [7]
2. Inability to auto-inflate the middle ears [6,7,8]
3. External ear exostoses or osteomas adequate to prevent external ear canal pressure equilibration [4]
4. Meniere’s Disease or other chronic vertiginous conditions, status post-surgery, such as subarachnoid subdural hematoma for Meniere’s Disease [11]
5. Stapedectomy and middle ear prosthesis [9]
6. Chronic mastoiditis or mastoid fistula [5]
7. Any oral or maxillofacial deformity that interferes with the retention of the regulator mouthpiece [43]
8. Corrected near visual acuity not adequate to see tank pressure gauge, watch, decompression tables, and compass underwater. Uncorrected visual acuity not adequate to see the diving buddy or locate the boat in case corrective lenses are lost underwater [13]
9. Radial keratotomy or other recent ocular surgery [14]
10. Claustrophobia of a degree to predispose to panic [15,16]
11. Suicidal ideation [16]
12. Significant anxiety states [16]
13. Psychosis [18]
14. Severe depression [16]
15. Manic states [16]
16. Alcoholism [19,20]
17. Mood-altering drug use [19,20]
18. Improper motivation for diving [16,17,18]
19. Episodic loss of consciousness [1,22]
22. History of cerebrovascular accident or transient ischemic attack [23]
23. History of spinal cord trauma with neurologic deficit - whether fully recovered or not [23]
24. Any degenerative or demyelinating CNS process [25]
25. Brain tumor with or without surgery [24]
26. Intracranial aneurysm or other vascular malformation [24]
27. History of neurological decompression sickness with residual deficit [23, 24]
28. Head injury with sequelae [21]
30. Sickle cell disease [34]
31. Polycythemia or leukemia [34]
32. Unexplained anemia [34]
33. History of myocardial infarction [28, 29, 20]
34. Angina or other evidence of coronary artery disease [29]
35. Unrepaired cardiac septal defects [32]
36. Aortic stenosis or mitral stenosis [32]
37. Complete heart block [31]
38. Fixed second-degree heart block [31]
39. Exercised-induced tachyarrhythmias [31, 32]
40. Wolf-Parkinson-White (WPW) Syndrome with paroxysmal atrial tachycardia or syncope [31]
41. Fixed-rate pacemakers [33]
42. Any drugs which inhibit the normal cardiovascular response to exercise tolerance [31]
43. Peripheral vascular disease, arterial or venous, severe enough to limit exercise tolerance [33, 41]
44. Hypertension with end-organ finding - retinal, cardiac, renal or vascular [30]
45. History of spontaneous pneumothorax [36]
46. Bronchial asthma. History of childhood asthma requires special studies [7, 35]
47. Exercise or cold air-induced asthma [36, 37]
48. X-ray evidence of pulmonary blebs, bullae, or cysts [36, 37]
49. Chronic obstructive pulmonary disease [37]
50. Insulin-dependent diabetes mellitus. Diet or oral medication-controlled diabetes mellitus if there is a history of hypoglycemic episodes [38]
51. Any abdominal wall hernia with potential for gas-trapping until surgically corrected [41]
52. Peptic ulcer or incarcerated sliding hiatal hernia [39]
53. Sliding hiatus hernia if symptomatic due to reflux esophagitis [39]
54. Pregnancy [1, 45]
55. Osteonecrosis. A history consistent with a high risk of dysbaric osteonecrosis
56. Any condition requiring ingestion of the following medication: antihistamines, bronchodilators, steroids, barbiturates, phenytoin, mood-altering drugs, insulin

Attachments: Medical Evaluation of Fitness for Scuba Diving Report
Diving Medical History Form
Question Evaluations for Diving Medical History Form
Recommended Physicians with Expertise in Diving/Undersea Medicine
References on Diving Medicine
APPENDIX 2
MEDICAL EVALUATION OF FITNESS FOR SCUBA DIVING REPORT

Name of Applicant (Print or Type) __________________________ Date (Mo/Day/Year) ________________

To the PHYSICIAN:

This person is an applicant for training or is presently certified to engage in diving with self-contained underwater breathing apparatus (scuba). This is an activity which puts unusual stress on the individual in several ways. Your opinion on the applicant’s medical fitness is requested. Scuba diving requires heavy exertion. The diver must be free of cardiovascular and respiratory disease. An absolute requirement is the ability of the lungs, middle ear and sinuses to equalize pressure. Any condition that risks the loss of consciousness should disqualify the applicant.

TESTS: Please initial that the following tests were completed.

[ ] Initial Examination
  or first over age 40
  Medical History
  Chest X-Ray
  12 Lead EKG
  Pulmonary function
  Audiogram
  Visual acuity
  Complete blood count (CBC)
  Blood chemistry
  Urinalysis

[ ] Re-examination
  Medical History
  Pulmonary function
  Audiogram
  Visual acuity
  Complete blood count (CBC)
  Blood chemistry
  Urinalysis

RECOMMENDATION:

[ ] APPROVAL. I find no medical condition(s) which I consider incompatible with diving.

[ ] RESTRICTED ACTIVITY APPROVAL. The applicant may dive in certain circumstances as described in REMARKS.

[ ] FURTHER TESTING REQUIRED. I have encountered a potential contraindication to diving. Additional medical tests must be performed before a final assessment can be made. See REMARKS.

[ ] REJECT. This applicant has medical condition(s) which, in my opinion, clearly would constitute unacceptable hazards to health and safety in diving.

OVER

35
REMARKS:

_____________________________________________________________________________________________________

I have discussed the patient's medical condition(s) which would not seriously interfere with diving but which may seriously compromise subsequent health. The patient understands the nature of the hazards and the risks involved in diving with these defects.

__________________________________________  M.D.
Date  Signature

__________________________________________
Name (Print or Type)

__________________________________________
Address

Telephone Number

My familiarity with applicant is:

O  With this exam only

O  Regular Physician for ___ years

O  Other (describe)____________________________

My familiarity with diving medicine:

O  On attached list of physicians

O  Other (describe)____________________________

_____________________________________________________________________________________________________

APPLICANT'S RELEASE OF MEDICAL INFORMATION FORM

I authorize the release of this information and all medical information subsequently acquired in association with my diving to the ____________________________ Diving Safety Officer and Diving Control Board or their designee at (place) ____________________________ on (date) _____________.

Signature of Applicant ____________________________
TO THE APPLICANT:

Scuba diving makes considerable demands on your physical and emotional condition. Diving with particular defects amounts to asking for trouble not only for yourself, but to anyone coming to your aid if you get into difficulty in the water. Therefore, it is prudent to meet certain medical and physical requirements before beginning a diving or training program.

Your answers to the questions are more important, in many instances, in determining your fitness than what the physician may see, hear or feel when you are examined. Obviously, you should give accurate information or the medical screening procedure becomes useless.

This form shall be kept confidential. If you believe any question amounts to invasion of your privacy, you may elect to omit an answer, provided that you shall subsequently discuss that matter with your own physician and he/she must then indicate, in writing, that you have done so and that no health hazard exists.

