

Diving Safety Manual

Association for Marine Exploration



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CHAPTER 1. GENERAL POLICY

1.1 Purpose

1.1.1 Organizational Context

The Association for Marine Exploration (hereinafter referred to as AME) conducts and facilitates innovative scientific exploration of undersea environments. Through the novel application of advanced diving equipment and techniques, AME and its affiliates provide unprecedented opportunities for research and discovery in ways not possible by conventional means. The overriding goal of this organization is to foster increased knowledge about the ocean and its inhabitants, enabling better understanding and more effective preservation of a wide range of marine habitats. The organization serves the scientific and diving community as a vehicle to obtain previously inaccessible data, thereby enabling new insights and discoveries about the underwater realm.

AME is a non-profit organization in the state of Hawaii, and has been approved by the Internal Revenue Service for Federal tax exemption under section 501(c)(3) of the Internal Revenue Code (starting date 12 June 2003). It operates exclusively for charitable, scientific, and/or educational purposes.

AME Projects are classified as one of the following three types:

1. **AME-Funded Project:** A project primarily organized and supported by AME, where more than 80% of the resources supporting the project are provided by AME.
2. **AME Collaboration:** A project organized by AME in conjunction with one or more organizations, groups or individuals; such that AME contributes 20% or more (but not more than 80%) of the resources and support for the project; with remaining support provided by other organizations, groups or individuals.
3. **AME-Supported Project:** A project primarily organized and supported by organizations, groups, or individuals other than AME, but for which some (less than 20%) of the resources supporting the project are provided by AME.

By its nature, AME conducts and facilitates projects that involve highly advanced and technical diving practices that are generally outside the realm of conventional scientific diving. The standards set forth herein were developed specifically with this context in mind.

1.1.2 Scientific Diving Standards

The purpose of this Policy Manual is to establish the scientific diving standards adopted for use by divers operating on AME-Funded Projects or representing AME

on AME Collaborations, or when using AME-owned equipment during dives on AME-Supported Projects. The guiding principle of these standards is to help assure that such diving activity is conducted in a manner that will protect divers from accidental injury and/or illness, while allowing for productive underwater research.

1.2 Occupational Safety and Health Administration (OSHA)

The Occupational Safety and Health Act of 1970 (also known as the “Williams-Steiger Act”) was established “...to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.” (<http://www.osha.gov>)

The scope and coverage of regulations of the Occupational Safety and Health Administration (hereinafter referred to as OSHA) are set forth in Part 1975 of Title 29 of the Code of Federal Regulations (29 CFR), and the occupational safety and health standards are contained in Part 1910. The specific portions of these standards with greatest relevance to AME are addressed herein.

1.2.1 Scope of OSHA Coverage

The extent of OSHA’s coverage is detailed in Part 1975 of 29 CFR, which clarifies the scope of employers that must comply with the provisions of the OSH Act of 1970. Section 3(5) of the Act defines the term “employer” as follows:

{5} The term "employer" means any person engaged in a business affecting commerce who has employees, but does not include the United States or any State or Political subdivision of a State.

Part 1975.3(d) elaborates on this definition: “...we interpret the term ‘business’ in the above definition as including any commercial or noncommercial activity affecting commerce and involving the employment of one or more employees; the term "commerce" is defined in the Act itself, in section 3(3).”

Section 1975.4(b) provides clarification as to certain employers, with Section 1975.4(b)(4) being most relevant to AME:

Nonprofit and charitable organizations. The basic purpose of the Williams-Steiger Act is to improve working environments in the sense that they impair, or could impair, the lives and health of employees. Therefore, certain economic tests such as whether the employer's business is operated for the purpose of making a profit or has other economic ends, may not properly be used as tests for coverage of an employer's activity under the Williams-Steiger Act. To permit such economic tests to serve as criteria for excluding certain employers, such as nonprofit and charitable organizations which employ one or more employees, would result in thousands of employees being left outside the protections of the Williams-Steiger Act in disregard of the clear mandate of Congress to assure "every working man and woman in the Nation safe and healthful working conditions . . .". Therefore, any

charitable or non-profit organization which employs one or more employees is covered under the Williams-Steiger Act and is required to comply with its provisions and the regulations issued thereunder. (Some examples of covered charitable or non-profit organizations would be disaster relief organizations, philanthropic organizations, trade associations, private educational institutions, labor organizations, and private hospitals.)

Whether or not diving activities connected with AME projects are covered by OSHA regulations ultimately depends on whether divers are acting in their capacity as “employees” of AME (hereinafter reference to as “employed divers”; see Section 1.2.2), or as independent contractors (hereinafter reference to as “contracted divers”; see Section 1.2.3). This Dive Safety Manual includes standards and protocols for both.

1.2.2 Employed Divers

Part 1910 of 29 CFR sets forth the Occupational Safety and Health Standards as they apply to general industry (under which AME would fall). Subpart A of Part 1910 unhelpfully defines “employee” [1910.2(d)] as follows:

"Employee" means an employee of an employer who is employed in a business of his employer which affects commerce

Title 26 of the Code of Federal Regulations (<http://ecfr.gpoaccess.gov>) addresses issues related to Internal Revenue. Volume 15, Chapter I, Subchapter C, Part 31, Subpart B, Section 31.3121(d)-1 provides more robust guidelines for determining when a person is to be considered an employee for purposes of Internal Revenue assessment. Paragraph (b) of Section 31.3121(d)-1 includes a test for determining whether an officer of a corporation is an employee of the corporation:

(b) Corporate officers. Generally, an officer of a corporation is an employee of the corporation. However, an officer of a corporation who as such does not perform any services or performs only minor services and who neither receives nor is entitled to receive, directly or indirectly, any remuneration is considered not to be an employee of the corporation. A director of a corporation in his capacity as such is not an employee of the corporation.

According to the AME By-Laws, diving is specifically not included among the duties of AME corporate officers, and furthermore officers explicitly do not receive, directly or indirectly, any remuneration for participation in any of their official activities. It is clear from the last sentence of paragraph (b) above that simply serving on the Board of Directors of AME does not, by itself, confer status as an “employee”.

Paragraph (c) of Section 31.3121(d)-1 (26 CFR) addresses Common Law Employees, and states (in part) under (c)(1):

(2) Generally such relationship [between employer and employee] exists when the person for whom services are performed has the right to control and direct the individual who performs the services, not only as to the result to be

accomplished by the work but also as to the details and means by which that result is accomplished. That is, an employee is subject to the will and control of the employer not only as to what shall be done but how it shall be done. In this connection, it is not necessary that the employer actually direct or control the manner in which the services are performed; it is sufficient if he has the right to do so. The right to discharge is also an important factor indicating that the person possessing that right is an employer. Other factors characteristic of an employer, but not necessarily present in every case, are the furnishing of tools and the furnishing of a place to work, to the individual who performs the services. In general, if an individual is subject to the control or direction of another merely as to the result to be accomplished by the work and not as to the means and methods for accomplishing the result, he is an independent contractor. An individual performing services as an independent contractor is not as to such services an employee under the usual common law rules.

In 1987, the Internal Revenue Service issued a Revenue Ruling pertaining to 26 CFR 31.3121(d)-1 (Rev. Rul. 87-41, 1987-1 C.B. 296), which includes a list of twenty factors used as guidelines to determine whether sufficient control is present to establish an employer-employee relationship. These twenty factors (Appendix 1) are used herein to determine whether a person engaged in diving activities on a project involving AME is to be considered as an “employee”, or as an “independent contractor”.

Divers determined to be employees of AME, according to the twenty factors listed in Appendix 1, are covered by OSHA regulations, and may only participate on AME dive projects if they conform to the OSHA Scientific Diving Exemption (Section 1.2.4) and all requirements associated therewith.

1.2.3 Contracted Divers

Divers determined to be operating as independent contractors according to the twenty factors listed in Appendix 1, are *not* covered by OSHA regulations, and will participate on AME dive projects as such only so long as they maintain status as non-employees (see Chapter 2).

1.2.4 OSHA Scientific Diving Exemption

In 1982, the U.S. Occupational Safety and Health Administration (OSHA) exempted scientific diving from commercial diving regulations (29 CFR Part 1910, Subpart T) under certain conditions, which are outlined below. The final guidelines for the exemption became effective in 1985 (Federal Register, Vol. 50, No. 6, p. 1046).

According to Section 1910.401(a)(2)(iv), the commercial diving standards do not apply to any diving operation that is 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 diving¹.

Scientific Diving is defined in Section 1910.402 of 29 CFR as follows:

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.

Appendix B to Subpart T of Section 1910 provides additional guidelines for determining programs that meet the criteria for the scientific diving exemption:

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.

1.3 Administrative Organization

All decisions relating to the implementation of the requirements set forth herein shall be determined by a majority of voting Diving Control Board (hereinafter referred to as DCB) members, with the advice and consent of additional selected individuals serving in an advisory capacity. Additional administrative oversight of employed

¹ Section 1910.402 of 29 CFR defines "SCUBA diving" as: "A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus."

divers (Section 1.2.1) is provided by an elected Diving Safety Officer (hereinafter referred to as DSO).

1.3.1 The Diving Control Board (DCB):

1. Shall minimally include as voting members all current members of the AME BOD;
2. May include additional members (other than BOD members) as appointed by a majority vote of the AME BOD, provided that:
 - a. Non-BOD members of the DCB can be removed by majority vote of the BOD;
 - b. BOD members may not be removed from the DCB (unless they are first removed from the BOD);
 - c. The maximum number of DCB members remains less than twice the number of members of the BOD, such that a unanimous vote by the BOD represents a majority vote by the DCB;
3. Shall consist of a majority of active divers;
4. Shall have autonomous and absolute authority over the diving operations of individuals acting in their capacity as employees of AME (Section 1.2.2; excluding independent contractors as defined in Section 1.2.3), including:
 - a. Certifying the depths to which divers have been trained;
 - b. Taking disciplinary action for unsafe practices;
 - c. Assuring adherence to the buddy system for SCUBA diving;
 - d. Establishing criteria for equipment selection and use;
 - e. Establishing and/or approving facilities for the inspection and maintenance of diving and associated equipment;
 - f. Recommending new equipment or techniques;
 - g. Reviewing and approving or disapproving dive plans required by any proposal for funding of scientific activity via intramural or extramural sources.
5. Shall approve and monitor diving projects;
6. Shall review and revise the Diving Safety Manual, and shall appropriately change policy and amend the Diving Safety Manual as the need arises;
7. Shall assure compliance with the manual;
8. Shall issue, reissue, restrict and revoke diving authorizations for all divers operating within the auspices of AME diving activities;
9. Shall act as a Board of Appeal to consider diver-related problems;
10. Shall suspend diving programs which it considers to be unsafe or unwise;
11. Shall periodically review the DSO's performance and program;

12. Shall sit as a Board of Investigation to inquire into the nature and cause of diving accidents or violations of this manual;
13. Shall hold periodic meetings as needed, either in-person or via electronic communication, depending on the amount of business pending as determined by the DSO.

1.3.2 The Diving Safety Officer (DSO):

1. Shall be elected by a majority vote of the AME BOD from among the existing members of the DCB;
2. May be removed from the position of DSO by a majority vote of the AME BOD;
3. Shall be responsible for the conduct of all diving activities of individuals diving in their capacity as employees of AME (Section 1.2.1; exclusive of independent contractors as per Chapter 2), including the authorization and approval of dive plans, maintenance of diving records, and ensuring compliance with this manual;
4. May permit portions of this program to be carried out by a qualified delegate;
5. Shall be guided in the performance of the required duties by the advice of the DCB;
6. Shall have the authority to waive at his/her discretion any requirements herein.

1.4 Operational Control

1.4.1 AME Auspices Defined

All scientific diving (as defined in Section 1.2.4) performed by individuals acting in their capacity as employees of AME (Section 1.2.2; excluding independent contractors as defined in Section 1.2.3), necessary to and part of a scientific, research, or educational activity sponsored, supported, or otherwise administered by AME, shall be considered as diving under the auspices of AME. This shall include operations involving AME employees that are supported in whole or in part by AME-administered funds, or involve AME-owned, purchased, rented, chartered or otherwise provided facilities, equipment, or supplies.

Dives performed by individuals operating as independent contractors (Section 1.2.3) are not considered to be under the auspices of AME, even in cases where such dives are conducted in direct association with dives performed by individuals operating in their capacity as employees of AME.

1.4.2 Records

The DSO or his/her designee shall maintain permanent records on each diver (Section 4.2.1; Chapter 8), including personal dive logs, copies of all dive plans approved (Section 3.2.7), records of diving accidents (Section 3.3.1), and, when

appropriate (as determined by a majority vote of the DCB), records of equipment modifications, tests, repairs, calibrations, and maintenance (Sections 5.4, 6.3.3).

1.4.3 Sites

The regulations herein shall be observed at all locations where scientific diving is conducted under AME auspices. This includes all sea-going vessels owned, operated by, and/or chartered for AME projects.

1.4.4 Conformance with Local Regulations

All diving activity, whether by contracted or employed divers, shall be conducted in a manner consistent with site-specific local, state, federal, and international regulations.

1.5 Diving Personnel

Due to the highly advanced, technical, and sometimes experimental nature of the diving activities conducted on most AME projects, ultimate responsibility for each diver's safety *MUST* rest with the diver him/herself. This applies equally to individuals acting in their capacity as employees of AME, as well as independent contractors (Chapter 2).

