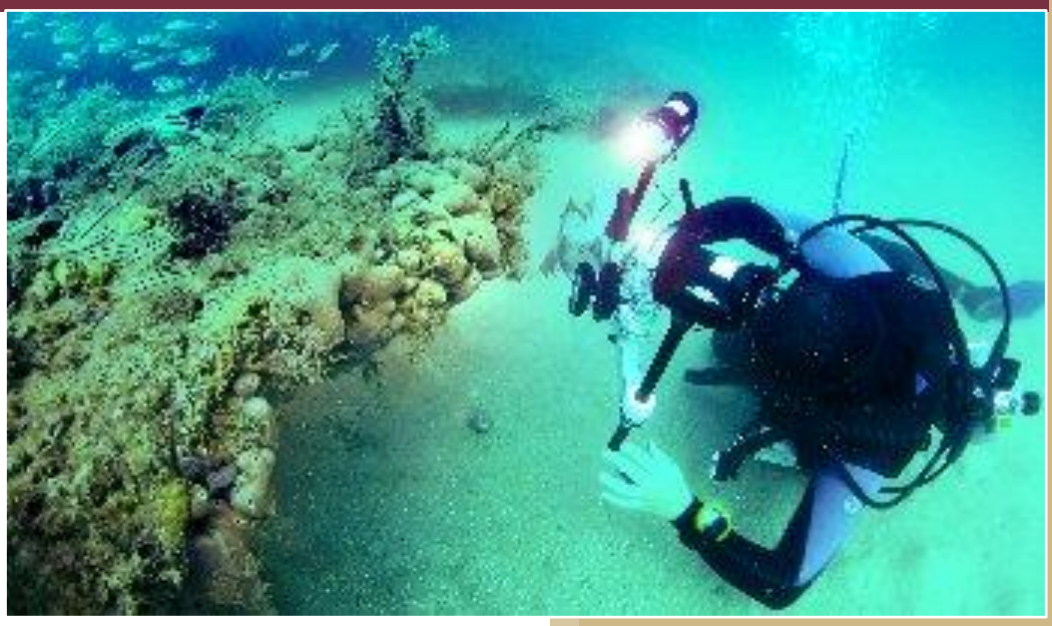
2016

Florida State University
Standards for Scientific Diving
& Operation of the Scientific Diving Program



ADP Dive Control Board
Florida State University
Coastal & Marine Laboratory

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Revision History

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February 1998
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Foreward

Since 1951 the scientific diving community has endeavored to promote safe, effective diving through self-imposed diver training and education programs. Over the years, manuals for diving safety have been circulated among organizations, revised and modified for local implementation, and have resulted in an enviable safety record.

This document represents the minimal safety standards for scientific diving at the present day. As diving science progresses, so shall this manual, and it is the responsibility of every member of the Florida State University Academic Diving Program to see that it always reflects state of the art, safe diving practice.

The Florida State University Diving Control Board

Acknowledgements

The Florida State University Diving Control Board thanks the numerous dedicated individuals for their contributions and editorial comments in the production of these standards.

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SECTION 1.00: GENERAL POLICY

The Academic Diving Program (ADP), an administrative unit of the Coastal and Marine Laboratory at The Florida State University, supervises all compressed gas diving on campus. Recreational diving operates under the Recreation Council and adheres to separate standards and procedures.

1.10 The Scientific Diving Standards

Purpose

The purpose of these Scientific Diving Standards is to ensure that all scientific diving is conducted in a manner that will maximize protection of scientific divers from accidental injury and/or illness, and to set forth standards for training and certification that will allow a working reciprocity between organizational members. Fulfillment of the purposes shall be consistent with the furtherance of research and safety.

This document sets minimal standards for the establishment of the Florida State University scientific diving program. These standards meet or exceed the standards established by the American Academy of Underwater Sciences (AAUS) for recognized scientific diving programs. These standards also describe the organizational structure and standards for the conduct of these programs, and the basic regulations and procedures for safety in scientific diving operations. It also establishes a framework for reciprocity between FSU, and other AAUS organizational members, and other entities sanctioning scientific diving (e.g., NOAA, EPA), which adhere to these minimum standards.

This manual was originally developed and written by the AAUS by compiling the policies set forth in the diving manuals of several university, private, and governmental scientific diving programs. These programs share a common heritage with the scientific diving program at the Scripps Institution of Oceanography (SIO). Adherence to the SIO standards has proven both feasible and effective in protecting the health and safety of scientific divers since 1954. The standards have been adapted as necessary by the staff of the Florida State University Academic Diving Program.

In 1982, OSHA exempted scientific diving from commercial diving regulations (29 CFR Part 1910, Subpart T) under certain conditions that are outlined below. The final guidelines for the exemption became effective in 1985 (Federal Register, Vol. 50, No.6, p.1046). OSHA recognizes the AAUS as the scientific diving standard setting organization.

AAUS Standards for Scientific Diving

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

Scientific Diving Exemption.--OSHA has granted an exemption for scientific diving from commercial diving regulations under the following guidelines (Appendix B to Subpart T):

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

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

c. Data will be made available according to funding regulations. Material not available for review is proprietary.

d. 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.
e. 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.

In addition, the scientific diving program shall contain at least the following elements:

a. Diving safety manual that includes at a minimum: Procedures covering all diving operations specific to the program; including procedures for emergency care, recompression, and evacuation; and the criteria for diver training and certification.
b. Diving control (safety) board, with the majority of its members being active scientific divers, which shall at a minimum have the authority to: approve and monitor diving projects, review and revise the diving safety manual, assure compliance with the manual, certify the depths to which a diver has been trained, take disciplinary action for unsafe practices, and assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for scuba diving.