Should your answers indicate a condition which might make diving hazardous, you will be asked to review the matter with your physician. In such instances, his/her written authorization will be required in order for further consideration to be given to your application. If your physician concludes that diving would involve undue risk for you, remember that he/she is concerned only with your well-being and safety. Respect the advice and the intent of this medical history form.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Please indicate whether or not the following apply to you</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Convulsions, seizures, or epilepsy</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Painting spells or dizziness</td>
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</tr>
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<td>4</td>
<td></td>
<td>Been addicted to drugs</td>
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<tr>
<td>5</td>
<td></td>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Motion sickness or sea/air sickness</td>
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<tr>
<td>7</td>
<td></td>
<td>Claustrophobia</td>
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<tr>
<td>8</td>
<td></td>
<td>Mental disorder or nervous breakdown</td>
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<td>8</td>
<td></td>
<td>Are you pregnant?</td>
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</tr>
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<td>9</td>
<td></td>
<td>Do you suffer from menstual problems?</td>
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<td>10</td>
<td></td>
<td>Anxiety spells or hyperventilation</td>
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<tr>
<td>11</td>
<td></td>
<td>Frequent sour stomachs, nervous stomachs or vomiting spells</td>
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<tr>
<td>12</td>
<td></td>
<td>Had a major operation</td>
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<tr>
<td>13</td>
<td></td>
<td>Presently being treated by a physician</td>
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</tr>
<tr>
<td>14</td>
<td></td>
<td>Taking any medication regularly (even nonprescription)</td>
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<td>Yes</td>
<td>No</td>
<td>Please indicate whether or not the following apply to you</td>
<td>Comments</td>
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</tr>
<tr>
<td>15</td>
<td></td>
<td>Been rejected or restricted from sports</td>
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<tr>
<td>16</td>
<td></td>
<td>Headaches (frequent and severe)</td>
<td></td>
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<tr>
<td>17</td>
<td></td>
<td>Wear dental plates</td>
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<td>18</td>
<td></td>
<td>Wear glasses or contact lenses</td>
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<td>19</td>
<td></td>
<td>Bleeding disorders</td>
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<td>20</td>
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<td>Alcoholism</td>
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<td>21</td>
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<td>Any Problems related to diving</td>
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<td>22</td>
<td></td>
<td>Nervous tension or emotional problems</td>
<td></td>
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<tr>
<td>23</td>
<td></td>
<td>Take tranquilizers</td>
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</tr>
<tr>
<td>24</td>
<td></td>
<td>Performed ear drums</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>Hay fever</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Frequent sinus trouble, frequent drainage from the nose, post-nasal drip, or stuffy nose</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>Frequent earaches</td>
<td></td>
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<tr>
<td>28</td>
<td></td>
<td>Drainage from the ears</td>
<td></td>
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<tr>
<td>29</td>
<td></td>
<td>Difficulty with your ears in airplanes or on mountains</td>
<td></td>
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<tr>
<td>30</td>
<td></td>
<td>Ear surgery</td>
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<td>Ringing in your ears</td>
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<td>32</td>
<td></td>
<td>Frequent dizzy spells</td>
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<td>33</td>
<td></td>
<td>Hearing problems</td>
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<td>34</td>
<td></td>
<td>Trouble equalizing pressure in your ears</td>
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<td>35</td>
<td></td>
<td>Asthma</td>
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<td>36</td>
<td></td>
<td>Wheezing attacks</td>
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<tr>
<td>37</td>
<td></td>
<td>Cough (chronic or recurrent)</td>
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</tr>
<tr>
<td>38</td>
<td></td>
<td>Frequently raise sputum</td>
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<td>39</td>
<td></td>
<td>Pleurisy</td>
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<td></td>
<td>Collapsed lung (pneumothorax)</td>
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<td>41</td>
<td></td>
<td>Lung cysts</td>
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<td>42</td>
<td></td>
<td>Pneumonia</td>
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</tr>
<tr>
<td>43</td>
<td></td>
<td>Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>Shortness of breath</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>Lung problem or abnormality</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td></td>
<td>Spit blood</td>
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<tr>
<td>47</td>
<td></td>
<td>Breathing difficulty after eating particular foods, after exposure to particular pollens or animals</td>
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<td>48</td>
<td></td>
<td>Are you subject to bronchitis</td>
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<td>49</td>
<td></td>
<td>Subcutaneous emphysema (air under the skin)</td>
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<td>50</td>
<td></td>
<td>Air embolism after diving</td>
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<tr>
<td>51</td>
<td></td>
<td>Decompression sickness</td>
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<tr>
<td>52</td>
<td></td>
<td>Rheumatic fever</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td></td>
<td>Scarlet fever</td>
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<tr>
<td>Yes</td>
<td>No</td>
<td>Please indicate whether or not the following apply to you</td>
<td>Comments</td>
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<td>----</td>
<td>--------------------------------------------------------</td>
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<tr>
<td>54</td>
<td></td>
<td>Heart murmur</td>
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<tr>
<td>55</td>
<td></td>
<td>Large heart</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td></td>
<td>High blood pressure</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td></td>
<td>Angina (heart pains or pressure in the chest)</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td></td>
<td>Heart attack</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td></td>
<td>Low blood pressure</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td>Recurrent or persistent swelling of the legs</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td></td>
<td>Pounding, rapid heartbeat or palpitations</td>
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<tr>
<td>62</td>
<td></td>
<td>Easily fatigued or short of breath</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td></td>
<td>Abnormal EKG</td>
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<td>64</td>
<td></td>
<td>Joint problems, dislocations or arthritis</td>
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<td>65</td>
<td></td>
<td>Back trouble or back injuries</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td></td>
<td>Ruptured or slipped disk</td>
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<td>67</td>
<td></td>
<td>Limiting physical handicaps</td>
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<tr>
<td>68</td>
<td></td>
<td>Muscle cramps</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td></td>
<td>Varicose veins</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>Amputations</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td></td>
<td>Head injury causing unconsciousness</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td></td>
<td>Paralysis</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td></td>
<td>Have you ever had an adverse reaction to medication?</td>
<td></td>
</tr>
<tr>
<td>74</td>
<td></td>
<td>Do you smoke?</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>Have you ever had any other medical problems not listed? If so, please list or describe below:</td>
<td></td>
</tr>
</tbody>
</table>

I certify that the above answers and information represent an accurate and complete description of my medical history.

_________________________  ____________________
Signature                     Date
APPENDIX 4

MEDICAL HISTORY QUESTIONS EVALUATION FORM
(Answer Screening Aid)

<table>
<thead>
<tr>
<th>1 - A</th>
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<th>41 - A</th>
<th>61 - B</th>
</tr>
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<td>63 - B</td>
</tr>
<tr>
<td>4 - B</td>
<td>24 - C</td>
<td>44 - B</td>
<td>64 - B</td>
</tr>
<tr>
<td>5 - C</td>
<td>25 - B</td>
<td>45 - B</td>
<td>65 - B</td>
</tr>
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<td>6 - D</td>
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<td>14 - B</td>
<td>34 - C</td>
<td>54 - B</td>
<td>74 - C</td>
</tr>
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<td>35 - B</td>
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<td>75 - B</td>
</tr>
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<td>36 - B</td>
<td>56 - B</td>
<td></td>
</tr>
<tr>
<td>17 - C</td>
<td>37 - B</td>
<td>57 - A</td>
<td></td>
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<td>38 - B</td>
<td>58 - B</td>
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<td>19 - D</td>
<td>39 - D</td>
<td>59 - D</td>
<td></td>
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<tr>
<td>20 - B</td>
<td>40 - B</td>
<td>60 - B</td>
<td></td>
</tr>
</tbody>
</table>

When a "Yes" answer is checked:

A = Absolute contraindication to diving;
B = Relative contraindication to diving, requires careful review by
physician;
C = Of interest, not a contraindication.
Appendix 5
Recommended Physicians with Expertise in Diving Medicine

Dr. Jason Garrison
100 Muirfield Ct.
Yorktown, VA 23693

757-874-1051

Any on-call physician at the
Divers’ Alert Network
Duke University Medical Center
Durham, NC

919-684-2948
APPENDIX 6

SELECTED REFERENCES IN DIVING MEDICINE


MEDICAL EXAMINATION OF SPORT SCUBA DIVERS, Jefferson Davis, M.D. (ed.). Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100.


SCUBA DIVING IN SAFETY AND HEALTH, C.W. Deuker. Madison Publishing Associates, Diving Safety Digest, P.O. Box 2735, Menlo Park, CA 94026


APPENDIX 7

DEFINITION OF TERMS

Air sharing - The sharing of an air supply between divers.

Bottom Time - The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins a direct ascent to the surface.

Breath-hold Diving - A diving mode in which the diver uses no self-contained or surface-supplied air or oxygen supply.

Buddy Breathing - The sharing of a single air source between divers.

Buddy Diver - Second member of the dive team.

Buddy system - Two comparably equipped scuba divers in the water in constant communication.

Buoyant Ascent - An ascent made using some form of positive buoyancy.

Burst Pressure - The pressure at which a pressure containment device would fail structurally.

Certified Diver - A diver who holds a recognized valid certification from a organizational member or recognized certifying agency.

Controlled Ascent - Any one of several kinds of ascents including normal, swimming, and air sharing ascents where the diver(s) maintain control so a pause or stop can be made during the ascent.

Cylinder - A pressure vessel for the storage of gases.

Decompression Chamber - A pressure vessel for human occupancy. Also called a hyperbaric chamber or recompression chamber.

Decompression Sickness - A condition with a variety of symptoms which may result from gas and bubbles in the tissues of divers after pressure reduction.

Decompression Table - A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures. (Also called dive tables.)

Dive - A descent into the water, an underwater diving activity utilizing compressed gas, an ascent, and return to the surface.

Dive Computer - A microprocessor based device which computes a diver's theoretical decompression status, in real time, by using pressure(depth) and time as input to a decompression model, or set of decompression tables, programmed into the device.

Dive Location - A surface or vessel from which a diving operation is conducted.

Dive Site - The physical location of a diver during a dive.

Diver - An individual in the water who uses apparatus, including snorkel, which supplies breathing gas at ambient pressure.

Diver-In-Training - An individual gaining experience and training in additional diving activities under the supervision of a dive team member experienced in those activities.
Diver-Carried Reserve Breathing Gas - A diver-carried independent supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by another diver.