1.5.1 Authorized Diver

Each diver operating under AME auspices shall be authorized, trained and qualified for the diving mode being used. In most cases, this would minimally include training by a national or international diving certification organization commensurate with the diving activity to be conducted. In most instances, certification from a commercial diving school, military diving school, or other appropriate training approved by the DCB will be required for some specialized diving modes, as defined in Chapter 7. Each dive team member shall have experience or training as outlined in Chapter 4, and/or Chapter 7.

1.6 Medical Examination

All AME-employed divers shall pass a medical examination prior to engaging in AME diving activities. After any major illness or injury, or any condition requiring hospitalization for more than 24 hours, authorized divers shall submit to a medical interview or examination appropriate to the nature and extent of the injury or illness, as determined by the examining physician, before receiving clearance to resume diving activities (Sections 3.3.2, 4.1.3, 4.3.3, Chapter 8; Appendix 3; Appendix 4; Appendix 5; Appendix 9).

1.7 Diving Accident Insurance

All AME-employed divers must be covered by diving accident insurance for advanced diving activities (e.g., Divers Alert Network "Master"-level coverage) in order to participate on AME-sponsored dive projects.

1.8 Consequences of Violation of Regulations

Failure to comply with the regulations of this manual may be cause for the revocation or restriction of the diver's authorization for diving under the auspices of AME, by action of the DCB. Alleged violations shall be reviewed by the DCB, and decisions about AME-administered consequences shall be made by a unanimous vote of the AME BOD. In cases where violations result in a risk to personnel safety, severe equipment loss or damage, or major environmental damage, the DSO, his/her designee, or the Diving Supervisor (when applicable) may impose restrictions on a diver's participation in diving activities during the course of a project, pending review by the DCB, and/or unanimous vote by the BOD.

CHAPTER 2. DIVING REGULATIONS (CONTRACTORS)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations in connection with AME projects, while acting as independent contractors (also referred to as “contracted divers”; Section 1.2.3).

2.1 General Policy

AME may include divers acting as independent contractors (contracted divers) on its projects, either in place of, or in addition to AME-employed divers. Dive teams or buddy pairs may consist entirely of contracted divers, entirely of employed divers, or a mixture of both (subject to pre-dive coordination of procedures).

2.2 Authorization

Contracted divers will be authorized to participate on AME dive projects only after a majority vote approval by the DCB, and only if all criteria contained in Section 2.3 are satisfied.

2.3 Operational Control

2.3.1 Right of Control

Contracted divers shall, in all circumstances, maintain the right to control and direct all details and means by which they perform any dives conducted as part of an AME project. That is, a contracted diver is *not* subject to the will and control of AME while conducting such dives.

2.3.2 Instructions

Contracted divers retain full control over when, where, and how they perform diving activities on AME projects. AME does not retain the right to require compliance with instructions for diving activities by contracted divers operating on its behalf.

2.3.3 Training

Contracted divers may only participate on AME dives as such if they already possess the necessary training and skills to perform the dives they plan to conduct. AME shall not provide training to contracted divers, nor require an experienced AME employee to work with contracted divers – either by corresponding with the contracted diver, by requiring the contracted diver to attend meetings, or by using other methods of training.

2.3.4 Integration

Contracted divers shall not engage in activities integrated into the general AME business operations. The success or continuation of AME as a corporation shall not

depend to an appreciable degree upon the performance of any particular contracted diver on any particular AME project.

2.3.5 Services Rendered Personally

AME shall not require that any specific contracted diver perform any particular dive or other related service. When contracted divers are participating on an AME project, AME is interested only in the completion of a particular task; not in the methods used to accomplish the task.

2.3.6 Hiring, Supervising, and Paying Assistants

In no circumstances shall AME hire, supervise, or pay assistants for contracted divers. However, a contracted diver may hire, supervise, and pay assistants pursuant to a contract under which the contracted diver agrees to provide materials and labor and under which the contracted diver is responsible only for the attainment of a result.

2.3.7 Continuing Relationship

Due to the limited number of available divers who are willing to perform diving activities often required on AME projects, it is likely that many such contracted divers will participate on more than one AME project. Such repeated involvement between contracted divers and AME is thus borne of necessity, and does not necessarily establish an employer-employee relationship between the contracted divers and AME.

2.3.8 Set Hours of Work

The establishment of set hours of diving activity will be determined by the contracted diver(s), and not by AME or its affiliates.

2.3.9 Full Time Required

Contracted divers are always free to work when and for whom they choose, and shall not devote substantially full time to AME.

2.3.10 Doing Work on AME's Premises

AME projects will rarely, if ever, involve contracted divers to engage in activities on AME premises, and shall in no circumstances will contracted divers be required to do so.

2.3.11 Order or Sequence Set

Contracted divers are not required to perform diving activities in an order or sequence set by AME, and AME does not retain the right to establish or impose any such order or sequence.

2.3.12 Oral or Written Reports

Contracted workers are not required to submit regular or written reports AME.

2.3.13 Payment by Hour, Week, Month

Payment by AME to contracted divers, if any, shall be limited to reimbursement of actual expenses in most cases. If payment is made for the contracted diver's time, or for other reasons besides reimbursement of expenses, it shall be done so either by the job or on straight commission.

2.3.14 Payment of Business and/or Traveling Expenses

Compensation for business and/or traveling expenses from AME to contracted divers will only be provided as part of a contract or agreement between the two parties, at an agreed-upon amount. AME shall in no cases retain control over the contracted diver's actual expenses, nor shall it retain the right to regulate and direct the contracted diver's business activities.

2.3.15 Furnishing of Tools And Materials

In most cases, contracted divers will be expected to furnish their own equipment, tools, and associated materials for the dives conducted as part of an AME project. Certain expendables and supplies may be provided by AME to contracted divers as part of an agreement for the contracted work. Contracted divers may on occasion use certain pieces of equipment owned by AME, but only as part of an agreement for the contracted work.

2.3.16 Significant Investment

In most cases, contracted divers will be expected to demonstrate significant investment in equipment and/or facilities used by the diver in performing the dives conducted as part of an AME project.

2.3.17 Realization of Profit or Loss

Contracted divers can realize a profit or suffer a loss as a result of participation on an AME project.

2.3.18 Working for More Than One Firm at a Time

Contracted divers perform significant work for organizations other than AME.

2.3.19 Making Service Available To General Public

It is assumed that most contracted divers shall also offer their services to the general public.

2.3.20 Right To Discharge

AME shall not retain the right to discharge a contracted diver from an AME project, unless the contracted diver fails to produce a result that meets the contract specifications.

2.3.21 Right To Terminate

The right of contracted divers to end their relationship with AME will be set forth in the contract agreement, and the contracted diver may incur liability from such termination.

2.4 Pre-Dive Coordination for mixed teams

As indicated in Section 2.1, employed divers may engage in diving activities alongside contracted divers, as part of the same dive team or as dive buddies. In such cases of mixed-team diving, all divers involved will coordinate their activities for maximum mutual benefit. In no cases, however, shall AME exert control over the methods or tactics of contracted divers, and contract agreements will never stipulate such mixed-team activity as a necessary component of completing a particular task or project.

2.5 Terms of Contract

The terms of a contract shall be determined by mutual consent of AME BOD members and contracted individual(s). Generally, the contract negotiation begins with the submission by the contracted individual(s) of a standard AME Project Plan (Appendix 2).

CHAPTER 3. DIVING REGULATIONS (EMPLOYEES)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations while acting in their capacity as employees of AME (Section 1.2.2).

3.1 General Policy

No person shall engage in scientific diving operations as an employee of AME unless he/she has been approved by a majority vote of the DCB. Procedures shall be established for emergency medical treatment of divers at a hyperbaric chamber, by in-water recompression, or at other medical facilities as appropriate for any medical emergency.

3.2 Diving Procedures

3.2.1 Enclosed or Confined Spaces

No diver shall enter confined or restricted overhead environments unless trained, and authorized by the DCB for work under such conditions. This shall include any environment in which there is a physical barrier which blocks direct ascent to the surface. See Section 7.3 regarding diving in restricted overhead environments.

3.2.2 Flotation Devices

Under normal circumstances each diver shall on every dive possess the capability of establishing neutral buoyancy at the working depth, making a controlled neutrally buoyant ascent, and attaining and maintaining positive buoyancy at the surface.

3.2.3 Timing Devices, Depth and Pressure Gauges, Diving Tables

Each diving team member must have an appropriate underwater time-keeping device, a reliable means of determining depth and a reliable means to monitor cylinder pressures.

Decisions about decompression methods and profiles are necessarily the responsibility of each individual dive-team member. Divers conducting simultaneous concurrent dives requiring decompression shall coordinate decompression strategies with each other as appropriate.

3.2.4 Depth Limits

AME divers are subject to depth limitations as imposed, on a case-by-case basis, for each individual dive team or team member by the DCB, DSO or his/her designee, or (when applicable) the Dive Supervisor. Such limitations are not fixed; they depend on the context of the particular diving environment and conditions, equipment used, and experience of each dive team member within each diving context.

3.2.5 Termination of Dive

1. It is the right and responsibility of any diver to terminate the dive whenever

he/she feels it is unsafe to continue the dive. This decision may be made at any time, without fear of penalty. Before electing to terminate a dive, the diver must ensure that it does not compromise the safety of another diver already in the water (see Sections 3.2.5, 3.2.8).

2. Under normal diving conditions, the dive shall be terminated while there is still sufficient breathing gas remaining to permit the diver to safely reach the surface, including decompression time, or to safely reach an additional breathing gas source at a decompression station.

3.2.6 Refusal to Dive

1. A diver may refuse to dive whenever he/she feels it is unsafe for him/her to make the dive (see Section 3.2.6, 3.2.8). This decision may be made at any time, without fear of penalty.
2. 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 judgment, conditions are unsafe or unfavorable, or if he/she would be violating the precepts of his/her training or the regulations in this manual.
3. In all cases when diving activities are performed, the right to direct or control the manner in which diving activities are performed will rest entirely with the individual divers, and not with AME, its officers, or its designated representatives (except to the extent that such individuals direct or control their own diving activities).

3.2.7 Dive Planning

No dive shall be conducted under AME auspices without adequate planning before commencement of the dive. The nature and extent of the planning will depend in large part on the specific nature of each dive, and the particular circumstances relating to bailout options, emergency procedures and other considerations. Minimally, planning shall include briefing of specific equipment configurations for each diver to all team members, coordination among team members on dive limits (e.g., maximum depth and duration), contingency planning, bailout options, and coordination with surface-support personnel, if applicable.

3.2.8 Pre-Dive Safety Checks

1. Diver's Responsibility:
 - a. Each scientific diver shall conduct a functional check of his/her diving equipment as appropriate for the type of gear used, and shall bear full responsibility for the correct function of the gear, appropriate gas mixtures and other supplies as relevant (e.g., CO₂ absorbent for rebreather diving, batteries, oxygen sensors, etc.). (See also Section 5.2).
 - b. 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.
 - c. The diver shall terminate a dive while there is still sufficient breathing gas duration remaining to permit the diver to safely reach the surface, including required in-water decompression time, if any.

2. Equipment Requirements: Each diver shall ensure that his/her equipment is in proper working order, and that the equipment is suitable and sufficient for the type of diving operation planned. Each diver shall be equipped for the diving modes to be utilized, as defined in appropriate sections in this manual.
 - a. If gases other than air are used as the breathing medium, appropriate diving tables shall be used. The procedures of Chapter 6 and Chapter 7 regarding use of breathing mixtures other than air must be followed.
 - b. Closed and semi-closed circuit rebreathers shall meet the requirements listed in Section 7.6.
3. Diver Qualifications: Each diver shall be trained, qualified, and authorized by the DCB for the diving mode and specialized equipment being used, the diving activity to be performed, and the depths and environments in which the diving is to be conducted (Chapter 4; Chapter 7).
4. Site Evaluation: The environmental conditions at the site will be evaluated prior to commencement of operations. Operations will be terminated if the conditions are deemed unsafe.

3.2.9 Post-Dive Safety Checks

1. After the completion of a dive, each diver shall report any physical problems, injury, symptoms of decompression illness, or equipment malfunctions to other dive team members. Incidents involving non-trivial symptoms shall be reported to the DCB (see Section 3.3.1).
2. When diving beyond no-decompression limits, the divers should remain awake for at least one hour after diving, and in the company of a dive team member who is prepared to assist with arrangements for expeditious recompression if necessary.

3.2.10 Emergency Deviation 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 report of such actions must be submitted to the DCB by the diver(s) involved, explaining the circumstances and justifications for such action.

3.2.11 Flying After Diving

AME divers shall not fly above an altitude of 8,000 feet within 12 hours after a dive. Divers engaging in staged decompression diving are strongly advised to not fly for 24 hours after diving.

3.2.12 Altitude Exposure During Surface Travel after Diving

AME divers shall wait an appropriate time interval before ascending to altitude after diving. Specific times shall be determined on a case-by-case basis, depending on the diving altitude exposures involved.

3.3 Dive Logs

AME divers shall log every dive made under the auspices of AME, and are encouraged to log all other dives. Log details will depend on the specific nature of each dive, but should generally include the following information:

1. Name of diver;
2. Date, time, and dive location;
3. Diving mode used, including environment, platform, life support technology, and gas mixture if special diving modes used (Chapter 7);
4. General nature of diving activities;
5. Maximum depth and bottom time, surface interval time and mixed gas profiles, if used;
6. Decompression algorithm followed;
7. Detailed report of any accidents or potentially dangerous incidents;

3.3.1 Incident Reporting

All diving accidents requiring recompression or resulting in moderate or serious injury or death shall be reported to the DSO, and DCB. This information can be released (e.g. to the Divers Alert Network, or the National Underwater Accident Data Center) only in blinded form or with the diver's/survivor's permission in writing.

1. The following information shall be recorded and retained for a period of at least five years by the DSO with the record of the dive:
 - a. Name, addresses, and phone numbers of the principal parties involved;
 - b. Summary of experience of divers involved;
 - c. Location and description of dive site and description of conditions that led to the incident;
 - d. Description of symptoms--including depth and time of onset;
 - e. Suspected causes and effects;
 - f. Diagnosis, treatment, and outcome;
 - g. Disposition of case;
 - h. Recommendations to avoid repetition of incident.
2. The DSO shall investigate and document any incident or pressure-related injury.
3. Additional information deemed necessary may be required.

3.3.2 Record Maintenance

The DSO or his/her designee shall maintain permanent records for each individual scientific diver authorized. The file shall include evidence of certification level, log sheets, waiver, reports of disciplinary actions by the DCB, and other pertinent information deemed necessary. The DSO will maintain and file all medical reports, the results of physical examinations, and diving medical history for each diver or applicant.

1. Availability of Records: Medical records shall be available to the attending

- physician of a diver or former diver when released in writing by the diver or his/her survivors. "Blinded" medical data may be released at the discretion of the DSO, and DCB Chair.
2. Records and documents required by this standard shall be retained by AME personnel for the following minimum periods:
 - a. Physician's written reports of medical examinations for AME divers: five years;
 - b. Manual for diving safety, current document and document(s) used with modifications, if any, during previous five years;
 - c. Records of dives - three years, except five years where there has been an incident of pressure-related injury;
 - d. Pressure-related injury assessment: five years;
 - e. Inspection, service, and testing records for life-support equipment owned by AME. For equipment listed in Sections 6.2 and 7.2.2, records shall be kept for each item from time of purchase until three years after date equipment is withdrawn from service. Records shall include description of each test, calibration, and repair performed, the date of same, and the person or vendor which performed the test, calibration, or repair;
 - f. Records of hospitalization: five years.

CHAPTER 4. DIVER AUTHORIZATION (EMPLOYEES)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations while acting in their capacity as employees of AME (Section 1.2.2).

No person shall engage in scientific diving as an employee of AME unless that person is authorized pursuant to provisions of this manual. The following are considered minimal standards for authorization as an AME Scientific Diver.

4.1 Prerequisites

4.1.1 Eligibility

Only a person diving in their capacity as an AME employee (Section 1.4.1) is eligible for authorization.

4.1.2 Application

Application for authorization shall be made to the DSO and/or DCB, including the forms found in Appendix 7 (Diving History); and Appendix 8 (Assumption of Risk, Waiver and Release).

4.1.3 Medical Examination

Each applicant for Scientific Diver Authorization shall submit a statement from a licensed physician trained in diving/undersea medicine, based on the medical examination found in Appendix 4, attesting to the applicant's fitness for diving (See also Chapter 8).

4.1.4 Qualification

Each applicant must demonstrate to the DSO (or his/her designee) acceptable proficiency and knowledge of the sorts of diving activities that will be performed under AME auspices.

4.2 Requirements For Diver Authorization

Submission of documents and participation in aptitude examinations does not automatically result in authorization. Authorization to dive under AME auspices is a privilege granted by the DCB after the applicant convinces the DSO and/or members of the DCB that he/she is sufficiently skilled and proficient to be authorized, and possesses the appropriate attitudes. Authorization will be acknowledged by the signature of the DSO. Any applicant may be denied authorization who in the evaluation of the DSO or the DCB does not possess the necessary knowledge, skills, or judgment under diving conditions for the safety of the diver and his/her partner or team. Minimum documentation and examinations required are as follows:

4.2.1 Documentation

The following completed documentation shall be submitted for review by the DSO and/or DCB:

1. Diving History (Appendix 7);
2. Medical approval for diving (Chapter 8; Appendix 4);
3. Emergency care training. The trainee must demonstrate proficiency in the following:
 - a. Cardiopulmonary resuscitation (CPR);
 - b. First aid for diving accidents;
 - c. Emergency oxygen administration.
4. Assumption of Risk, Waiver and Release (Appendix 8);
5. Medical Consent Form (Appendix 9).

4.2.2 Training

The diver must demonstrate knowledge and understanding of additional theoretical aspects and practical training beyond standard recreational diving certification. Theoretical aspects should include principles and activities appropriate to the diver's involvement with AME diving activities.

4.2.3 Waiver of Requirements

If an applicant for authorization can show evidence of qualifying experience, the DSO and the DCB may grant a waiver for specific requirements of training and experience.

4.3 Continuation of Authorization

4.3.1 Term of Authorization

Divers shall remain authorized for diving under AME, and will be subject to certain limitations of depth, duration, and environment, at the discretion of the DCB.

4.3.2 Maintaining Proficiency

In general, divers must maintain a level of proficiency consistent with the diving activities to be conducted under AME auspices. Only the individual divers can determine whether proficiency has been maintained, and if not, what level of work-up diving activity will be necessary to re-establish proficiency. The DCB reserves the authority to prevent diver participation on AME dive projects if, by a majority vote, it determines that adequate levels of proficiency have not been met, or that a diver is not adequately prepared for a particular dive activity.

4.3.3 Medical Examination

Authorized Scientific Divers shall pass a periodic medical examination, as specified in Chapter 8.

After each major illness or injury as described in Section 8.1.2, an Authorized Scientific Diver shall submit to a medical interview or examination before resuming diving activities.

4.4 Revocation of Authorization

Authorization for diving under AME auspices is maintained solely at the discretion of the DCB. The DCB may, by majority vote, revoke the authorization of any diver, at any time, for any reason. Subsequent re-authorization is also at the discretion of the DCB (by majority vote).

CHAPTER 5. DIVING EQUIPMENT (EMPLOYEES)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations while acting in their capacity as employees of AME (Section 1.2.2).

5.1 General Policy

All equipment shall meet standards as determined by the DSO and the DCB, and as specified in this manual. Equipment that is subjected to extreme usage under adverse conditions requires more frequent testing and maintenance. AME recognizes that the advanced, technical, and sometimes experimental nature of dives conducted under its auspices often require highly specialized and/or modified diving equipment, and that the proper function and maintenance for such equipment is highly specific to individual circumstance. However, this chapter outlines minimal requirements for certain types of equipment, where applicable.

It is the responsibility of the primary user (the diver) to regularly examine his/her equipment and verify that it is fit for use.

5.2 Equipment

All inspections, tests, and maintenance specified in this manual shall be accomplished by qualified technicians or facilities approved by the DSO and the DCB.

5.2.1 Regulators

Diving regulators used by divers operating under AME auspices shall be inspected and tested prior to their first use. Regulators shall be inspected and tested periodically. Normally this inspection and testing shall occur every twelve months.

5.2.2 Breathing Masks and Helmets

Breathing masks and helmets shall have the following features:

1. A non-return valve at the attachment point between helmet or mask and hose which shall close readily and positively;
2. An exhaust valve;
3. A minimum ventilation rate capable of maintaining the diver at the depth to which he/she is diving.

5.2.3 Pressure Cylinders

Pressure cylinders shall be designed, constructed and maintained in accordance with the applicable provisions of the Unfired Pressure Vessel Safety Orders.

1. Pressure cylinders must be hydrostatically tested in accordance with federal Department of Transportation standards.
2. Pressure cylinders must have an internal visual inspection at intervals not to

exceed 12 months.

3. Pressure cylinder valves shall be functionally tested at intervals not to exceed 12 months.
4. Pressure cylinders and valves which are subjected to usage higher than 15 dives per month or filling by multiple users, shall be inspected at a more frequent interval.

5.2.4 Timing Devices, Depth Gauges and Submersible Cylinder Pressure Gauges

All members of a dive team must have an underwater timing device, a reliable means of monitoring depth, and a reliable means of monitoring remaining pressure in primary gas cylinders. Individual divers are responsible for assuring that these devices are properly calibrated and functioning correctly.

5.2.5 Decompression Schedules

Methods used to calculate estimated decompression requirements, including decompression algorithms (dive computers, table-generation software, published tables) as well as ad-hoc modifications to calculated decompression profiles (deep stops, gradient factors, etc.) must be approved by the DCB prior to use on AME dives. As with many aspects of advanced, technical and sometimes experimental diving activities, responsibility for proper decompression rests with the individual diver. On team dives, team members must coordinate and plan decompression strategies prior to commencement of the dive, to ensure mutual understanding among all team members. Modifications to decompression plans made during the course of a dive must be communicated to all team members and/or surface support (if applicable). All divers shall have access to at least two independent means for calculating estimated decompression requirements on all dives involving more than 10 minutes of "required" staged decompression stops (e.g., two computers, one computer and one set of pre-printed tables, etc.).

5.3 Auxiliary Equipment

All auxiliary equipment shall be of a type approved by the DSO and/or the DCB.

1. First Aid Supplies and Emergency Equipment
 - a. A first-aid kit adequate for the diving operation shall be available at the dive location.
 - b. When used in a hyperbaric chamber or bell, the first-aid kit shall be suitable for use under hyperbaric conditions.
 - c. An emergency oxygen supply adequate for the diving operation shall be available at the dive location.
2. Underwater Hand-held Power Tools
 - a. Hand-held electrical tools and equipment used underwater shall be specifically approved for this purpose.
 - b. Hand-held electrical tools and equipment supplied with power from the surface shall be de-energized before being placed into or retrieved from the water.

- c. Surface-powered hand-held power tools shall not be supplied with power until requested by the diver.
- 3. Powerhead Spears
 - a. Authorization to carry powerhead spears requires direct DCB approval.
 - b. Powerheads shall be equipped with a safety locking device and/or only be loaded when in the water.

5.4 Record Keeping

For AME-owned equipment, records shall be kept for each item listed below from its original acquisition until three years after the date equipment is withdrawn from service. Each equipment modification, repair, test, calibration, or maintenance service shall be logged including the date and nature of work performed, serial or identification number of item, and the name of the person performing the work. Records shall be kept for the equipment listed in Table 5.1.

Table 5.1. Diving Equipment for Which Records Shall be Kept.

Compressors (Section 6.3)	Submersible Pressure Gauges
Regulators	Depth Gauges
Dive Computers	Buoyancy Control Devices
Pressure Cylinders	Cylinder Valves
Diving Helmets	Gas Control Panels
Submersible Breathing Masks	Analytical Instruments
Air Storage Cylinders	Air Filtration Systems
Rebreathers and Specialized Diving Equipment (Chapter 7)	

CHAPTER 6. BREATHING GAS (EMPLOYEES)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations while acting in their capacity as employees of AME (Section 1.2.2).

6.1 Breathing Air Standards

6.1.1 Breathing Air

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

Table 6.1. CGA Grade E Specifications.

<u>Component</u>	<u>Maximum Concentration</u>
Oxygen	20-22%
Carbon Monoxide	0.001% (10 ppm/v)
Carbon Dioxide	0.05% (500 ppm/v)
Condensed Hydrocarbons	5 mg/m ³
Dust and Droplets of Oil and Water	Absent
Odors and Vapors	Absent

6.1.2 Air to be Mixed with Greater than 40% Oxygen

In addition to the standards outlined in Section 6.1.1, the following standards shall be met for breathing air that is:

1. Placed in contact with oxygen concentrations greater than 40%, or
2. Used in Enriched Air Nitrox (EAN) filling operations by the partial pressure mixing method, with greater than 40% oxygen as the enriching agent:

Table 6.2. Specifications for Air to be Mixed with Greater than 40% Oxygen.

Air Purity	CGA Grade E (Section 6.1.1)
Condensed Hydrocarbons	500 mg/m ³
Hydrocarbon Contaminants	less than or equal to 0.1 mg/m ³

6.2 Oxygen And Mixed Gas

6.2.1 Oxygen

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

Table 6.3. Medical (U.S.P.) Grade Oxygen Specifications.

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

6.2.2 Nitrogen or Helium

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

1. Nitrogen

Table 6.4. Nitrogen Specifications.

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

2. Helium

Table 6.5. Nitrogen Specifications.

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

6.3 Compressor Systems

6.3.1 Design and Location of Compressor

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

1. Low pressure compressors used to supply air to the diver equipped with a

- volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve;
2. Compressed air systems over 500 psig equipped with slow-opening shut-off valves;
 3. Fill station controls located in a remote position, shielded from cylinders being filled, to minimize risk of injury in the event of a cylinder failure;
 4. Pressurized gas bank cylinders secured to prevent falling;
 5. All high pressure lines and fittings of appropriate rated working pressures and secured every 2 feet;
 6. All air compressor intakes located away from areas containing engine exhaust or other contaminants.

6.3.2 Compressors for EAN systems

1. An oil-free or oil-less compressor is strongly recommended when blending or mixing nitrox using oxygen concentrations greater than 40%, to reduce the presence of oil mist and reduce the possibility for oxygen ignition of hydrocarbons. A hyper-filtered oil compressor for an EAN system shall be checked for oil and hydrocarbon contamination on a frequent basis.
2. The DCB and DSO shall review and approve the design of EAN filling stations under AME control. Only those designs approved by the DSO and DCB shall be used in AME controlled filling operations. Methods for producing EAN (membrane filtration, etc.) which do not require the addition to the cylinder of oxygen concentrations above 40% shall be regarded as preferable to partial pressure mixing methods using high concentration oxygen.

6.3.3 Compressor Operation and Air Test Records

1. Gas analysis and air tests shall be performed on each AME-controlled breathing air compressor at regular intervals of no more than 100 hours of operation or six months, whichever occurs first. The results of these tests shall be entered in a formal log and be maintained. Copies of the results shall be kept on file by the DSO, or the DSO's designee.
2. A log shall be maintained showing operation, repair, overhaul, filter maintenance, and temperature adjustment for each compressor.
3. Personnel filling pressure cylinders from AME-owned compressors shall be periodically trained and qualified in the operation of the fill station used.