Diving Mode - A type of diving required specific equipment, procedures, and techniques, for example, snorkel, scuba, surface-supplied air, or mixed gas.

Diving Control Board (DCB). The group of individuals who act as the official representative of the membership organization in matters concerning the scientific diving program (see Sec. 1.24).

Diving Safety Officer (DSO) - The individual responsible for the safe conduct of the scientific diving program of the membership organization (see Sec. 1.23).

Emergency Ascent - An ascent made under emergency conditions where the diver exceeds the normal ascent rate.

FSW - Feet of seawater, or equivalent static head.

Hookah Diving - A type of shallow water surface-supplied diving where there is no voice communication with the surface.

Hyperbaric Chamber - See decompression chamber.

Hyperbaric Conditions - Pressure conditions in excess of normal atmospheric pressure at the dive location.

Lead Diver - The certified scientific diver with experience and training to conduct the diving operation.

Maximum Working Pressure - The maximum pressure to which a pressure vessel may be exposed under standard operating conditions.

Organizational member - An organization which is a current member of the AAUS, and which has a program which adheres to the standards of the AAUS as set forth in the AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs.

Mixed-Gas Diving - A diving mode in which the diver is supplied in the water with a breathing gas other than air.

MSW - Meters of seawater or equivalent static head.

No-Decompression limits - The depth-time limits of the "no-decompression limits and repetitive dive group designations table for no-decompression air dives" of the U.S. Navy Diving Manual or equivalent limits.

Normal Ascent - An ascent made with an adequate air supply at a rate of 60 feet per minute or less.

Pressure-Related Injury - An injury resulting from pressure disequilibrium within the body as the result of hyperbaric exposure. Examples include: decompression sickness, pneumothorax, mediastinal emphysema, air embolism, subcutaneous emphysema, or ruptured eardrum.

Pressure Vessel - See cylinder.

Psig - pounds per square inch gauge.

Recompression Chamber - see decompression chamber.
Scientific Diving - Scientific diving is defined (29 CFR 1910.402) as diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks.

Scuba Diving - A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

Standby Diver - A diver at the dive location capable of rendering assistance to a diver in the water.

Surface Supplied Diving - A diving mode in which the diver in the water is supplied from the dive location with compressed gas for breathing.

Swimming Ascent - An ascent which can be done under normal or emergency conditions accomplished by simply swimming to the surface.

Umbilical - The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies a diver or bell with breathing gas, communications, power, or heat, as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

Working Pressure - The normal pressure at which the system is designed to operate.
APPENDIX 8

AAUS REQUEST FOR DIVING RECIPROCITY FORM
VERIFICATION OF DIVER TRAINING AND EXPERIENCE

A scientific diver that is currently certified under the auspices of an organizational member institution of the American Academy of Underwater Sciences (AAUS) shall be recognized by any other organizational member of AAUS and may apply for reciprocity in order to dive with the host organization. Organizational 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 (1996 edition). The visiting diver will comply with the diving regulations of the host organization's Diving Safety Manual unless previously arranged by both organization's Diving Control Boards.

The host organization 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 organization. If the request is denied, the host organization 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:

<table>
<thead>
<tr>
<th>(Date)</th>
<th>Written scientific diving examination</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Last diving medical examination</td>
</tr>
<tr>
<td></td>
<td>Most recent checkout dive</td>
</tr>
<tr>
<td></td>
<td>Scuba regulator/equipment service/test</td>
</tr>
<tr>
<td></td>
<td>CPR training (Agency)</td>
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<td></td>
<td>Oxygen administration (Agency)</td>
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<td></td>
<td>First aid for diving</td>
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<tr>
<td></td>
<td>Date of last dive</td>
</tr>
</tbody>
</table>

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
- Dive Computer
- Nitrox
- Mixed gas
- Closed circuit
- Saturation
- Decompression
- Rescue
- Livemaster
- Instructor
- EMT
- Dive Accident Management
- Chamber operator
- Lifesaving
- Blue water
- Altitude
- Ice/Polar
- Cave
- Night
- Other

Name of diver:

Emergency Information: (To notify in an emergency)

Name:__________________________________________

Relationship:___________________________________

Telephone: (work)________________________________(home)____________________

Address:_______________________________________

This is to verify that the above individual is currently a certified scientific diver at:

(Name of AAUS Organizational Member)

Diving Safety Officer:__________________________________

(Signature)__________________________________________(Date)

(Print)____________________________________________(Telephone, FAX, Email)
APPENDIX 9
AAUS CHECKOUT DIVE AND TRAINING EVALUATION

Certified scientific divers and Divers-In-Training from AAUS organizational members should be able to demonstrate proficiency in the following skills during checkout dives or training evaluation dives with the Dive Safety Officer or designee:

___ Knowledge of AAUS diving standards and regulations
___ Pre-dive planning, briefing, site orientation, and buddy check
___ Use of dive tables and/or dive computer
___ Equipment familiarity
___ Underwater signs and signals
___ Proper buddy contact
___ Monitor cylinder pressure, depth, bottom time
___ Swim skills:
   ___ Surface dive to 10 ft. without scuba gear
   ___ Demonstrate watermanship and snorkel skills
   ___ Surface swim without swim aids (400 yd. <12min)
   ___ Underwater swim without swim aids (25 yd. without surfacing)
   ___ Tread water without swim aids (10 min.), or without use of hands (2 min.)
   ___ Transport another swimmer without swim aids (25yd)
___ Entry and exit (pool, boat, shore)
___ Mask removal and clearing
___ Regulator removal and clearing
___ Surface swim with scuba, alternate between snorkel and regulator (400 yd.)
___ Neutral buoyancy (hover motionless in midwater)
___ Proper descent and ascent with B.C.
___ Remove and replace weight bolt while submerged
___ Remove and replace scuba cylinder while submerged
___ Alternate air source breathing with and without mask (donor/receiver)
___ Buddy breathing with and without mask (donor/receiver)
___ Simulated emergency swimming ascent
___ Compass and underwater navigation
___ Simulated decompression and safety stop
___ Rescue:
   ___ Self rescue techniques
   ___ Tows of conscious and unconscious victim
   ___ Simulated in-water rescue breathing
   ___ Rescue of submerged non-breathing diver (including equipment removal, simulated rescue breathing, towing, and recovery to boat or shore)
___ Use of emergency oxygen on breathing and non-breathing victim
___ Accident management and evacuation procedures

Additional Training (optional)
___ Compressor/ Fill station orientation and usage
___ Small boat handling

__________________________
__________________________
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__________________________
__________________________
__________________________

47
APPENDIX 10
DIVING EMERGENCY MANAGEMENT PROCEDURES

Introduction
A diving accident victim could be any person who has been breathing air underwater regardless of depth. It is essential that emergency procedures are pre-planned and that medical treatment is initiated as soon as possible. It is the responsibility of each AAUS organizational member to develop procedures for diving emergencies including evacuation and medical treatment for each dive location.

General Procedures

Depending on and according to the nature of the diving accident, stabilize the patient, administer 100% oxygen, contact local Emergency Medical System (EMS) for transport to medical facility, contact diving accident coordinator, as appropriate. Explain the circumstances of the dive incident to the evacuation teams, medics and physicians. Do not assume that they understand why 100% oxygen may be required for the diving accident victim or that recompression treatment may be necessary.

1. Make appropriate contact with victim or rescue as required.

2. Establish (A)irway, (B)reathing, (C)irculation as required.

3. Administer 100% oxygen, if appropriate (in cases of Decompression Illness, or Near Drowning).

4. Call local Emergency Medical System (EMS) for transport to nearest medical treatment facility.

5. Call appropriate Diving Accident Coordinator for contact with diving physician and recompression chamber, etc.

6. Notify DSO or designee according to the Emergency Action Plan of the organizational member.

7. Complete and submit Incident Report Form(Appendix 11) to the DCB of the organization and the AAUS (As required in Section 3.43).

List of Emergency Contact Numbers Appropriate For Dive Location:

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

48
**AMERICAN ACADEMY OF UNDERWATER SCIENCES**

**ACCIDENT OR INCIDENT REPORT FORM**

**DATE & TIME OF ACCIDENT**
- MONTH: ____, DAY: ____, YEAR: _____
- TIME: __:__ AM/PM

**IS THIS A FATALITY REPORT?**
- YES ☐
- NO ☐

If yes, complete Fatality Report Form.

1. **PATIENT NAME**
   - LAST
   - FIRST
   - MI

2. **OCCUPATION**

3. **ADDRESS**
   - STREET
   - CITY
   - ST
   - ZIP

4. **PATIENT PHONE (HOME)**

5. **PATIENT PHONE (WORK)**

6. **COUNTRY (IF NOT USA)**

7. **AGE**
   - YES ☐
   - NO ☐

8. **SEX**
   - M ☐
   - F ☐

9. **HEIGHT**
   - FT
   - IN

10. **WEIGHT**
   - LG.