6.3.4 Oxygen Systems and Systems using Greater Than 40% Oxygen (EAN)

1. Diving equipment used with oxygen or mixtures containing over 40% oxygen by volume shall be cleaned, designed and maintained for oxygen service.
2. Components of cylinder filling stations exposed to oxygen or gas mixtures containing oxygen concentrations over 40% by volume shall be cleaned for oxygen service, and equipped with oxygen-clean fill whips, gauges, valves, and plumbing, etc. These measures are intended to maintain EAN system integrity.
3. Oxygen delivery systems and breathing gas systems using greater than 40%

oxygen at pressures over 125 psig shall have slow-opening shut-off valves.

4. Pressure cylinders and valves used in partial pressure EAN mixing during which oxygen concentrations greater than 40% are passed into the cylinder shall be cleaned and maintained in an oxygen-clean and compatible state.
5. A dedicated fill station should be used for EAN filling operations exclusive of other fill stations, to reduce the potential for cross-mixing (air/EAN).

6.4 Production of Special Gas Mixtures

6.4.1 Authorization

Production of special gas mixtures (EAN, Heliox, Trimix, etc...) shall be authorized and approved by the DCB.

6.4.2 Personnel

Personnel involved in the production of EAN and mixed gas shall be trained and qualified for the method of production used, as determined by the DCB.

CHAPTER 7. SPECIFIC DIVING MODES (EMPLOYEES)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations while acting in their capacity as employees of AME (Section 1.2.2).

7.1 General

Any dive requiring staged decompression, conducted in restricted overhead environments (cavern, cave, tunnel, ice, or shipwreck penetration), conducted in bluewater (open ocean), incorporating breathing gas mixtures other than air, involving breathing gas delivery systems other than self-contained, open-circuit systems, or conducted in any other particularly hazardous environments, shall be considered Specialized Diving.

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

1. Training and/or experience verification requirements for AME authorization;
2. Equipment requirements;
3. Operational Requirements and additional safety protocols to be used.

For dives that involve more than one specialized diving mode, all requirements for each of the relevant diving modes shall be met.

The DCB reserves the authority to review each application of specialized diving modes, and include any further requirements deemed necessary on a case-by-case basis.

7.2 Staged Decompression Diving

Staged Decompression diving shall be defined as any diving during which the diver cannot perform a direct return to the surface without performing a required decompression stop to allow the release of inert gas from the diver's body.

The following procedures shall be observed when conducting dives requiring staged decompression stops or incurring a decompression ceiling.

7.2.1 Training Requirements

1. Divers shall document training in staged decompression diving appropriate for the conditions in which dive operations are to be conducted. Such documentation shall be to the satisfaction of the DSO and/or DCB. Training shall be conducted by agencies or instructors approved by the DSO and DCB.
2. Divers shall demonstrate to the satisfaction of the DSO or the DSO's designee proficiency in planning and executing staged decompression dives appropriate to the conditions in which diving operations are to be conducted.

7.2.2 Equipment Requirements

1. Valve and regulator systems shall be configured in a redundant manner that allows continuous breathing gas delivery in the event of failure of any one component of the regulator/valve system.
2. Redundancy in the following components is desirable, or required at the discretion of the DSO or DCB, or in accordance with other provisions listed in this Manual:
 - a. Submersible Cylinder Pressure Gauges;
 - b. Dive Computers or Decompression Calculation Devices;
 - c. Dive Timing Devices;
 - d. Depth gauges;
 - e. Buoyancy Control Devices.

7.2.3 Operational Requirements

1. Approval of dive plans involving staged decompression dives shall be on a case-by-case basis.
2. Breathing gas supply needs shall be estimated for each diver based on historic diver consumption rates, with allowances for exertion and stress.
3. At least one-third of the gas supply shall be reserved for emergencies. Except in the event of an emergency, all divers shall surface with at least one-third of the total gas supply remaining.
4. Decompression gas shall be available in twice the amount estimated to be needed for a full staged decompression schedule as planned.
5. Diver/vessel contact and communications procedures shall be reviewed and approved by the DSO, and established and rehearsed to the satisfaction of the DSO or his/her designee.
6. If breathing gas mixtures other than air are used for staged decompression, their use shall be in accordance with those regulations set forth in Chapter 6 of this manual.
7. Emergency procedures approved by the DCB for loss of gas supply, equipment malfunction, unexpected diving conditions, or dive team separation shall be developed. Emergency procedures shall be reviewed by the divers prior to each dive.

7.3 Restricted Overhead Environments

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

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

7.3.1 Training Requirements

1. Divers shall document training in restricted overhead environment diving appropriate for the conditions in which dive operations are to be conducted. Such documentation shall be to the satisfaction of the DSO and/or DCB. Training shall be conducted by agencies and instructors approved by the DSO and DCB.
2. Divers shall demonstrate to the satisfaction of the DSO or his/her designee, proficiency in planning and executing dives in a restricted overhead environment appropriate to the conditions in which diving operations are to be conducted.

7.3.2 Equipment Requirements

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

7.3.3 Operational Requirements

1. Divers shall immediately begin exiting from a restricted overhead environment when a light source or a piece of equipment fails or malfunctions.
2. Divers shall begin exiting the overhead environment as soon as any member of the dive team reaches two-thirds of his/her starting air supply.
3. Where an enclosed or confined space is not large enough for two divers, a diver shall be stationed at the underwater point of entry, an orientation line shall be used, and an emergency breathing gas supply will be available at the point of entry.
4. Emergency procedures for loss of gas supply, equipment malfunction, team separation, unexpected diving conditions and loss of visibility shall be developed. Emergency procedures shall be reviewed by the divers prior to each dive.

7.4 Bluewater Diving

Bluewater diving is defined as diving conducted in any body of water in which there is no physical bottom within diving depth ranges. The following regulations are derived from the publication, *Bluewater Diving Guidelines* (Heine, J.N., Ed., 1986. California Sea Grant College Program Publication No. T-CSGCP-014.) Exceptions to this may be made on a case-by-case basis, if a risk of entanglement with other structures exists, or there are other means of physical control. Procedures for diver control and communication must be developed to the satisfaction of the DSO and/or DCB.

7.4.1 Training Requirements

The diver shall complete practical training in bluewater diving techniques, and demonstrate proficiency to the satisfaction of the DSO or his/her designee. This training shall include:

1. Bluewater diving equipment deployment;
2. Entry procedures;
3. Buoyancy control and awareness;
4. Diver communication;
5. Scientific procedure familiarization;
6. Out-of-air procedures;
7. Dangerous marine life defensive techniques;
8. Exit procedures;
9. Emergency communication and protocols.

7.4.2 Equipment Requirements

1. Divers shall employ a down-line and counterweighted trapeze line system in order to maintain diver contact and depth control.
2. The total weight in water of the down-line and tether array shall be no greater than 10 pounds.
3. All diver tether attachments shall be made with connectors which can be quickly released by the diver while the line is under a tension at least equivalent to the weight of the entire array. Attachments shall be to either the diver's BCD, or to a separate harness, but not to the diver's weight belt.

7.4.3 Operational Requirements

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

7.5 Mixed-Gas (non-air) Diving

Based on the nature of diving activities related to the mission and objectives of AME, it is expected that the majority of dives made during AME projects will involve gas mixtures other than air. This section provides details on minimum requirements for the use of gas mixtures other than air on AME dives.

7.5.1 Personnel

All AME personnel must be trained and experienced in the use of alternate gas mixtures as applied to the dives they conduct. Submission of documents and participation in aptitude examinations does not automatically result in authorization to use alternate gas mixtures under AME auspices. The applicant must convince the DSO and DCB that he/she is sufficiently skilled and knowledgeable to be certified.

Authorization to use alternate gas mixtures may be denied to any applicant who does not demonstrate to the satisfaction of the DSO and/or DCB the appropriate judgment or proficiency to ensure the safety of the diver and dive buddy.

7.5.2 Training Requirements

Minimum certification and examinations required are as follows:

1. Divers shall document training in the use of relevant gas mixtures for the conditions in which dive operations are to be conducted. Such documentation shall be to the satisfaction of the DSO and/or DCB. Training shall be conducted under agencies and by instructors approved by the DCB.
2. Theoretical training and proficiency shall include mastery of the following concepts:
 - a. Applied Gas Law Physics;
 - b. Physiological and Medical aspects of mixed-gas diving;
 - c. CNS and Pulmonary Oxygen Toxicity;
 - d. Oxygen Dose/Time Limits;
 - e. Determination of Nitrogen status and no-stage decompression limits, using the Equivalent Air Depth calculations and standard air tables for any EAN mixture between 21 and 40%;
 - f. Calculation of Optimal Mix and Maximum Oxygen Depth for all gas mixtures;
 - g. Causes, signs, symptoms, treatment and prevention of near drowning, arterial gas embolism, decompression and hyperbaric exposure-related illnesses, anoxia/hypoxia, and oxygen toxicity;
 - h. Emergency procedures including problem recognition, assessment, management, in-water emergency techniques, and evacuation procedures for the maladies listed above;
 - i. Gas analysis and mixing procedures;
3. Divers shall demonstrate proficiency in the following, to the satisfaction of the

DSO or his/her designee:

- a. Breathing gas analysis;
 - b. Mixing procedures (if the diver is to be authorized to mix or blend breathing gases);
 - c. Oxygen safety procedures;
 - d. Planning and execution of dives using gas mixtures appropriate to the conditions in which diving operations are to be conducted;
 - e. Planning and execution of dives involving staged decompression, using high oxygen concentration mixtures.
4. The DSO and/or DCB may grant a waiver to the above requirements of training and experience, if evidence of qualifying knowledge and experience for EAN diving can be demonstrated.

7.5.3 Equipment Requirements

All Equipment used in mixed-gas diving shall comply with other applicable sections of this manual. Additional equipment requirements for mixed-gas operations are as follows:

1. For gas mixtures containing less than 40% oxygen, normal SCUBA equipment may be used.
2. All equipment used or in contact with high pressure oxygen or oxygen mixtures greater than 40% oxygen by volume shall be prepared, maintained, and designated for oxygen service in compliance with ASTM Pamphlet G88-84, "Designing Systems for Oxygen Service". Oxygen cleaning of all involved equipment must take place when using high pressure oxygen concentrations greater than 40% by volume.
3. Pressure cylinders for use with alternate gas mixtures shall be dedicated to that purpose. If the cylinders are to be used with gas mixtures greater than 40% oxygen or are to be filled by methods during which the valve assembly is exposed to oxygen concentrations greater than 40%, the cylinders shall be cleaned and maintained for oxygen service.
4. Any cylinders, regulators, compressors, or gas storage or handling equipment used during cylinder filling operations which may be exposed to mixtures containing greater than 40% oxygen shall be cleaned and maintained for oxygen service.
5. All alternate gas mixture pressure cylinders shall be color coded appropriately for the mixture, to allow immediate identification of the nature of the gas mixture they contain.
6. An oxygen analyzer capable of determining the oxygen content in the diver's cylinder prior to diving is required. The use of two analyzers is recommended for comparative and verification purposes.
7. If a full-face mask is used, it shall be configured so that the breathing gas can be switched to a alternate mixtures without removal of the mask.

7.5.4 Operational Requirements

1. Oxygen partial pressures during dives shall not exceed 1.4 atm during the working portion of a dive, nor exceed 1.6 atm during passive activity (e.g., decompression). For divers engaged in more strenuous activities, or diving in cold or arduous conditions, a more conservative oxygen partial pressure limits should be used.
2. A set of appropriate decompression tables or other means of calculating estimated decompression requirements must be available at the dive site.
3. Repetitive dives shall be performed in compliance with procedures required by the specific tables used.
4. Each diver shall be ultimately responsible for confirming by direct analysis the oxygen content of his/her gas cylinders, and acknowledge the following dive profile information:
 - a. The target depth and appropriate gas mixture to be used at that depth;
 - b. The maximum depth and bottom time allowed for the mixture contained in the cylinder.

7.6 Closed Circuit Rebreathers

Closed-circuit underwater breathing apparatus (CCUBA), or rebreathers, are defined as any device that recirculates some or all of the exhaled gas in a breathing loop and returns it to the diver. "Oxygen rebreathers" recirculate pure oxygen, replenishing that which is metabolized by the diver, "semi-closed" rebreathers recirculate the majority of exhaled breathing gas, venting a portion into the water and replenishing it with a constant or variable amount of an oxygen-rich gas mixture, and "fully-closed" rebreathers recirculate a gas mixture, replacing the metabolized oxygen via an electronically-controlled valve governed by electronic oxygen sensors.

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

7.6.1 Training and Qualification Requirements

Specific training requirements for rebreather use shall be defined by the DCB on a case-by-case basis. General requirements are as follows:

1. Training in use of Enriched Air Nitrox, in accordance with Section 7.5, is required.
2. Satisfactory completion of a rebreather training program authorized by the manufacturer of the rebreather to be used, or other training regime approved by the DCB, must be demonstrated.
3. Divers must demonstrate to the DSO or his/her designee proficiency in pre-dive, dive, and post-dive operational procedures for the particular model of

rebreather to be used. Skills shall include, at minimum, oxygen control system calibration and verification, carbon dioxide absorbent canister packing, and system monitoring.

4. Divers must demonstrate to the DSO or his/her designee proficiency in bailout procedures, including problem recognition, manual system control, flooded breathing loop recovery, absorbent canister failure, and alternate bailout options.
5. If the rebreather is to be serviced and maintained by the diver, the diver must demonstrate to the DSO or his/her designee proficiency in proper system maintenance, including full breathing loop disassembly and cleaning (mouthpiece, check-valves, hoses, counterlung, absorbent canister, etc.), oxygen sensor change out, and other tasks required by specific rebreather models.
6. Diving experience with the particular model of rebreather to be used shall include a minimum of 25 hours underwater, of which at least 20 hours shall have been under open-water conditions, and at least 5 dives to the proposed operating depth.
7. Rebreather dives involving operational depths in excess of 100 feet are subject to additional training requirements, as determined by the DCB on a case-by-case basis.

7.6.2 Equipment Requirements

1. Only those models of rebreathers specifically approved by the DCB shall be used. Test data for specific rebreather designs may be required by the DCB prior to model approval.
2. In the case of fully-closed rebreathers, a minimum of three independent oxygen sensors shall be incorporated into the rebreather design, and a minimum of two independent displays of oxygen sensor readings shall be available to the diver. Additional redundancies in onboard electronics, power supplies, and life support systems is highly preferred.
3. Each diver shall be equipped with an alternate breathing gas supply, such as redundant rebreather or open circuit bailout capability, designed to safely return the diver to the surface at normal ascent rates, including any required decompression.

7.6.3 Operational Requirements

All dives involving rebreathers must comply with relevant operational requirements set forth in other sections of this Manual. In addition, rebreather divers must comply with the following minimum operational requirements:

1. Specific Operational Requirements

All dive team members involved with rebreather diving operations under AME auspices must be familiar with, at minimum, the following items relating to each team member using rebreathers:

- a. Information about the specific rebreather model to be used; including

- name of manufacturer, type of rebreather system (oxygen semi-closed, or closed-circuit), brief description of oxygen control system, volume and designed duration of CO₂ absorbent canister, and other specific rebreather design parameters relevant to the diving activity;
- b. Type of CO₂ absorbent material to be used;
 - c. Composition and volume(s) of “diluent” gases to be used;
 - d. Complete description of alternate bailout procedures, including manual rebreather operation and open-circuit bailout procedures, if any;
2. General Operational Requirements
 - a. The oxygen partial pressure in the breathing gas shall not exceed 1.4 atm at depths greater than 20 feet.
 - b. Rebreather equipment shall be used and maintained in accordance with the specifications of the manufacturer, including pre- and post-dive procedures and operational limits (e.g., depth, water temperature, etc.).
 - c. All rebreather divers shall have at their disposal an alternate means to return to the surface in the event of a catastrophic, unrecoverable breathing loop failure (e.g., a second rebreather system, or sufficient open-circuit gas supply).
 - d. If the buddy of a rebreather diver is using open-circuit SCUBA, the rebreather must be equipped with a means to provide the SCUBA diver with a sufficient supply of open-circuit breathing gas to allow both divers to return safely to the surface.
 3. Consumables
 - a. Long-term storage of chemicals used for the absorption of carbon dioxide shall be in a cool, dry location in a sealed container. Field storage shall be as practicable, but must be adequate to maintain short-term viability of the material until use.
 - b. The Lead Diver shall determine that the carbon dioxide absorption canister is used in accordance with the manufacturer's specifications.
 - c. Other consumables (e.g., batteries, oxygen sensors, etc.) shall be maintained, tested, and replaced in accordance with the manufacturer's specifications.
 4. Oxygen Rebreathers
 - a. Oxygen rebreathers shall not be used at depths greater than 25 feet.
 - b. The breathing loop must be adequately flushed with pure oxygen prior to entering the water on each dive.
 5. Semi-closed Rebreathers
 - a. The composition of the injection gas supply of a semi-closed rebreather shall be chosen such that the partial pressure of oxygen in the breathing loop will not drop below 0.2 atm, even under maximum exertion at the surface.
 - b. The breathing loop shall be flushed with fresh gas prior to ascending.
 6. Closed-circuit Rebreathers

- a. The "diluent" gas supply shall contain enough oxygen such that it will sustain a diver at the depth it is used.
- b. Divers shall periodically monitor both primary and secondary oxygen display systems at regular intervals throughout the dive.
- c. The oxygen "set-point" (the oxygen partial pressure that the system maintains in the breathing loop) shall not be lower than 0.5 atm, nor higher than 1.4 atm.

7.7 Other Specific Diving Modes

Other specific dive modes (e.g., Hookah, Surface-supplied Helmet diving, Shipboard diving Saturation diving, diving on an active underwater lava flow, etc.) involving specialized training, equipment, and operational requirements, shall comply with standards kept on file by the DSO. No such dives will be conducted until all members of the team have been approved for the relevant diving mode by the DSO or by a program/facility approved by the DSO and evaluated by him/her for this type of diving.

CHAPTER 8. MEDICAL STANDARDS (EMPLOYEES)

The contents of this chapter pertain to diving regulations as they apply to individuals who conduct diving operations while acting in their capacity as employees of AME (Section 1.2.2).

8.1 Medical Requirements Of Dive Team

8.1.1 General

1. The AME DCB shall determine that dive team members who are exposed to hyperbaric conditions have passed a current diving physical examination and have been declared by a licensed physician to be fit to engage in diving activities as may be limited or restricted in the medical evaluation report.
2. 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.
3. The diver should be free of any chronic disabling disease and be free of any condition contained in the list of conditions for which restrictions from diving is generally recommended (Appendix 3).

8.1.2 Frequency of Medical Evaluations

Medical evaluation and associated laboratory requirements shall be completed:

1. Before a diver may dive, unless an equivalent medical evaluation has been given within the preceding 5 years (3 years if over the age of 40), the AME BOD has obtained the results of that examination, and those results have been reviewed and found satisfactory by the DSO and DCB.
2. At five-year intervals from the date of initial evaluation or last equivalent evaluation up to the age of 40 and every three years after the age of 40.
3. After any major injury or illness requiring hospitalization for more than 24 hours. These occurrences require clearance to return to diving from a physician. If the condition or illness is pressure-related, then the clearance to resume diving must come from a physician trained in diving medicine.
4. After any episode of unconsciousness.
5. After any diving accident requiring recompression therapy.

8.1.3 Information Provided Examining Physician

AME shall provide a copy of the medical evaluation requirements of this standard to the examining physician (Appendix 3; Appendix 4; Appendix 5).

8.1.4 Content of Medical Examinations

Medical examinations conducted initially and periodically shall consist of the following:

1. Applicant agreement for release of medical information release to the DSO

and DCB (Appendix 5, Section 2).

2. Medical history (Appendix 5, Section 1);
3. Diving-related medical history (Appendix 7, Section 4) ;
4. Diving physical examination (Section 8.1.6; Appendix 4; Appendix 5);
5. Any additional tests the physician may consider necessary.

8.1.5 Restriction of Diving

Conditions for which restriction from diving is recommended (Adapted from Davis, 1986) are listed in Appendix 3.

8.1.6 Laboratory Requirements for Diving Medical Examination:

1. The initial entry examination, first examination with a physician unfamiliar with the diver's past diving medical history, and/or the first examination over 40 shall include:
 - a. Medical History
 - b. Chest X-Ray (2 views)
 - c. 12-lead Electrocardiogram
 - d. Pulmonary Function Test
 - e. Audiogram
 - f. Visual Acuity
 - g. Complete Blood Count
 - h. Blood Chemistry (SMA-12)
 - i. Urinalysis
 - j. Any further tests deemed necessary by the physician to qualify the patient for diving.
2. A Periodic Re-examination shall include:
 - a. Medical History
 - b. Pulmonary Function Test
 - c. Audiogram
 - d. Visual Acuity
 - e. Complete Blood Count
 - f. Blood Chemistry (SMA-12)
 - g. Urinalysis
 - h. Any further tests deemed necessary by the physician to qualify the patient for diving.
3. For Scientific Divers, the periodic examination shall be done every 5 years up to age 40, and every 3 years thereafter.
4. An exercise stress EKG shall be performed at the first exam over age 40 and at 4 year intervals thereafter. If there is evidence of high risk for cardiac artery disease (i.e., family history, smoking, obesity, or high cholesterol) more frequent tests are strongly advised.

8.1.7 Physician's Written Report

1. After any medical examination relating to the individual's fitness to dive, the AME BOD shall be provided with 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 (Appendix 4). This shall be reviewed by the DSO and DCB.
2. AME shall make a copy of the physician's written report available to the individual.

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Appendix 1
Twenty Factors for Determining Diver Status as Employee

In 1987, the Internal Revenue Service issued a Revenue Ruling pertaining to 26 CFR 31.3121(d)-1 (Rev. Rul. 87-41, 1987-1 C.B. 296), which includes a list of twenty factors used as guidelines to determine whether sufficient control is present to establish an employer-employee relationship. They are:

1. **INSTRUCTIONS.** A worker who is required to comply with other persons' instructions about when, where, and how he or she is to work is ordinarily an employee. This control factor is present if the person or persons for whom the services are performed have the RIGHT to require compliance with instructions. See, for example, Rev. Rul. 68-598, 1968-2 C.B. 464, and Rev. Rul. 66-381, 1966-2 C.B. 449.
2. **TRAINING.** Training a worker by requiring an experienced employee to work with the worker, by corresponding with the worker, by requiring the worker to attend meetings, or by using other methods, indicates that the person or persons for whom the services are performed want the services performed in a particular method or manner. See Rev. Rul. 70-630, 1970-2 C.B. 229.
3. **INTEGRATION.** Integration of the worker's services into the business operations generally shows that the worker is subject to direction and control. When the success or continuation of a business depends to an appreciable degree upon the performance of certain services, the workers who perform those services must necessarily be subject to a certain amount of control by the owner of the business. See *United States v. Silk*, 331 U.S. 704 (1947), 1947-2 C.B. 167.
4. **SERVICES RENDERED PERSONALLY.** If the Services must be rendered personally, presumably the person or persons for whom the services are performed are interested in the methods used to accomplish the work as well as in the results. See Rev. Rul. 55-695, 1955-2 C.B. 410.
5. **HIRING, SUPERVISING, AND PAYING ASSISTANTS.** If the person or persons for whom the services are performed hire, supervise, and pay assistants, that factor generally shows control over the workers on the job. However, if one worker hires, supervises, and pays the other assistants pursuant to a contract under which the worker agrees to provide materials and labor and under which the worker is responsible only for the attainment of a result, this factor indicates an independent contractor status. Compare Rev. Rul. 63-115, 1963-1 C.B. 178, with Rev. Rul. 55-593 1955-2 C.B. 610.
6. **CONTINUING RELATIONSHIP.** A continuing relationship between the worker and the person or persons for whom the services are performed indicates that an employer-employee relationship exists. A continuing relationship may exist where work is performed at frequently recurring although irregular intervals. See *United States v. Silk*.
7. **SET HOURS OF WORK.** The establishment of set hours of work by the person or persons for whom the services are performed is a factor indicating control. See Rev. Rul. 73-591, 1973-2 C.B. 337.
8. **FULL TIME REQUIRED.** If the worker must devote substantially full time to the business of the person or persons for whom the services are performed, such person or persons have control over the amount of time the worker spends working and impliedly restrict the worker from doing other gainful work. An independent contractor on the other hand, is free to work when and for whom he or she chooses. See Rev. Rul. 56-694, 1956-2 C.B. 694.

9. **DOING WORK ON EMPLOYER'S PREMISES.** If the work is performed on the premises of the person or persons for whom the services are performed, that factor suggests control over the worker, especially if the work could be done elsewhere. Rev. Rul. 56-660, 1956-2 C.B. 693. Work done off the premises of the person or persons receiving the services, such as at the office of the worker, indicates some freedom from control. However, this fact by itself does not mean that the worker is not an employee. The importance of this factor depends on the nature of the service involved and the extent to which an employer generally would require that employees perform such services on the employer's premises. Control over the place of work is indicated when the person or persons for whom the services are performed have the right to compel the worker to travel a designated route, to canvass a territory within a certain time, or to work at specific places as required. See Rev. Rul. 56-694.
10. **ORDER OR SEQUENCE SET.** If a worker must perform services in the order or sequence set by the person or persons for whom the services are performed, that factor shows that the worker is not free to follow the worker's own pattern of work but must follow the established routines and schedules of the person or persons for whom the services are performed. Often, because of the nature of an occupation, the person or persons for whom the services are performed do not set the order of the services or set the order infrequently. It is sufficient to show control, however, if such person or persons retain the right to do so. See Rev. Rul. 56-694.
11. **ORAL OR WRITTEN REPORTS.** A requirement that the worker submit regular or written reports to the person or persons for whom the services are performed indicates a degree of control. See Rev. Rul. 70-309, 1970-1 C.B. 199, and Rev. Rul. 68-248, 1968-1 C.B. 431.
12. **PAYMENT BY HOUR, WEEK, MONTH.** Payment by the hour, week, or month generally points to an employer-employee relationship, provided that this method of payment is not just a convenient way of paying a lump sum agreed upon as the cost of a job. Payment made by the job or on straight commission generally indicates that the worker is an independent contractor. See Rev. Rul. 74-389, 1974-2 C.B. 330.
13. **PAYMENT OF BUSINESS AND/OR TRAVELING EXPENSES.** If the person or persons for whom the services are performed ordinarily pay the worker's business and/or traveling expenses, the worker is ordinarily an employee. An employer, to be able to control expenses, generally retains the right to regulate and direct the worker's business activities. See Rev. Rul. 55-144, 1955-1 C.B. 483.
14. **FURNISHING OF TOOLS AND MATERIALS.** The fact that the person or persons for whom the services are performed furnish significant tools, materials, and other equipment tends to show the existence of an employer-employee relationship. See Rev. Rul. 71-524, 1971-2 C.B. 346.
15. **SIGNIFICANT INVESTMENT.** If the worker invests in facilities that are used by the worker in performing services and are not typically maintained by employees (such as the maintenance of an office rented at fair value from an unrelated party), that factor tends to indicate that the worker is an independent contractor. On the other hand, lack of investment in facilities indicates dependence on the person or persons for whom the services are performed for such facilities and, accordingly, the existence of an employer-employee relationship. See Rev. Rul. 71-524. Special scrutiny is required with respect to certain types of facilities, such as home offices.
16. **REALIZATION OF PROFIT OR LOSS.** A worker who can realize a profit or suffer a loss as a result of the worker's services (in addition to the profit or loss ordinarily realized by employees) is generally an independent contractor, but the worker who cannot is an employee. See Rev. Rul. 70-309. For example, if the worker is subject to a real risk of economic loss due to significant investments or a bona fide liability for expenses, such as salary payments to unrelated employees, that factor indicates that the worker is an independent contractor. The risk that a worker will not receive payment for his or her services, however, is common to both independent contractors and employees and thus does not constitute a sufficient economic risk to support treatment as an independent contractor.