11. **HOME INSTITUTION**

12. **CERTIFIED DEPTH**

13. **DAN MEMBER?**
   - Y - Yes ☐
   - N - No ☐

14. **YEARS DIVING**
   - YEARS
   - MONTHS

15. **NUMBER OF DIVES MADE**
   - Total
   - Previous 12 months

16. **PREVIOUS DIVE ACCIDENTS**
   - A - Possible DCS
   - B - DCS
   - C - AGE
   - D - Pul barotrauma
   - E - None

17. **CURRENT MEDICATIONS**
   - Y or N ☐
   - Prescription ☐
   - Non-prescription ☐

18. **CIGARETTE USE**
   - A - Presently
   - B - Never
   - Packs per day

19. **PREVIOUS MAJOR ILLNESSES/SURGERY**
   - (Provide up to 3 responses)
   - A - Chest-lung ☐
   - B - Asthma ☐
   - C - Chest-heart ☐
   - D - Gastrointestinal/Abdomen ☐
   - E - Brain ☐
   - F - Spine/Back ☐
   - G - Limb or joint of DCS site ☐
   - H - Circulation/Blood ☐
   - I - Neurologic/Nervous system ☐
   - J - Muscle/Skeleton system ☐
   - K - Eye ☐
   - L - Mental/Emotional ☐
   - M - Other __________________________
   - N - None ☐

   List and describe specific problems:

20. **CURRENT HEALTH PROBLEMS WITHIN PREVIOUS 2 MONTH**
   - (Provide up to 3 responses)
   - A - Chest-lung ☐
   - B - Asthma ☐
   - C - Chest-heart ☐
   - D - Gastrointestinal/Abdomen ☐
   - E - Brain ☐
   - F - Spine/Back ☐
   - G - Limb or joint of DCS site ☐
   - H - Circulation/Blood ☐
   - I - Neurologic/Nervous system ☐
   - J - Muscle/Skeleton system ☐
   - K - Eye ☐
   - L - Mental/Emotional ☐
   - M - Other __________________________
   - N - None ☐

   List and describe specific problems or additional current medications:

**ATTACH A WRITTEN REPORT DESCRIBING THE ACCIDENT OR INCIDENT**

49
21. DIVE PLATFORM
   A - Shore
   B - Small boat
   C - Research Vessel

22. DIVE ACTIVITY (up to 2 responses)
   A - Collecting
   B - Photography
   C - Installing Equip.
   D - Servicing Equip.
   E - Under instruction
   F - Other

23. ENVIRONMENT
   A - Freshwater
   B - Saltwater

24. ALTITUDE OF DIVE
   A - Sea Level
   B - > Sea Level
   C - > 1000 ft
   D - > 1000 ft

25. Was this dive or dive series typical of your normal type of diving?
   Y - Yes
   N - No

26. DIVER'S PERCEPTION OF TEMPERATURE
   A - Cold
   B - Hot
   C - Comfortable

27. CURRENT STRENGTH
   A - Strong
   B - Moderate
   C - Weak
   D - None

28. AIR SUPPLY
   A - Scuba Air
   B - Surface Supply Air
   C - Mixed gas
   D - None/Rebreath hold dive

29. AIR CONSUMPTION
   A - Low
   B - Out of air
   C - Not a problem
   D - Buddy breathing

30. BUOYANCY PROBLEM
   Y - Yes
   N - No

31. RAPID ASCENT
   Y - Yes
   N - No

32. WITHIN LIMITS - Y or N
   Tables
   (which table)
   or
   Computer
   (type)

33. TYPE OF SUIT
   A - Wet
   B - Partial Wet
   C - Dry
   D - Lycra
   E - Swim

34. EQUIPMENT USED ON DIVE:
   (please check all that apply)
   Depth gauge
   Timing device/watch
   Buoyancy vest
   BC Inflator hose in use
   Decompression computer

35. EQUIPMENT MALFUNCTION:
   A - None
   B - Regulator
   C - BC Vest
   D - Weight belt
   E - Dry suit
   F - DC Computer
   G - Inflator hose
   H - Contaminated air supply
   I - Equipment was not familiar to you.
   J - Other
   Reason:

36. TYPE OF DIVE
   Y - Yes
   N - No
   Single
   Repetitive

37. WOMEN, PLEASE RESPOND
   (up to 2 responses)
   When the accident occurred, were you:
   A - Menstruating
   B - On oral contraceptives
   C - Pregnant
   D - None of the above

38. DIVE LOCATION:
   State, Province, or Island.
   Country or nearest country:

39. How long ago was your last Dive Trip/Series?
   Circle one:
   Y - Yes
   N - No
   Days
   Weeks
   Months

40. STRENUOUS EXCERCISE
   Y - Yes
   N - No
   24 hours pre dive
   During dive
   6 hours postive

41. PREDIVE HEALTH
   A - Nausea
   B - Hangover
   C - Diarrhea
   D - Other
   E - No Problem

42. ALCOHOL
   Number drank:
   None
   Night Before
   Predive
   Between Dives
   Post Dive

43. RECREATIONAL DRUG INF
   Prior to, between, or after dive
   Y - Yes
   N - No

44. Do you consider yourself physically fit?
   Y - Yes
   N - No
   Do you exercise on a weekly basis?
   Y or N
   # Days per week

45. FATIGUE OR LACK OF SLEEP PRIOR TO DIVE?
   Y - Yes
   N - No

46. DIVE SERIES
   Please fill in all that apply up to and including your last dive. If you stopped a day please leave that day blank.

<table>
<thead>
<tr>
<th>DAY</th>
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<tbody>
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<td>1</td>
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</tr>
</tbody>
</table>

Total # of dives:

Any night dive? (How many):

Any symptoms? (Yes/No):
   A - All no stop dive(s)
   E - Any safety stop
   C - Any dive requiring decompression stops
   A - Multiple
   B - Square

Deepest Dive (ft):
### DIVE ACCIDENT OR INCIDENT (cont’d)

#### 47. DIVE PROFILE FOR DAY OF DIVE ACCIDENT

<table>
<thead>
<tr>
<th>GROUP LETTER</th>
<th>1st DIVE</th>
<th>2nd DIVE</th>
<th>3rd DIVE</th>
<th>4th DIVE</th>
<th>5th DIVE</th>
<th>6th DIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURFAC INT (MIN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DEC STOPS (MIN)</td>
<td></td>
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<tr>
<td>DEPTH (FT)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BOTTOM TIME (MIN)</td>
<td></td>
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</tr>
</tbody>
</table>

#### 48. INITIAL CONTACT WAS:
- A - DAN Emergency
- B - DAN Non-emergency
- C - Hospital emergency room
- D - Emergency medical service
- E - US Coast Guard
- F - Physician
- G - Dive instructor/shop
- H - Other

#### 49. Total delay from symptom onset to contacting DAN or other medical help:

- HOURS
- DAYS

#### 50. FLYING OR INCREASED ELEVATION AFTER DIVING AND PRIOR TO TREATMENT?
- A - Commercial airliner
- B - Unpressurized aircraft
- C - Med Evac Flight
- D - Mountain elevation
- E - Does not apply

#### 51. SIGNS & SYMPTOMS

<table>
<thead>
<tr>
<th>Symptom</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A - Pain</td>
<td>B - Rash</td>
<td>C - Itching</td>
<td>D - Weakness</td>
<td>E - Numbness/Tingling</td>
<td>F - Dizziness/Vertigo</td>
</tr>
<tr>
<td></td>
<td>G - Dementia/consciousness</td>
<td>H - Unconsciousness</td>
<td>I - Restlessness</td>
<td>J - Extreme fatigue</td>
<td>K - Visual disturbance</td>
<td>L - Paralysis</td>
</tr>
<tr>
<td></td>
<td>M - Headache</td>
<td>N - Difficulty breathing</td>
<td>O - Nausea/Vomiting</td>
<td>P - Hemoptysis/doucheing blood from lungs</td>
<td>Q - Mental confusion</td>
<td>R - Convulsions</td>
</tr>
</tbody>
</table>

#### 52. LOCATION: Block A = location of symptom

#### 53. SYMPTOM ONSET:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A - Head</td>
<td>B - Face</td>
<td>C - Sinus</td>
<td>D - Eyes</td>
<td>E - Ears</td>
<td>F - Neck</td>
</tr>
<tr>
<td></td>
<td>G - Shoulder</td>
<td>H - Knee</td>
<td>I - Entire arm</td>
<td>J - Chest</td>
<td>K - Forearm</td>
<td>L - Wrist</td>
</tr>
<tr>
<td></td>
<td>M - Hand</td>
<td>N - Fingers</td>
<td>O - Fingers</td>
<td>P - Fingers</td>
<td>Q - Fingers</td>
<td>R - Fingers</td>
</tr>
</tbody>
</table>

#### 54. ANY OF THE SYMPTOMS FROM #1 PRIOR TO THE LAST DIVE?

- Y - Yes
- N - No

#### 55. FIRST AID ADMINISTERED BEFORE HOSPITAL OR CHAMBER HELP WAS RECEIVED?

- Y - Yes
- N - No

- Oxygen
- Aspirin
- Oral fluids
- Head down position/ Trendelenburg
- Demand valve
- Freeflow valve
- Don’t know
PRE-CHAMBER INFORMATION (cont.)