17. **WORKING FOR MORE THAN ONE FIRM AT A TIME.** If a worker performs more than de minimis services for a multiple of unrelated persons or firms at the same time, that factor generally indicates that the worker is an independent contractor. See Rev. Rul. 70-572, 1970-2 C.B. 221. However, a worker who performs services for more than one person may be an employee of each of the persons, especially where such persons are part of the same service arrangement.
18. **MAKING SERVICE AVAILABLE TO GENERAL PUBLIC.** The fact that a worker makes his or her services available to the general public on a regular and consistent basis indicates an independent contractor relationship. See Rev. Rul. 56-660.
19. **RIGHT TO DISCHARGE.** The right to discharge a worker is a factor indicating that the worker is an employee and the person possessing the right is an employer. An employer exercises control through the threat of dismissal, which causes the worker to obey the employer's instructions. An independent contractor, on the other hand, cannot be fired so long as the independent contractor produces a result that meets the contract specifications. Rev. Rul. 75-41, 1975-1 C.B. 323.
20. **RIGHT TO TERMINATE.** If the worker has the right to end his or her relationship with the person for whom the services are performed at any time he or she wishes without incurring liability, that factor indicates an employer- employee relationship. See Rev. Rul. 70-309.

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Appendix 2 Dive Project Plan Template

Location:

Type:

Dates:

Participants:

AME Participants:

Collaborators:

Scientific Goals/Objectives:

Methods:

Diving Technology:

Diving Protocol:

Data Collection Protocol:

Expected Results and Significance:

Budget & Funding Sources:

Item	AME	Other	Total
Travel Costs			
Airfare	-	-	-
Gear Transport	-	-	-
Lodging	-	-	-
Boat Usage	-	-	-
Diving Supplies	-	-	-
Scientific Supplies	-	-	-
Other	-	-	-
Total	-	-	-

Budget Explanation:

Remarks:

References:

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Appendix 3
Diving Medical Exam Overview for the Examining Physician

TO THE EXAMINING PHYSICIAN:

This person, _____, requires a medical examination to assess his/her fitness for authorization as a Scientific Diver for the Association for Marine Exploration (AME). 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 Diving Medical Evaluation Report. If you have questions about diving medicine you may wish to consult one of the references on the attached list. Please contact the undersigned AME Diving Safety Officer if you have any questions or concerns about diving medicine or the AME Diving Program standards. Thank you for your assistance.

Joseph Dituri, Diving Safety Officer
XXXXXXXXXXXXXXXXXXXX

Phone XXX-XXX-XXXX
Fax XXX-XXX-XXX

SCUBA and other modes of compressed-gas diving can be strenuous and hazardous. A special risk is present if the middle ear, sinuses, or lungs do not readily equalize air pressure changes. The most common cause of distress is Eustachian insufficiency. Most fatalities involve deficiencies in prudence, judgment, 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 endolymphatic shunt for Meniere's Disease [11]
5. Stapedectomy and middle ear prostheses [9]
6. Chronic mastoiditis or mastoid fistula [5]
7. Any maxillofacial deformity that interferes with the retention of the regulator mouth piece [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]
20. History of seizure. History of seizure in early childhood must be evaluated individually [21]
21. Migraine [20]
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]
29. History of intracranial surgery [24]
30. Sickle Cell Disease [34]
31. Polycythemia or leukemia [34]
32. Unexplained anemia [34]
33. History of myocardial infarction [28, 29, 30]
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. Exercise-induced tachyarrhythmias [31,32]
40. Wolf-Parkinson-White (WPW) Syndrome with paroxysmal atrial tachycardis or syncope[31]
41. Fixed-rate pacemakers [33]
42. Any drugs that 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-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 if there is a history of hypoglycemic episodes. [38]
51. Any abdominal wall hernia with potential for gas-trapping until surgically corrected.
52. Paraesophageal or incarcerated sliding hiatial 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, broncodialators, steroids, barbiturates, phenytoin, mood-altering drugs, insulin.

Attachments: Medical Evaluation of Fitness for Diving Report
Diving Medical History Form
Question evaluations for Diving Medical History Form
Recommended Physicians with Expertise in Diving/Undersea Medicine

References on Diving

- DIVING MEDICINE, 1990. A. Bove and J. Davis. W.B. Saunders Co., Philadelphia
- DIVING AND SUBAQUATIC MEDICINE, 3rd Edition, 1992. C. Edmonds, C. Lowery, and J. Pennefather. Butterworth-Heinemann Ltd., Oxford. (Available from Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100).
- MEDICAL EXAMINATION OF SPORT SCUBA DIVERS, 1989. Jefferson Davis, M.D. (ed.). Best Publishing Co., P.O. Box 30100, Flagstaff AZ 86003-0100.
- NOAA DIVING MANUAL, NOAA. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.
- SCUBA DIVING IN SAFETY AND HEALTH, C.W. Dueker. Madison Publishing Associates, Diving Safety Digest, P.O. Box 2735, Menlo Park, CA 94026.
- THE PHYSICIAN'S GUIDE TO DIVING MEDICINE, C.W. Shilling, C.B. Carlson, and R.A. Mathias. Plenum Press, New York (Available through Underwater and Hyperbaric Medical Society, Bethesda, MD).
- U.S. NAVY DIVING MANUAL. Superintendent of Documents, U.S. Government Printing Office, Washington, DC.

Association for Marine Exploration Diving Safety Manual

Appendix 4

Medical Evaluation of Fitness for Diving Report

Name of Applicant (Print or Type)

Date (Mo./Day/Year)

TO THE PHYSICIAN:

The person named above is an applicant for training or is presently authorized to engage in diving activities under auspices of the Association for Marine Exploration (AME). This is an activity which puts unusual stress on the individual in several ways. Your opinion on the applicant's medical fitness is requested. 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. **Your signature on the reverse is required.**

REQUIRED TESTS: Please initial that the following tests were completed, evaluated, and included in your opinion. These tests must be included in the exam or the diver will not be authorized to dive under AME auspices. This is in compliance with national standards for scientific diving, as set by OSHA and the American Academy of Underwater Sciences.

Initial Diving Evaluation or 1st Exam
over age 40:

Periodic Re-examination:

___ Medical History
___ Chest X-Ray
___ 12-Lead EKG
___ Pulmonary Function Test
___ Audiogram
___ Visual Acuity
___ Complete Blood Count
___ Blood Chemistry
___ Urinalysis
___ Any further tests deemed necessary
by the physician to qualify the patient
for diving: _____

___ Medical History
___ Pulmonary Function Test
___ Audiogram
___ Visual Acuity
___ Complete Blood Count
___ Blood Chemistry
___ Urinalysis
___ Any further tests deemed necessary
by the physician to qualify the patient
for diving: _____

___ Stress Treadmill EKG (1st Exam over age 40, or at Physician's discretion)

RECOMMENDATION:

- APPROVAL. I find no medical conditions 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. **(Please describe in REMARKS).**
- REJECT. This applicant has medical condition(s) which, in my opinion, clearly would constitute unacceptable hazards to health and safety in diving. **(Please describe in REMARKS).**

(Physician's signature and REMARKS required on reverse)

Patient's Name: _____

REMARKS:

I have discussed with the patient any medical condition(s) he/she currently has, as indicated in this exam, which would not seriously interfere with diving but which may seriously compromise subsequent health. The patient understands the nature of the hazards and risks involved in diving with these defects.

Physician's Signature MD. _____
Date

Name (print or type): _____

Address: _____

Telephone: _____

My familiarity with the applicant is:

- This exam only.
- Regular Physician for _____ years
- Other (describe) _____

My Familiarity with Diving Medicine is (describe):

Please forward all patient records, as specified in Applicant's Release of Medical Information statement in Appendix 5: Medical Examination of Association for Marine Exploration Scientific Divers, to:

Association for Marine Exploration, XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Association for Marine Exploration Diving Safety Manual

Appendix 5 Medical Examination Of Scientific Divers

Section 1: Medical History. To be completed by the diver prior to exam.

Last Name: _____

First Name: _____ M.I. _____

Date of Birth: _____ Sex: _____

Home Phone: _____

Home Street Address: _____ City: _____

State: _____ Zip: _____ Email: _____

Have you completed one of these forms before? Yes / No

Is your medical history unchanged since then? Yes / No

If the answer to both questions was 'yes', then skip to Section 2.

To The Applicant: 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 your buddy, or anyone coming to your aid if you have 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 following questions are more important, in many cases, than what the physician can hear or feel when you are examined. Obviously, you should give accurate information or the medical screening process becomes useless.

This form shall be kept confidential. If you believe any question amounts to an 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 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 concerned only with your well-being and safety. Respect the advice and the intent of this medical history form.

FAMILY HISTORY— If single, answer as child; If married, answer as spouse

Relative	Age	State of Health	Occupation	Age at Death	Cause of Death
Father/Husband					
Mother/Wife					
Child 1 Sex:					
Child 2 Sex:					
Child 3 Sex:					
Child 4 Sex:					
Child 5 Sex:					
Sibling 1 Sex:					
Sibling 2 Sex:					
Sibling 3 Sex:					
Sibling 4 Sex:					
Sibling 5 Sex:					

PERSONAL HISTORY— Please answer all questions. Comment on all positive answers in the “Remarks” space below.

1. When was your last physical exam, and for what was it given? _____
 2. Who gave it (Name and Address)? _____
 3. Have you ever been rejected for armed service, employment, or insurance for medical reasons?
Yes / No
 4. Has your physical activity ever been restricted for any reason in the past 5 years? Yes / No
 5. Have you ever received treatment or counseling for a nervous condition, personality or character disorder, or emotional problem? Yes / No
 6. Are you being treated by a doctor at the present? Yes / No
 7. Are you taking any medication daily, or on a regular basis, either orally or by injection? Yes / No
 8. What medication do you take on an irregular basis and how often? _____

 9. How often do you take aspirin or aspirin-like drugs? _____
 10. How often do you take “cold medicines”, i.e. antihistamines? _____
 11. In the course of a year, list any other drugs/medicines not listed above that you might take:

 12. Do you have allergies to any drugs? Yes / No If yes, list: _____

 13. Are you subject to air/seasickness? Yes / No
 14. Have you had any of the following diseases?
Chickenpox: Yes / No Measles: Yes / No Tuberculosis: Yes / No Mumps: Yes / No
Scarlet Fever: Yes / No Rheumatic Fever: Yes / No Jaundice: Yes / No Malaria: Yes / No
Poliomyelitis: Yes / No German Measles: Yes / No Meningitis: Yes / No
- If Yes, give details below.
15. What other illnesses have you had? _____
 16. Have you ever had any operations? Yes / No
 17. Have you ever had any broken bones? Yes / No
 18. Have you ever been knocked unconscious? Yes / No
 19. Do you smoke/use any type of tobacco? Yes / No If yes, how often? _____

Check whether or not you have, or ever have had, any of the following. Explain any “yes” responses under “REMARKS”, giving dates and other pertinent information. If you wish this to be confidential, please say “confidential”, but it must be discussed with the physician during the examination.

20. Yes / No Frequent colds or sore throat.
21. Yes / No Hay Fever or Sinus Trouble.
22. Yes / No Trouble breathing through nose, other than during colds.
23. Yes / No Painful or running ear, mastoid trouble, broken eardrum.
24. Yes / No Hearing problems.
25. Yes / No Asthma or bronchitis.
26. Yes / No Shortness of breath after moderate exercise.
27. Yes / No History of Pleurisy.
28. Yes / No Collapsed Lung (pneumothorax).