56. HOSPITAL TREATMENT ADMINISTERED
(Please check all that apply):
- None
- Steroids
- Oral fluids
- Antipasagulant
- IV fluids
- Antepain
- Oxygen
- Other medication

57. RELIEF BEFORE CHAMBER TREATMENT?
- Complete
- Partial
- Temporary
- None

58. IF ANY RELIEF OCCURRED, WHICH SYMPTOMS FROM #51 ABOVE?
(Please check):
- 1st
- 2nd
- 3rd
- 4th
- 5th
- 6th

59. PRE-CHAMBER RELIEF OCCURRED:
- Without first aid or medical care
- Following first aid
- Following pre-chamber hospital care
- No relief occurred

CHAMBER TREATMENT

60. CHAMBER TREATMENT FACILITY LOCATION
CITY
STATE
COUNTRY

61. TYPE OF CHAMBER
(Please check)
- Initial Treatment
- Retreatment Chamber
- Monoplace
- Duplace
- Multiplace
- Monoplace
- Duplace
- Multiplace

62. TOTAL DELAY FROM SYMPTOM ONSET TO RECOMPRESSION
- HOURS
- DAYS

63. INITIAL TREATMENT
- A - USN TT4
- B - USN TT5
- C - USN TT6
- D - USN TT6A
- E - HART Protocol
- F - KINDOWALL Protocol
- G - 45 hrs 90 min
- H - 33 hrs 120 min
- I - Other

64. TABLE EXTENSIONS REQUIRED?
- Y - Yes
- N - No

65. RELIEF AFTER INITIAL TREATMENT OF SYMPTOMS FROM #51?

66. RETREATMENT GIVEN
(Provide up to 3 responses)
- USN TT4
- USN TT5
- USN TT6
- USN TT6A
- HART Protocol
- KINDOWALL Protocol
- 45 hrs 90 min
- 33 hrs 120 min
- Other

67. RELIEF AFTER HYPERBARIC THERAPY COMPLETED?
- A - Complete
- B - Partial
- C - Temporary
- D - Hyperbaric therapy not completed
- E - None

68. RESIDUAL SYMPTOMS-
AFTER HYPERBARIC THERAPY COMPLETED?
- A - Pain only
- B - Neurologic
- C - Hyperbaric therapy not completed
- D - None

69. DURATION OF RESIDUAL SYMPTOMS
(Circle one)
- DAYS
- WEEKS
- MONTHS

70. FINAL DIAGNOSIS:
- A - DCS I
- B - DCS II
- C - Air Embolism
- D - Pulmonary Barotrauma
- E - Other

_______________________________________
Form Completed By
APPENDIX 12

GUIDELINES FOR USE OF DIVE COMPUTERS


1. Only those makes and models of dive computers specifically approved by the Diving Control Board may be used.

2. Any diver desiring the approval to use a dive computer as a means of determining decompression status must apply to the Diving Control Board, complete an appropriate practical training session and pass a written examination.

3. Each diver relying on a dive computer to plan dives and indicate or determine decompression status must have his own unit.

4. On any given dive, both divers in the buddy pair must follow the most conservative dive computer.

5. If the dive computer fails at any time during the dive, the dive must be terminated and appropriate surfacing procedures should be initiated immediately.

6. A diver should not dive for 18 hours before activating a dive computer to use it to control his diving.

7. Once the dive computer is in use, it must not be switched off until it indicates complete outgassing has occurred or 18 hours have elapsed, whichever comes first.

8. When using a dive computer, non emergency ascents are to be at a rate specified for the make and model of dive computer being used.

9. Ascent rates shall not exceed 40 fsw/min in the last 60 fsw.

10. Whenever practical, divers using a dive computer should make a stop between 10 and 30 feet for 5 minutes, especially for dives below 60 fsw.

11. Only 1 dive on the dive computer in which the NDL of the tables or dive computer has been exceeded may be made in any 18 hour period.

12. Repetitive and multi-level diving procedures should start the dive, or series of dives, at the maximum planned depth, followed by subsequent dives of shallower exposures.

13. Multiple deep dives require special consideration.
APPENDIX 13

SAFE ASCENT RECOMMENDATIONS

From: AAUS BIOMECHANICS OF SAFE ASCENTS WORKSHOP, 1990, Lang and Egstrom (Eds.)

It has long been the position of the American Academy of Underwater Sciences that the ultimate responsibility for safety rests with the individual diver.

The time has come to encourage divers to slow their ascents.

1. Buoyancy compensation is a significant problem in the control of ascents.

2. Training in, and understanding of, proper ascent techniques is fundamental to safe diving practice.

3. Before certification, the diver is to demonstrate proper buoyancy, weighting and a controlled ascent, including a "hovering" stop.

4. Diver shall periodically review proper ascent techniques to maintain proficiency.

5. Ascent rates shall not exceed 60 fsw per minute.

6. A stop in the 10-30 fsw zone for 3-5 min is recommended on every dive.

7. When using a dive computer or tables, non-emergency ascents are to be at the rate specified for the system being used.

8. Each diver shall have instrumentation to monitor ascent rates.

9. Divers using dry suits shall have training in their use.

10. Dry suits shall have a hands-free exhaust valve.

11. BCs shall have a reliable rapid exhaust valve which can be operated in a horizontal swimming position.

12. A buoyancy compensator is required with dry suit use for ascent control and emergency flotation.

13. Breathing 100% oxygen above water is preferred to in-water air procedures for omitted decompression.
Appendix 14

Release and Waiver Forms

All students or other individuals diving under Institute auspices in a capacity other than employee shall execute a release holding the Commonwealth of Virginia, the College of William and Mary, the Virginia Institute of Marine Science (VIMS), its employees, and the Board of Visitors harmless from any claims which might arise in connection with SCUBA diving. This release is to read:

Release and Waiver

The undersigned and, in the event the undersigned is under 18 years of age, the undersigned’s parents and/or guardians, for and in consideration of the granting of permission by the Diving Control Board of the Virginia Institute of Marine Science/School of Marine Science, for said undersigned to become a qualified SCUBA diver and to engage in SCUBA diving under the auspices of VIMS, hereby hold(s) harmless and release(s) and forever discharge(s) the Board of Visitors of the College of William and Mary, the Director, the Diving Policy Committee, the Diving Control Board, the Diving Officer, and all of the Board of Visitors agents, officers, assistants, and employees, either in their individual capacities or by reason of their relationship to the said Board of Visitors of the College of William and Mary, and their successors, from any and all claims and demands whatsoever, which the undersigned and any of them, and the heirs, representatives, executors and administrators thereof, or any other persons acting on their behalf, or on the behalf of their respective agents, have or may have against the said Board of Visitors of the College of William and Mary, or any or all of the above-mentioned persons or their successors, by reasoning of any accident, illness, injury or death, or other consequences arising or resulting directly or indirectly from participation in SCUBA diving under the auspices of VIMS, and occurring during said participation, or at any time subsequent thereto.

In adopting the policies set forth in the VIMS Guide to Diving Safety, the College of William and Mary, its employees, and the Board of Visitors assume(s) no liability not otherwise imposed by law. Other than those Institute employees diving in the course of their employment, each diver is assumed under those policies to be voluntarily performing activities for which he/she assumes all risks, consequences and potential liability.

Dated this ___________ day of ___________ 19__

Witness  

Witness

Father (or guardian)

Mother (or guardian)

Participant

55
Appendix 15
OSHA Regulations on Commercial Diving (including Definition of Scientific Diving)

29 CFR 1910 Subpart T - Commercial Diving Operations

General
1910.401 Scope and application
1910.402 Definitions
Personnel Requirements
1910.410 Qualifications of the dive team
General Operations Procedures
1910.421 Pre-dive procedures
1910.422 Procedures during dive
1910.423 Post-dive procedures
Specific Operations Procedures
1910.424 SCUBA diving
1910.425 Surface-supplied air diving
1910.426 Mixed-gas diving
1910.427 Liveboating
Equipment Procedures and Requirements
1910.430 Equipment
Record keeping
1910.440 Record keeping requirements
1910.441 Effective date
Appendix A to Subpart T
Examples of Conditions Which May Restrict or Limit Exposure to Hyperbaric Conditions
Appendix B to Subpart T
Scientific Diving
Subpart T—Commercial Diving Operations

Authority: Sections 4, 5, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, and 657); sec. 107, Contract Work Hours and Safety Standards Act (the Construction Safety Act) (40 U.S.C. 333); sec. 41, Longshore and Harbor Workers’ Compensation Act (33 U.S.C. 941); Secretary of Labor’s Order No. 8-76 (41 FR 52059), 8-83 (48 FR 35736), or 1-90 (55 FR 9033), as applicable; 29 CFR part 1911.

Source: 42 FR 37668, July 22, 1977, unless otherwise noted.

General

§ 1910.401 Scope and application.

(a) Scope. (1) This subpart (standard) applies to every place of employment within the waters of the United States, or within any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, Wake Island, Johnston Island, the Canal Zone, or within the Outer Continental Shelf lands as defined in the Outer Continental Shelf Lands Act (47 Stat. 462; 43 U.S.C. 1331), where diving and related support operations are performed.

(2) This standard applies to diving and related support operations conducted in connection with all types of work and employments, including general industry, construction, ship repairing, shipbuilding, shipbreaking and longshorening. However, this standard does not apply to any diving operation:

(i) Performed solely for instructional purposes, using open-circuit, compressed-air SCUBA and conducted within the no-decompression limits;

(ii) Performed solely for search, rescue, or related public safety purposes by or under the control of a governmental agency;

(iii) Governed by 45 CFR part 46 (Protection of Human Subjects, U.S. Department of Health and Human Services) or equivalent rules or regulations.
§ 1910.402

Definitions.

As used in this standard, the listed terms are defined as follows:

A caregiver. Actual cubic feet per minute.

ASME. Code or equivalent: ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.

ATA. Atmosphere absolute.

Bell. An enclosed compartment, pressurized (closed bell) or unpressurized (open bell), which allows the diver to be transported to and from the underwater work area and which may be used as a temporary refuge during diving operations.

Bottom time. The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins ascent.

Bursting pressure. The pressure at which a pressure containment device would fail structurally.

Cylinder. A pressure vessel for the storage of gases.

Decompression chamber. A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.

Decompression sickness. A condition with a variety of symptoms which may result from gas or bubbles in the tissues of divers after pressure reduction.

Decompression table. A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

Dive location. A surface or vessel from which a diving operation is conducted.

Dive location reserve breathing gas. A supply system of air or mixed-gas (as appropriate) at the dive location which is independent of the primary supply system and sufficient to support divers during the planned decompression.

Dive team. Divers and support employees involved in a diving operation, including the designated person-in-charge.

Diver. An employee working in water using underwater apparatus which supplies compressed breathing gas at the ambient pressure.

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Established by another federal agency, which regulate research, development, or related purposes involving human subjects.

(iv) Defined as scientific diving and which is under the direction and control of a diving program containing at least the following elements:

(A) Diving safety manual which includes at a minimum: Procedures covering all diving operations specific to the program; procedures for emergency care, including recompression and evacuation; and criteria for diver training and certification.

(B) Diving control (safety) board, with the majority of its members being active divers, which shall at a minimum have the authority to: Approve and monitor diving projects; review and revise the diving safety manual; assure compliance with the manual; certify the depths to which a diver has been trained; take disciplinary action for unsafe practices; and, assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving.

(b) Application in emergencies. An employer may deviate from the requirements of this standard to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage, provided that the employer:

(1) Notifies the Area Director, Occupational Safety and Health Administration within 48 hours of the onset of the emergency situation indicating the nature of the emergency and extent of the deviation from the prescribed regulations; and

(2) Upon request from the Area Director, submits such information in writing.

(c) Employer obligation. The employer shall be responsible for compliance with:

(1) All provisions of this standard of general applicability; and

(2) All requirements pertaining to specific diving modes to the extent diving operations in such modes are conducted.


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Diver-carried reserve breathing gas: A diver-carried supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver.

Diving mode: A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).

Fus: Feet of seawater (or equivalent static pressure head).

Heavy gear: Diver-worn deep-sea dress including helmet, breastplate, dry suit, and weighted shoes.

Hyperbaric conditions: Pressure conditions in excess of surface pressure.

Inwater stage: A suspended underwater platform which supports a diver in the water.

Liveboating: The practice of supporting a surfaced-supplied air or mixed gas diver from a vessel which is underway.

Mixed-gas diving: A diving mode in which the diver is supplied in the water with a breathing gas other than air.

No-decompression limits: The depth-time limits of the "no-decompression limits and repetitive dive group designation table for no-decompression air dives", U.S. Navy Diving Manual or equivalent limits which the employee can demonstrate to be equally effective.

Psi(g): Pounds per square inch (gage)

Scientific diving: means diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as: Placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.

SCUBA diving: A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater-breathing apparatus.

Standby diver: A diver at the dive location available to assist a diver in the water.

Surface-supplied air diving: A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.

Treatment table: A depth-time and breathing gas profile designed to treat decompression sickness.

Umbilical: The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies the diver or bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

Volume tank: A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

Working pressure: The maximum pressure to which a pressure containment device may be exposed under standard operating conditions.

[42 FR 37568, July 22, 1977, as amended at 47 FR 57860, Nov 26, 1982]

PERSONNEL REQUIREMENTS

§ 1910.410 Qualifications of dive team.

(a) General. (1) Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.

(2) Each dive team member shall have experience or training in the following:

(i) The use of tools, equipment and systems relevant to assigned tasks;

(ii) Techniques of the assigned diving mode; and

(iii) Diving operations and emergency procedures.

(3) All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).

(4) Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.

(b) Assignments. (1) Each dive team member shall be assigned tasks in accordance with the employee’s experience or training, except that limited additional tasks may be assigned to an employee undergoing training provided that these tasks are performed under...
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the direct supervision of an experienced dive team member.
(2) The employer shall not require a dive team member to be exposed to hyperbaric conditions against the employee’s will, except when necessary to complete decompression or treatment procedures.
(3) The employer shall not permit a dive team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive team member.
(c) Designated person-in-charge. (1) The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members.
(2) The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation.

GENERAL OPERATIONS PROCEDURES

(a) General. The employer shall develop and maintain a safe practices manual which shall be made available at the dive location to each dive team member.
(b) Contents. (1) The safe practices manual shall contain a copy of this standard and the employer’s policies for implementing the requirements of this standard.
(2) For each diving mode engaged in, the safe practices manual shall include:
(i) Safety procedures and checklists for diving operations;
(ii) Assignments and responsibilities of the dive team members;
(iii) Equipment procedures and checklists; and
(iv) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury.

§ 1910.421 Pre-dive procedures.
(a) General. The employer shall comply with the following requirements prior to each diving operation, unless otherwise specified.
(b) Emergency aid. A list shall be kept at the dive location of the telephone or call numbers of the following:
(i) An operational decompression chamber (if not at the dive location);
(ii) Accessible hospitals;
(iii) Available physicians;
(iv) Available means of transportation; and
(v) The nearest U.S. Coast Guard Rescue Coordination Center.
(c) First aid supplies. (1) A first aid kit appropriate for the diving operation and approved by a physician shall be available at the dive location.
(2) When used in a decompression chamber or bell, the first aid kit shall be suitable for use under hyperbaric conditions.
(d) Planning and assessment. Planning of a diving operation shall include an assessment of the safety and health aspects of the following:
(i) Diving mode;
(ii) Surface and underwater conditions and hazards;
(iii) Breathing gas supply (including reserves);
(iv) Thermal protection;
(v) Diving equipment and systems;
(b) Dive team assignments and physical fitness of dive team members (including any impairment known to the employer);
(c) Repetitive dive designation or residual inert gas status of dive team members;
(d) Decompression and treatment procedures (including altitude corrections); and
(e) Emergency procedures.
(e) Hazardous activities. To minimize hazards to the dive team, diving operations shall be coordinated with other activities in the vicinity which are likely to interfere with the diving operation.
(i) Employee briefing. (1) Dive team members shall be briefed on:
(1) The tasks to be undertaken;
(ii) Safety procedures for the diving mode;
(iii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and
(iv) Any modifications to operating procedures necessitated by the specific diving operation.
(2) Prior to making individual dive team member assignments, the employer shall inquired into the dive team member's current state of physical fitness, and indicate to the dive team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.