- 29. Yes / No Chest pain or persistent cough.
- 30. Yes / No Tiring easily.
- 31. Yes / No Spells of fast, irregular, or pounding heartbeat.
- 32. Yes / No High or low blood pressure.
- 33. Yes / No Any kind of "heart trouble".
- 34. Yes / No Frequent upset stomach, heartburn, or indigestion, or peptic ulcer.
- 35. Yes / No Anemia.
- 36. Yes / No Belly or backache lasting more than a day or two.
- 37. Yes / No Kidney or bladder disease; blood, sugar, or albumin in urine.
- 38. Yes / No Broken bone, serious sprain or strain, or dislocated joint.
- 39. Yes / No Rheumatism, arthritis, or other joint trouble.
- 40. Yes / No Severe or frequent headaches.
- 41. Yes / No Trouble sleeping, frequent nightmares, or sleepwalking.
- 42. Yes / No Nervous breakdown or periods of marked depression or nervousness
- 43. Yes / No Dizzy spells, fainting spells or fits.
- 44. Yes / No A phobia for closed-in places, large open places, or high places.
- 45. Yes / No Any neurological or psychological condition.
- 46. Yes / No Alcoholism, or any drug or narcotic habit (including regular use of sleeping pills, Benzedrine, Prozac, Haldol, etc.).
- 47. Yes / No Recent gain or loss of weight or appetite.
- 48. Yes / No Hepatitis.
- 49. Yes / No Tuberculosis.
- 50. Yes / No Sickle Cell Disease.
- 51. Yes / No Diabetes.
- 52. Yes / No Inner ear disease.
- 53. Yes / No A seizure disorder.
- 54. Yes / No Epilepsy.
- 55. Yes / No Hemoglobinopathy or leukemia.
- 56. Yes / No Dental bridgework or plates.
- 57. Yes / No Susceptible to panic.
- 58. Yes / No Pain from altitude of flying or diving.
- 59. Yes / No Frequent diarrhea or blood in stool.
- 60. Yes / No Infectious disease.
- 61. Yes / No Any serious accident, injury, illness or condition not mentioned above (Describe under "REMARKS", giving nature and dates).

Females only:

- 62. Yes / No Premature birth. If yes, how many weeks _____
- 63. Yes / No Irregular Periods
- 64. Yes / No Severe Cramps
- 65. Yes / No Excessive Flow
- 66. Yes / No Are you pregnant?

REMARKS: (reference each remark by the appropriate question number):

SECTION 2. MEDICAL HISTORY UPDATE FOR DIVING REAUTHORIZATION

Were you hospitalized or did you have any accidents or injuries of any kind since your previous diving authorization? Yes / No If yes, explain and give dates in "Remarks" section above.

Have you suffered any diving injury or been involved in any diving incident since your last diving authorization? Yes / No If yes, explain and give dates in "Remarks" section above.

DIVER AFFIRMATION: I certify that I have not withheld any information, and that the above is accurate to the best of my knowledge.

Signature: _____ Date: _____

APPLICANT'S RELEASE OF MEDICAL INFORMATION

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

Signature of Applicant _____ Date _____

MEDICAL EXAMINATION OF SCIENTIFIC DIVERS

Section 3. To be completed by the Doctor. (Check 'Yes' or 'No', whichever is correct)

Last Name: _____ First Name: _____ M.I. _____

Date of Birth: _____ Sex: _____ Height: _____ Weight: _____

MEDICAL HISTORY REVIEW: Is there any significant past history which would disqualify the applicant for diving? Yes / No

Remarks: _____

General Appearance: _____

Blood Pressure: _____ Pulse: _____

Vision: Uncorrected: R/____ L/____ Corrected: R/____ L/____

Color Test: _____ Normal _____ Deficient.

EXAMINATION: Please check all items and, if abnormal, give details.

	Normal	Abnormal	Comments
1. Head and neck	_____	_____	_____
2. Nose, Sinuses	_____	_____	_____
3. Ear Canals	_____	_____	_____
4. Ear Drums	_____	_____	_____
5. Ear clearing	_____	_____	_____
6. Webber, Rinne	_____	_____	_____
7. Fundi, Disks	_____	_____	_____
8. Pupils, ECM	_____	_____	_____
9. Peripheral visions	_____	_____	_____
10. Mouth and Throat	_____	_____	_____
11. Neck, Nodes/mass	_____	_____	_____
12. Axillary Nodes	_____	_____	_____
13. Back and Chest	_____	_____	_____
14. Lungs	_____	_____	_____
15. Heart Sounds	_____	_____	_____
16. Heart rhythm, size	_____	_____	_____
17. Abdomen LS & K	_____	_____	_____
18. Genitalia, nodes	_____	_____	_____
19. Cremasteric	_____	_____	_____
20. DTR's Tricep	_____	_____	_____
21. DTR's Bicep	_____	_____	_____
22. DTR's Knee	_____	_____	_____
23. DTR's Ankle	_____	_____	_____
24. Plantar Reflex	_____	_____	_____
25. Sensory, noxious	_____	_____	_____
26. Sensory, fine	_____	_____	_____
27. Sensory, vib	_____	_____	_____
28. Heel/Toe Walk	_____	_____	_____
29. Romberg	_____	_____	_____
30. Fast Pointing	_____	_____	_____
31. Finger - Nose	_____	_____	_____
32. Rapid Movement	_____	_____	_____
33. Squat	_____	_____	_____

Emotional Stability: _____

Diving Aptitude: _____

Breathhold Duration: _____

Signature: _____, Examiner Date: _____

Print or Type Name: _____

Address: _____

Telephone: (_____) _____

Association for Marine Exploration Diving Safety Manual

Appendix 6

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 team member for each project or dive to collectively establish effective diving emergency procedures for the local diving operations, including evacuation and medical treatment.

General Procedures. Depending on and according to the nature of the diving accident, stabilize the patient, administer 100% oxygen, contact the local Emergency Medical System (EMS) for transport to a medical facility, and contact the Diving Safety Officer, as appropriate. Explain the circumstances of the dive accident to 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 may be necessary.

1. Make appropriate contact with the victim, or rescue as required.
2. Establish (A)irway, (B)reathing, (C)irculation as required. Control severe bleeding and treat for Shock, as per First Aid guidelines.
3. Administer 100% oxygen, if appropriate (in cases of suspected Near Drowning, DCS, AGE, Cardiac Emergencies, or Breathing Emergencies).
4. Contact local Emergency Medical System (EMS) for transport to nearest medical treatment facility.
5. If possible, complete or assign additional personnel to complete the following actions:
 - a. Take notes of how the incident occurred, and all response measures taken, including a time table of actions;
 - b. Isolate the victim's equipment for inspection by the DSO and authorities;
 - c. Manage the accident scene for crowd control, Assign someone to keep bystanders from interfering;
 - d. Make statements regarding the incident only to representatives of AME and EMS/Medical personnel. AME representatives shall be responsible for providing information to the media.
6. Call the AME DSO for contact with diving physician and recompression chamber.
7. If appropriate, commence In-Water Recompression according to the guidelines provided below.
8. Submit a detailed Incident Report to the AME DCB.

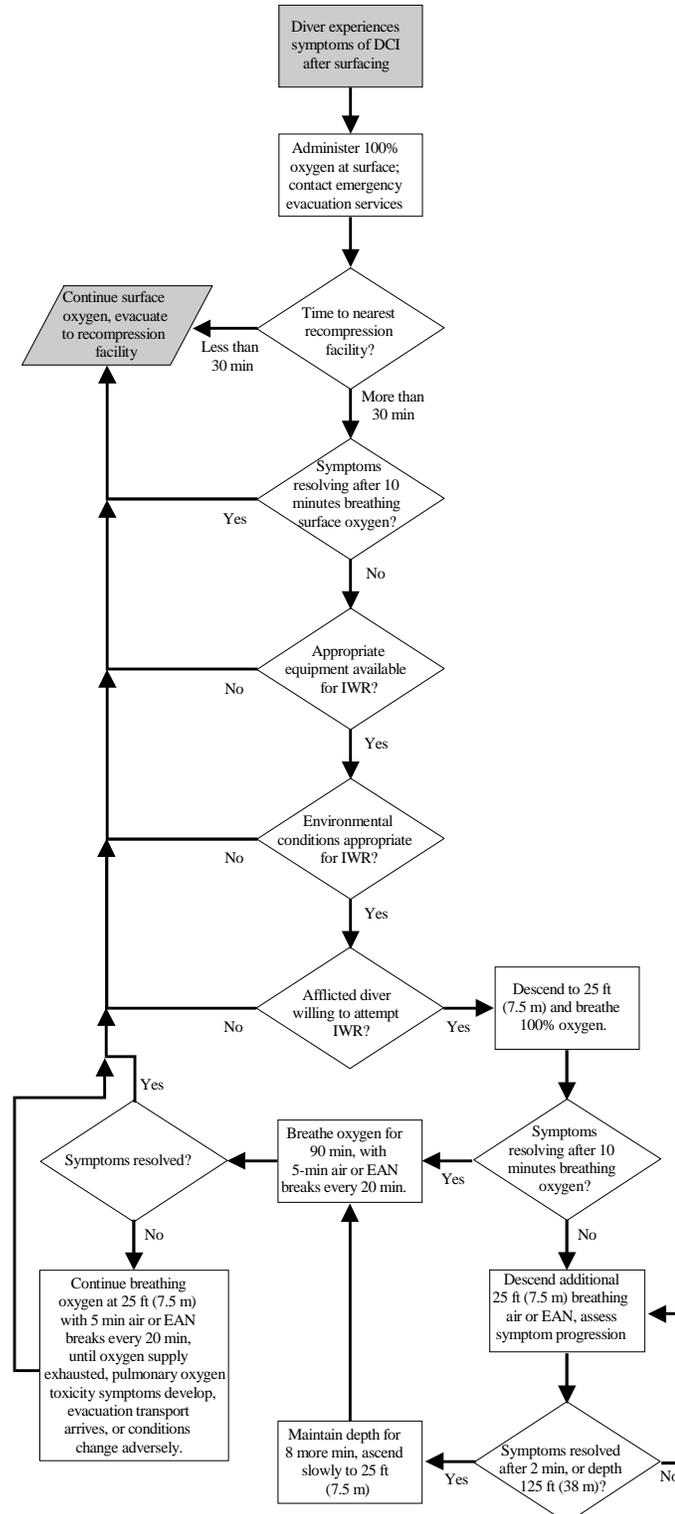
Association for Marine Exploration

Appendix 6 (Cont.)

Recommended Procedure for Emergency In-Water Recompression

Required Equipment

1. An adequate supply of oxygen that can be delivered to a diver underwater, either in the form of an appropriately serviced pressure cylinder, surface-supplied apparatus, or rebreather device (the latter for appropriately trained divers *only!*)
2. An adequate supply of air, EAN, or other diluted oxygen mixture that can be delivered to a diver underwater, either in the form of an appropriately serviced pressure cylinder, surface-supplied apparatus, or rebreather device (the latter for appropriately trained divers *only!*)
3. Weighted descent or decompression line marked at 10-ft (3-m) intervals, extending to a depth of 130 ft (40 m) or the maximum available depth, whichever is shallower.
4. Some means of communicating basic information between the diver and the surface support.



Recommended Equipment

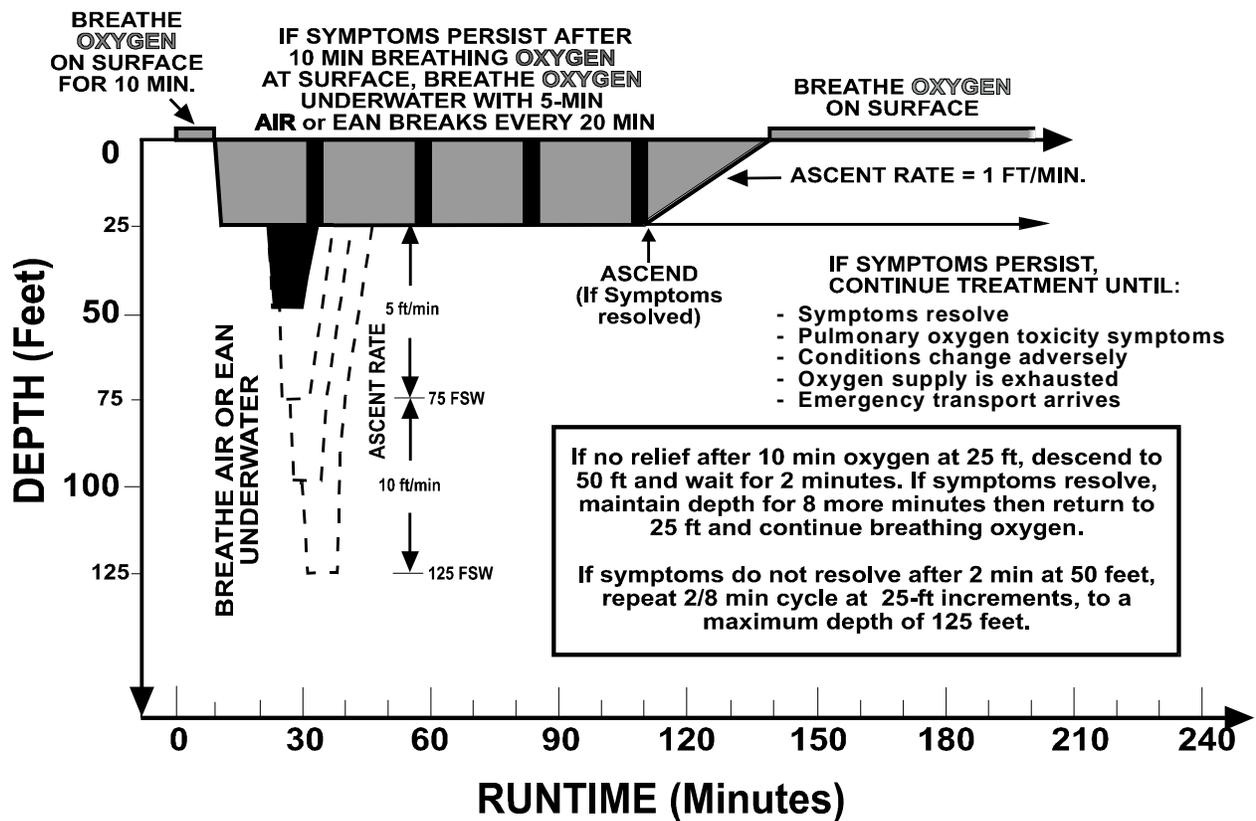
1. A full face mask or diving helmet to be worn by the afflicted diver.
2. Means to physically attach

afflicted diver to decompression line.