(g) Equipment inspection. The breathing gas supply system including reserve breathing gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.

(h) Warning signal. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.

41 FR 7086, July 22, 1976; as amended at 47 FR 14786, Apr. 6, 1982; 54 FR 24334, June 7, 1989

§ 1910.422 Procedures during dive.

(a) General. The employer shall comply with the following requirements which are applicable to each diving operation unless otherwise specified.

(g) Water away and exit. (1) A means capable of supporting the diver shall be provided for entering and exiting the water.

(2) The means provided for exiting the water shall extend below the water surface.

(3) A means shall be provided to assist an injured diver from the water or into a bell.

(c) Communications. (1) An operational two-way voice communication system shall be used between:

(i) Each surface supplied air or mixed-gas diver and a dive team member at the dive location or bell (when provided or required); and

(ii) The bell and the dive location.

(2) An operational, two-way communication system shall be available at the dive location to obtain emergency assistance.

(d) Decompression tables. Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location.

(e) Dive profiles. A depth-time profile, including when appropriate any breathing gas changes, shall be maintained for each diver during the dive including decompression.

(f) Hand-held power tools and equipment. (1) Hand-held electrical tools and equipment shall be de-energized before being placed into or retrieved from the water.

(2) Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.

(g) Welding and burning. (1) A current supply switch to interrupt the current flow to the welding or burning electrode shall be:

(i) Tended by a dive team member in voice communication with the diver performing the welding or burning; and

(ii) Kept in the open position except when the diver is welding or burning.

(2) The welding machine frame shall be grounded.

(3) Welding and burning cables, electrode holders, and connections shall be capable of carrying the maximum current required by the work, and shall be properly insulated.

(4) Insulated gloves shall be provided to divers performing welding and burning operations.

(5) Prior to welding or burning on closed compartments, structures or pipes, which contain a flammable vapor or in which a flammable vapor may be generated by the work, they shall be vented, flooded, or purged with a mixture of gases which will not support combustion.

(h) Explosives. (1) Employers shall transport, store, and use explosives in accordance with this section and the applicable provisions of §1910.129 and §1926.912 of Title 29 of the Code of Federal Regulations.

(2) Electrical continuity of explosive circuits shall not be tested until the diver is out of the water.
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(3) Explosives shall not be detonated while the diver is in the water.

(i) Termination of dive. The working interval of a dive shall be terminated when:

(1) A diver requests termination;

(2) A diver fails to respond correctly to communications or signals from a dive team member;

(3) Communications are lost and can not be quickly re-established between the diver and a dive team member at the dive location, and between the designated person-in-charge and the person controlling the vessel in liveboating operations; or

(4) A diver begins to use diver-carried reserve breathing gas or the dive-location reserve breathing gas.

§ 1910.423 Post-dive procedures.

(a) General. The employer shall comply with the following requirements which are applicable after each diving operation, unless otherwise specified.

(i) Precautions. (1) After the completion of any dive, the employer shall:

(ii) Check the physical condition of the diver;

(iii) Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness;

(iv) Advise the diver of the location of a decompression chamber which is ready for use; and

(v) Alert the diver to the potential hazards of flying after diving.

(2) For any dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas as a breathing mixture, the employer shall instruct the diver to remain awake and in the vicinity of the decompression chamber which is at the dive location for at least one hour after the dive (including decompression or treatment as appropriate).

(b) Recompression capability. (1) A decompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) shall be available at the dive location for:

(i) Surface-supplied air diving to depths deeper than 100 fsw and shallower than 220 fsw.

(ii) Mixed gas diving shallower than 300 fsw; or

(iii) Diving outside the no-decompression limits shallower than 300 fsw.

(2) A decompression chamber capable of recompressing the diver at the surface to the maximum depth of the dive shall be available at the dive location for dives deeper than 300 fsw.

(3) The decompression chamber shall be:

(i) Dual-lock;

(ii) Multiplace; and

(iii) Located within 5 minutes of the dive location.

(4) The decompression chamber shall be equipped with:

(i) A pressure gauge for each pressurized compartment designed for human occupancy;

(ii) A built-in-breathing-system with a minimum of one mask per occupant;

(iii) A two-way voice communication system between occupants and a dive team member at the dive location;

(iv) A viewport; and

(v) Illumination capability to light the interior.

(5) Treatment tables, treatment gas appropriate to the diving mode, and sufficient gas to conduct treatment shall be available at the dive location.

(6) A dive team member shall be available at the dive location during and for at least one hour after the dive to operate the decompression chamber (when required or provided).

(d) Record of dive. (1) The following information shall be recorded and maintained for each diving operation:

(i) Names of dive team members including designated person-in-charge;

(ii) Date, time, and location;

(iii) Diving modes used;

(iv) General nature of work performed;

(v) Approximate underwater and surface conditions (visibility, water temperature and current); and

(vi) Maximum depth and bottom time for each diver.

(2) For each dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas, the following additional information shall be recorded and maintained:

(i) Depth-time and breathing gas profiles;

(ii) Decompression table designation (including modification); and
(iii) Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation for each diver.

(2) For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained:

(i) Description of decompression sickness symptoms (including depth and time of onset); and

(ii) Description and results of treatment.

(c) Decompression procedure assessment. The employer shall:

(1) Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used, and individual susceptibility;

(2) Take appropriate corrective action to reduce the probability of recurrence of decompression sickness; and

(3) Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness.


SPECIFIC OPERATIONS PROCEDURES

§ 1910.425 SCUBA diving.

(a) General. Employers engaged in SCUBA diving shall comply with the following requirements, unless otherwise specified.

(b) Limits. SCUBA diving shall not be conducted:

(1) At depths deeper than 130 fsw;

(2) At depths deeper than 100 fsw or outside the no-decompression limits unless a decompression chamber is ready for use;

(3) Against currents exceeding one (1) knot unless line-tended;

(4) In enclosed or physically confining spaces unless line-tended.

(c) Procedures. (i) A standby diver shall be available while a diver is in the water.

(ii) A diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operations.

(iii) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(iv) A diver-carried reserve breathing gas supply shall be provided for each diver consisting of:

(A) A manual reserve (J valve); or

(B) An independent reserve cylinder with a separate regulator or connected to the underwater breathing apparatus.

(v) The valve of the reserve breathing gas supply shall be in the closed position prior to the dive.

§ 1910.425 Surface-supplied air diving.

(a) General. Employers engaged in surface-supplied air diving shall comply with the following requirements, unless otherwise specified.

(b) Limits. (1) Surface-supplied air diving shall not be conducted at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw.

(2) A decompression chamber shall be ready for use at the dive location for any dive outside the no-decompression limits or deeper than 100 fsw.

(3) A bell shall be used for dives with an inwater decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.

(c) Procedures. (i) Each diver shall be continuously tended while in the water.

(ii) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(iii) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.

(iv) For dives deeper than 100 fsw or outside the no-decompression limits:

(A) A separate dive team member shall tend each diver in the water;

(B) A standby diver shall be available while a diver is in the water;

(C) A diver-carried reserve breathing gas supply shall be provided for each diver except when heavy gear is worn; and

(D) A dive-location reserve breathing gas supply shall be provided for heavy-gear diving deeper than 100 fsw or outside the no-decompression limits.
§ 1910.426 Mixed-gas diving.

(a) General. Employers engaged in mixed-gas diving shall comply with the following requirements, unless otherwise specified.

(b) Limits. Mixed-gas diving shall be conducted only when:

(1) A decompression chamber is ready for use at the dive location; and

(2) A bell is used at depths greater than 220 fsw or when the dive involves inwater decompression time of greater than 120 minutes, except when heavy gear is worn or when diving in physically confining spaces; or

(ii) A closed bell is used at depths greater than 300 fsw, except when diving is conducted in physically confining spaces.

(c) Procedures. (1) A separate dive team member shall tend each diver in the water.

(2) A standby diver shall be available while a diver is in the water.

(3) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(4) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.

(5) Each diving operation shall have a dive-location reserve breathing gas supply.

(6) When heavy gear is worn:

(i) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver; and

(ii) An inwater stage shall be provided to divers in the water.

(7) An inwater stage shall be provided for divers without access to a bell for dives deeper than 100 fsw or outside the no-decompression limits.

8) When a closed bell is used, one dive team member in the bell shall be available and tend the diver in the water.

(9) Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing gas supply shall be provided whenever the diver is prevented by the configuration of the dive area from ascending directly to the surface.

§ 1910.427 Liveboating.

(a) General. Employers engaged in diving operations involving liveboating shall comply with the following requirements.

(b) Limits. Diving operations involving liveboating shall not be conducted:

(1) With an inwater decompression time of greater than 120 minutes;

(2) Using surface-supplied air at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

(3) Using mixed gas at depths greater than 220 fsw;

(4) In rough seas which significantly impede diver mobility or work function;

(5) In other than daylight hours.

(c) Procedures. (1) The propeller of the vessel shall be stopped before the diver enters or exits the water.

(2) A device shall be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.

(3) Two-way voice communication between the designated person-in-charge and the person controlling the vessel shall be available while the diver is in the water.

(4) A standby diver shall be available while a diver is in the water.

(5) A diver-carried reserve breathing gas supply shall be carried by each diver engaged in liveboating operations.
§ 1910.430 Equipment

(a) General. (1) All employers shall comply with the following requirements, unless otherwise specified.

(2) Each equipment, modification, repair, test, calibration or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.

(b) Air compressor system. (1) Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.

(2) Air compressor intakes shall be located away from areas containing exhaust or other contaminants.

(3) Respirable air supplied to a diver shall not contain:

(i) A level of carbon monoxide (CO) greater than 20 ppm;

(ii) A level of carbon dioxide (CO₂) greater than 1,000 ppm;

(iii) A level of oil mist greater than 5 milligrams per cubic meter; or

(iv) A noxious or pronounced odor.

(4) The output of air compressor systems shall be tested for air purity every 6 months by means of samples taken at the connection to the distribution system, except that non-oil lubricated compressors need not be tested for oil mist.

(c) Breathing gas supply hoses. (1) Breathing gas supply hoses shall:

(i) Have a working pressure at least equal to the working pressure of the total breathing gas system;

(ii) Have a rated bursting pressure at least equal to 4 times the working pressure.

(iii) Be tested at least annually to 1.5 times their working pressure; and

(iv) Have their open ends taped, capped or plugged when not in use.

(2) Breathing gas supply hose connectors shall:

(i) Be made of corrosion-resistant materials;

(ii) Have a working pressure at least equal to the working pressure of the hose to which they are attached, and

(iii) Be resistant to accidental disengagement.

(3) Umbilicals shall:

(i) Be marked in 10-ft. increments to 100 feet beginning at the diver's end, and in 50 ft. increments thereafter;

(ii) Be made of kink-resistant material;

(iii) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psig.

(d) Buoyancy control. (1) Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.

(2) A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.

(3) When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing gas supply.

(e) Compressed gas cylinders. Compressed gas cylinders shall:

(1) Be designed, constructed and maintained in accordance with the applicable provisions of 29 CFR 1910.101 and 1910.189 through 1910.171.

(2) Be stored in a ventilated area and protected from excessive heat.

(3) Be secured from falling; and

(4) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifested, or when used for SCUBA diving.

(f) Decompression chambers. (1) Each decompression chamber manufactured after the effective date of this standard, shall be built and maintained in accordance with the ASME Code or equivalent.

(2) Each decompression chamber manufactured prior to the effective date of this standard shall be maintained in conformity with the code requirements to which it was built or equivalent.

(3) Each decompression chamber shall be equipped with:
§ 1910.440

(i) Means to maintain the atmosphere below a level of 25 percent oxygen by volume;

(ii) Mufflers on intake and exhaust lines, which shall be regularly inspected and maintained;

(iii) Suction guards on exhaust line openings; and

(iv) A means for extinguishing fire, and shall be maintained to minimize sources of ignition and combustible material.

(g) Gauges and timekeeping devices. (1) Gauges indicating diver depth which can be read at the dive location shall be used for all dives except SCUBA.

(2) Each depth gauge shall be dead-weight tested or calibrated against a master reference gauge every 6 months, and when there is a discrepancy greater than two percent (2 percent) of full scale between any two equivalent gauges.

(3) A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.

(4) A timekeeping device shall be available at each dive location.

(h) Masks and helmets. (1) Surface-supplied air and mixed-gas masks and helmets shall have:

(i) A non-return valve at the attachment point between helmet or mask and hose which snaps closed readily and positively; and

(ii) An exhaust valve.

(2) Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

(i) Oxygen safety. (1) Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designed for oxygen service.

(2) Components (except umbilicals) exposed to oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be cleaned of flammable materials before use.

(3) Oxygen systems over 125 psig and compressed air systems over 500 psig shall have slow-opening shut-off valves.

(j) Weights and harnesses. (1) Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.

(2) Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with:

(i) A positive buckling device;

(ii) An attachment point for the umbilical to prevent strain on the mask or helmet; and

(iii) A lifting point to distribute the pull force of the line over the diver's body.


RECORDKEEPING

§ 1910.440 Recordkeeping requirements.

(a)(1) [Reserved]

(2) The employer shall record the occurrence of any diving-related injury or illness which requires any dive team member to be hospitalized for 24 hours or more, specifying the circumstances of the incident and the extent of any injuries or illnesses.

(b) Availability of records. (1) Upon the request of the Assistant Secretary of Labor for Occupational Safety and Health, or the Director, National Institute for Occupational Safety and Health, Department of Health and Human Services of their designees, the employer shall make available for inspection and copying any record or document required by this standard.

(2) Records and documents required by this standard shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.20 (a)-(e) and (g)-(i). Safe practices manuals (§1910.220), depth-time profiles (§1910.422), records of dives (§1910.423), decompression procedure assessment evaluations (§1910.423), and records of hospitalizations (§1910.440) shall be provided in the same manner as employee exposure records or analyses using exposure or medical records. Equipment inspections and testing records which pertain to employees (§1910.430) shall also be provided upon request to employees and their designated representatives.
(3) Records and documents required by this standard shall be retained by the employer for the following period:

(i) Dive team member medical records (physician's reports) (§1910.411)—5 years;

(ii) Safe practices manual (§1910.429)—current document only;

(iii) Depth-time profile (§1910.442)—until completion of the recording of dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness;

(iv) Recording of dive (§1910.429)—1 year, except 5 years where there has been an incident of decompression sickness;

(v) Decompression procedure assessment evaluations (§1910.429)—5 years;

(vi) Equipment inspections and testing records (§1910.439)—current entry or tag, or until equipment is withdrawn from service;

(vii) Records of hospitalizations (§1910.440) 5 years.

(4) After the expiration of the retention period of any record required to be kept for five (5) years, the employer shall forward such records to the National Institute for Occupational Safety and Health, Department of Health and Human Services. The employer shall also comply with any additional requirements set forth at 20 CFR 1910.20(h).

(5) In the event the employer ceases to do business:

(i) The successor employer shall receive and retain all dive and employee medical records required by this standard; or

(ii) If there is no successor employer, dive and employee medical records shall be forwarded to the National Institute for Occupational Safety and Health, Department of Health and Human Services.


§1910.441 Effective date.

This standard shall be effective on October 20, 1977, except that for provisions where decompression chambers or bells are required and such equipment is not yet available, employers shall comply as soon as possible thereafter but in no case later than 6 months after the effective date of the standard.

APPENDIX A TO SUBPART I TO PART 1910—EXAMPLES OF CONDITIONS WHICH MAY RESTRICT OR LIMIT EXPOSURE TO HYPERBARIC CONDITIONS

The following disorders may restrict or limit occupational exposure to hyperbaric conditions depending on severity, presence of residual effects, response to therapy, number of occurrences, diving mode, or degree and duration of isolation.

History of seizure disorder other than early febrile convulsions.

Malignancies (active) unless treated and without recurrence for 5 years.

Chronic inability to equalize sinus and/or middle ear pressure.

Cystic or cavitory disease of the lungs.

Impaired organ function caused by alcohol or drug use.

Conditions requiring continuous medication for control (e.g., antihistamines, steroids, barbiturates, moodaltering drugs, or insulin).

Nodular's disease.

Hemoglobinopathies.

Obstructive or restrictive lung disease.

Vestibular and organ destruction.

Pneumothorax.

Cardiac abnormalities (e.g., pathological heart block, valvular disease, intraventricular conduction defects other than isolated right bundle branch block, angina pectoris, arrhythmia, coronary artery disease).

Juxta-articular osteonecrosis.

APPENDIX B TO SUBPART T TO PART 1910—GUIDELINES FOR SCIENTIFIC DIVING

This appendix contains guidelines that will be used in conjunction with §1910.401(c)(2)(iv) to determine those scientific diving programs which are exempt from the requirements for commercial diving. The guidelines are as follows:

1. The Diving Control Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operations.

2. The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary.

3. The tasks of a scientific diver are those of an observer and data gatherer. Construction and trouble-shooting tasks traditionally associated with commercial diving are not included within scientific diving.

4. Scientific divers, based on the nature of their activities, must use scientific expertise in studying the underwater environment.
and, therefore, are scientists or scientists in training.

[50 FR 1050, Jan. 9, 1985]