Method

Immediately upon recognizing potential symptoms of DCI:

1. Administer 100% oxygen to diver while at surface for 10 minutes, assess the progression of symptoms, and evaluate conditions (time to nearest recompression facility, diver disposition, oxygen supply, availability of tender diver, weather conditions, time of day, etc.), contact emergency evacuation services, and decide whether IWR is warranted.
2. If IWR is warranted and symptoms are not resolving within 10 minutes of commencement of surface oxygen, place afflicted diver at a depth of 25 ft (7.5 m) on weighted decompression line, breathing 100% oxygen for 10 minutes, under close observation of a tender diver who can maintain communication with surface support.
3. If symptoms are resolving after 10 minutes of breathing 100% oxygen at 25 ft (7.5 m), maintain depth and continue breathing oxygen for a period of 90 minutes, interspersed with 5-minute periods breathing air or EAN every 20 minutes.
4. If symptoms persist or continue to progress after the initial 10 minutes at 25 ft (7.5 m), change breathing gas to air or appropriate EAN, descend to a depth of 50 ft (15 m) and assess symptom progression for 2 minutes. If symptoms are resolving, maintain depth for 8 additional minutes, then ascend at a rate of 5 ft/min (1.5 m/min) to 25 ft (7.5 m) and perform step 3.
5. If symptoms persist or continue to progress after 2 minutes at 50 feet, descend to 75 feet and repeat step 4. Continue to repeat step 4 at 25-ft (7.5-m) depth increments until symptoms resolve, or a depth of 125 ft (38 m) is reached. After 10 minutes at maximum “spike” depth return to a depth of 25 ft (7.5 m) at a rate of 10 ft/min (3 m/min) below 75 ft (22.5 m), and 5 ft/min (1.5 m/min) above 75 ft (22.5 m), and perform step 3.
6. After 90 minutes of 100% oxygen with air or EAN breaks, if symptoms have resolved, ascend to surface at a rate of 1 ft/min (0.3 m/min) and continue breathing oxygen at surface until emergency evacuation transport arrives, diver suffers pulmonary oxygen toxicity symptoms, or 3 hours.
7. If symptoms persist or continue to progress after 90 minutes of 100% oxygen with air or EAN breaks, maintain depth and continue 20-min oxygen / 5 min air or EAN cycle until oxygen supply is exhausted, emergency evacuation transport arrives, diver suffers pulmonary oxygen toxicity symptoms, environmental or diver conditions change adversely, or symptoms resolve, then ascend at a rate of 1 ft/min (0.3 m/min).



From:

Pyle, R.L. 1999. Keeping up with the times: application of technical diving practices for in-water recompression. pp.74-88. In: Kay, E. and Spencer, M.P. (eds.) In-Water Recompression: The Forty Eighth Workshop of the undersea and Hyperbaric Medical Society. Undersea and Hyperbaric Medical Society and Diver's Alert Network. 108 pp.

Association for Marine Exploration

Appendix 6 (Cont.)

Emergency Contact Information

(unless specified, all area codes are 808)

AME CONTACTS

DIVING SAFETY OFFICER

Joe Dituri
(Contact details)

CHIEF OPERATIONS OFFICER

John Rooney
(Contact details)

DIVING CONTROL BOARD MEMBERS

Amy Dituri
(Contact details)

Lisa Privitera
(Contact details)

Richard Pyle
(Contact details)

SEARCH, RESCUE AND CASUALTY EVACUATION (HAWAII)

EMT/AMBULANCE, ALL ISLANDS:

Call 911

U.S. Coast Guard

Search and Rescue Operations Center:
Honolulu, HI

541-2500
toll free cellular: *8724
(*USCG)

Response Stations:

Honolulu Harbor, Oahu
Maalaea Harbor, Maui
USCGC Point Evans, Nawiliwili Harbor, Kauai
USCGC Kiska, Hilo Harbor, Big Island
Air Evacuation Barber's Point NAS, Oahu

541-2454
244-7235
246-0390
933-6944
(through Ops Center)

City and County of Honolulu

Fire and Rescue
Lifeguard Service

Call 911
922-3888

Hospital Emergency Rooms

OAHU:

Kuakini Hospital, 347 N. Kuakini St., Honolulu 547-9540
Castle Memorial Hospital, 640 Ulukahiki St., Kailua 263-5500
Kahuku Hospital, Kahuku, 293-9221
Kapi'olani Medical Center, 1319 Punahou St., 973-8511
Queens Hospital, 1301 Punchbowl St., Honolulu 538-9011
Straub Hospital, 888 S. King St., Honolulu 522-4000
Wahiawa General Hospital, 128 Lehua St., Wahiawa 621-8411

MAUI:

Maui Memorial Hospital, 221 Mahalani St., Kahului 242-2343

LANAI:

Lanai Community Hospital 565-6411

MOLOKAI:

Molokai General Hospital 553-5331

BIG ISLAND (HAWAII):

Hilo Medical Center, 1190 Waianuenue Ave., Hilo 969-4111
Kona Community Hospital, Kealahou 322-9311*
Kohala Hospital, Kapaa (Hawi) 889-6211*
N. Haw. Com. Hospital, 67-1125 Mamalahoa Hwy., Kamuela 885-4444*
Honokaa Hospital, Honokaa 775-7211

* at significant altitude

REGIONAL HYPERBARIC TREATMENT CENTERS

HAWAII:

University of Hawaii Hyperbaric Treatment Center 587-3425
Kuakini Hospital
347 N. Kuakini St.
Honolulu, HI 96817
(staffed 24 hours, M.D. on call)

GUAM:

Apra Harbor U.S. Naval Station 671-339-7143
Ship Repair Facility

MEDICAL ADVICE AND GUIDANCE

Diver's Alert Network (DAN)
Duke University Medical Center
Durham, NC
919-684-2948 (General information on diving medicine.)
919-684-8111 (Emergencies only. Call COLLECT and state: ("I am reporting a diving accident"))

Association for Marine Exploration

Appendix 7 Diving History

Name: _____ Date of Birth: _____ Dept: _____

Office/Work Phone: _____ Email: _____

Section 1: Diving Training History

Date of First Certification: _____ Agency: _____ Location: _____

Certification Type	Agency	Date	Number	Duration	Location
Basic					
Openwater					
Advanced					
Rescue					
Asst. Instructor					
Divemaster					
O ₂ Administration					
Instructor					
Military					

Other Dive Training (List Below):

Type of Training	Agency or School	Date(s)	Location

(Please provide photocopies of all certificates and c-cards to document claimed training)

Section 2. Emergency Training History

Date of Last Physical: _____ Date of Last Diving Physical: _____

Date of CPR Training: _____ Agency: _____

Name of Course: _____

Date of First Aid Training: _____ Agency: _____

Name of Course: _____

Section 3. Diving Experience

A. General

Years Diving _____ Age 1st Skin Dive: _____ Age first Compressed Air Dive _____

Military Diving Experience _____

B. Diving Experience

Type of Diving	Total Years	Maximum Depth	Total # Dives	# Dives Last Year	Cumulative Bottom Time
Compressed Air SCUBA					
Compressed Air Surface-supplied					
Nitrox—Open-circuit SCUBA					
Trimix—Open-circuit SCUBA					
Heliox (He/O ₂)					
Oxygen Rebreather					
Semi-closed Circuit Rebreather					
Closed-circuit Rebreather					
One-Atm. Diving Suit					

C. Activity Profile

Past experience with (check all that apply):

Sport Diving Research Marine Life Collecting Education
 Net Tending Commercial Collecting Commercial Construction
 Saturation Surface Decompression Mixed Gas/Heliox
 Other: _____

Number of Dives per day: Maximum: _____ Average: _____ Minimum: _____

List approximate number of dives (Past Year) in the following categories (enter 0 where appropriate)

Depth: < 30 feet: _____ 30-60 feet: _____ 60-100 feet: _____ 100-150 feet: _____ >150 feet: _____

Conditions: Night: _____ Low Visibility: _____ Physical Overhead: _____ Bluewater (No Bottom): _____

Platform/Technology: Small Boat Dives: _____ Shipboard Diving: _____

Staged Decompression: _____ Nitrox: _____ Mixed Gas/Heliox: _____

Saturation: _____ Surface Deco: _____ Rebreathers: _____

Other (Describe): _____

Section 4. Injury History	all prev. years		current year		Life Total
	19__	19__	19__	19__	19__
Total Number of Dives.....	_____	_____	_____	_____	_____
Deepest Dive	_____	_____	_____	_____	_____
# Dives with Staged Decompression.....	_____	_____	_____	_____	_____
# Dives with Surface Decompression.....	_____	_____	_____	_____	_____
# Dives resulting in Skin Bends or "niggles" (not treated):.....	_____	_____	_____	_____	_____
#Dives Resulting in Bends (pain only):...	_____	_____	_____	_____	_____
# Central Nervous System DCS:.....	_____	_____	_____	_____	_____
# Times treated for DCS:.....	_____	_____	_____	_____	_____
Any permanent injury from DCS:.....	_____	_____	_____	_____	_____

If you have ever had Decompression Sickness, what type of treatment did you receive?

a. For Bend Pain:

___None ___Aspirin ___Oxygen on Surface ___USN Table (list):_____

b. for CNS Symptoms:

___None ___Aspirin ___Oxygen on Surface ___USN Table (list):_____

___Other:_____

Do you have difficulty clearing your ears on descent, or in aircraft? Yes / No
IF YES, EXPLAIN:

Does ear difficulty limit your diving? Yes / No
If yes, how often: 1 2 10 50 100

Have you ever experienced "ear squeeze" to the point of having temporary hearing loss? Yes / No
If yes, how often: 1 2 10 50 100

Have you ever aborted a dive because of ear problems? Yes / No
If yes, how often: 1 2 10 50 100

Have you ever had difficulty with your sinuses during a dive? Yes / No
If yes, how often: 1 2 10 50 100

Have you ever had a sinus squeeze? Yes / No
If yes, how often: 1 2 10 50 100

APPLICANT'S AFFIDAVIT: I certify that the above information is true to the best of my knowledge and ability. I understand that misstatements on this report can result in loss of my diving privileges under the Association for Marine Exploration auspices.

Signature of Applicant: X_____ Date:_____

Association for Marine Exploration
Appendix 8
Assumption of Risk, Waiver and Release

(please read and initial each paragraph, and sign below)

I, _____, the undersigned:
(Print Name)

_____ In full recognition and appreciation of the dangers and hazards inherent in diving to which I may be exposed (including but not limited to arterial gas embolism, ear and/or sinus barotrauma, decompression sickness, drowning, near-drowning, and/or dysbaric osteonecrosis and other long-term effects, as yet poorly defined), and during transportation to and from dive locations, do hereby agree to assume all the risks and responsibilities surrounding my participation in diving or any independent research or activities undertaken as an adjunct thereto;

_____ Further, I do for myself, my heirs, executors, and administrators hereby defend, hold harmless, indemnify and release, and forever discharge the Association for Marine Exploration (AME) and all its officers, agents, assigns, and employees from and against any and all claims, demands, and actions, or cause of action, on account of damage to personal property, or personal injury or death, which may result from my participation, and which result from causes beyond the control of, and with or without the fault or negligence of AME, its officers, agents, assigns, and employees, during the period of my participation as aforesaid;

_____ Further, I have read and I fully understand the rules and precautions for conducting diving operations that are part of the requirements for my participation in diving under AME auspices, as set forth in the Association for Marine Exploration Diving Safety Manual, as well as those explained to me by the AME Diving Safety Officer, and I agree to strictly observe these rules. I understand that failure to comply with these rules may result in review, restriction, or revocation of my authorization to dive under AME auspices by the AME Diving Control Board.

IN WITNESS WHEREOF, I have caused this release to be executed this _____ day

of _____, 19____.

(Signature of Diver)

(Cosignature of Parent or Guardian if diver is under age 18 years)

(Printed/Typed Name)

(Printed/Typed Name)

(Diver Social Security Number)

(Parent/Guardian Phone Number)

Association for Marine Exploration

Appendix 9 Medical Consent Form

(please read and initial each paragraph, and sign below)

I, _____, consent to and authorize any medical professional and others working under their supervision to treat me for any injury or illness occurring during my diving activities affiliated with the Association for Marine Exploration.

_____ I understand that the Association for Marine Exploration (AME) does not provide any form of insurance to divers operating under its auspices, and that AME Dive Policy requires all of its participant divers to be covered by a Divers Alert Network "Master"-level diving accident insurance plan (or equivalent).

_____ I further agree to pay any and all such medical expenses, costs and other charges not covered by Divers Alert Network or other insurance, and to release and discharge and hold harmless the Association for Marine Exploration, its officers, agents, assigns, and employees from and against any liability or any claims or demands arising from or connected with such medical treatment or care.

IN WITNESS WHEREOF, I have caused this release to be executed this _____ day

of _____, 19____.

(Signature of Diver)

(Cosignature of Parent or Guardian if diver is under age 18 years)

(Printed/Typed Name)

(Printed/Typed Name)

(Diver Social Security Number)

(Parent/Guardian Phone Number)

IN CASE OF EMERGENCY:

1st Person to Contact: _____ Relation: _____

Home Phone: _____ Work Phone: _____

2nd Person to Contact: _____ Relation: _____

Home Phone: _____ Work Phone: _____