Review of Standards.--As part of the Florida State University ADP annual report, any recommendations for modifications of these standards shall be submitted to the Florida State University DCB for consideration.

1.20 Operational Control

The Florida State University Auspices Defined

For the purposes of these standards the auspices of The Florida State University includes any scientific diving operation in which the University is connected because of ownership of any equipment used, locations selected, or relationship with the individual(s) concerned. This includes all cases involving the operations of employees of The Florida State University or employees of auxiliary organizations, where such employees are acting within the scope of their employment, and the operations of other persons who are engaged in scientific diving as associates or students of The Florida State University.

It is the responsibility of The Florida State University to adhere to these standards for Scientific Diving Certification and Operation of the Scientific Diving Program. The administration of the scientific diving program will reside with the Florida State University Diving Control Board (DCB).

The regulations herein shall be observed at all locations where scientific diving is conducted unless altered by terms of reciprocity with a qualifying organization.

The Florida State University Scientific Diving Standards and Safety Manual

The Florida State University is required by OSHA and AAUS to develop and maintain a scientific diving safety manual that provides for the development and implementation of policies and procedures that will enable the Florida State University scientific diving program to meet the requirements of local environments and conditions as well as to comply with the AAUS scientific diving standards. The standards of the Florida State University Academic Diving Program shall include, but not be limited to:

- A set of minimal guidelines for the conductance of scientific diving under the auspices of The Florida State University.

- Emergency evacuation and medical treatment procedures.
- The criteria for diver training and certification.
- Standards written or adopted by reference for each diving mode utilized which include the following:
    a. Safety procedures for the diving operation.
    b. Responsibilities of the dive team members.
    c. Equipment use and maintenance procedures.
    d. Emergency procedures.

The Diving Safety Officer

The Diving Safety Officer (DSO) serves as a member of the Diving Control Board. This person should have broad technical and scientific expertise in research related diving.

Qualifications

- Shall be appointed by the responsible administrative officer of The Florida State University or his/her designee, with the advice and counsel of the diving control board.
- Shall be trained as a scientific diver.
- Shall be a member as defined by the AAUS.
- Shall be certified as a scuba diving instructor with a national or international certifying agency (e.g., NAUI, YMCA, and PADI).

Duties and Responsibilities

- Shall be responsible, through the DCB, to the responsible administrative officer or his/her designee, for the conduct of the scientific diving program of The Florida State University. The routine operational authority for this program, including the conduct of training and certification, approval of dive plans, maintenance of diving records, and ensuring compliance with this manual and all relevant regulations of the membership organization, rests with the Diving Safety Officer.
- May permit portions of this program to be carried out by a qualified delegate, although the Diving Safety Officer may not delegate responsibility for the safe conduct of the local diving program.
- Shall be guided in the performance of the required duties by the advice of the DCB, but operational responsibility for the conduct of the local diving program will be retained by the Diving Safety Officer.
- Shall suspend diving operations which he/she considers to be unsafe or unwise.

The Diving Control Board

- The Diving Control Board (DCB) shall consist of a majority of active scientific divers. Voting members shall include the Diving Safety Officer, and a representative (preferably a diving scientist) from each University department whose faculty or students engage in underwater research using diving. Members shall be nominated by their respective departmental Chair and appointed by the Vice President for Research. The voting members of the DCB shall choose a Chair, and the Chair shall designate a person to record minutes.
- Non-voting members shall include the Director of the Department of Environmental Health and Safety or their designee, the General Counsel of the University or their designee.

- The Diving Control Board shall meet at least annually and as required by circumstances.

The Diving Control Board has autonomous and absolute authority over the Florida State University scientific diving program's operation.

The Diving Control Board is responsible for setting policy and:

- Shall approve and monitor diving projects.
- Shall review and revise the diving safety manual.
- Shall assure compliance with the manual.
- Shall certify the depths to which a diver has been trained.
- Shall take disciplinary action for unsafe practices.
- Shall assure adherence to the buddy system for scuba diving.
- Shall act as the official representative of The Florida State University in matters concerning the scientific diving program.
- Shall act as a board of appeal to consider diver-related problems.
- Shall recommend the issue, reissue, or the revocation of diving certifications.
- Shall recommend changes in policy and amendments to both the AAUS scientific diving manual and the Florida State University scientific diving manual as the need arises.
- Shall establish and/or approve training programs through which the applicants for certification can satisfy the requirements of the Florida State University diving safety manual.
- Shall suspend diving programs which it considers to be unsafe or unwise.
- Shall establish criteria for equipment selection and use.
- Shall recommend new equipment or techniques.
- Shall establish and/or approve facilities for the inspection and maintenance of diving and associated equipment.
- Shall ensure that the Florida State University air station(s) meet air quality standards as described in Sec. 3.60 of this manual.
- Shall periodically review the Diving Safety Officer's performance and program and provide advice & counsel to the responsible administrative officer on hiring, performance, and retention of the Diving Safety Officer.
- Shall sit as a board of investigation to inquire into the nature and cause of diving accidents or violations of the Florida State University diving manual.

Instructional Personnel

Qualifications.-- All personnel involved in diving instruction under the auspices of The Florida State University shall be qualified for the type of instruction being given.

Selection.--Instructional personnel will be selected by the Diving Safety Officer, or his/her designee, who will solicit the advice of the DCB in conducting preliminary screening of applicants for instructional positions.

Lead Diver

For each dive, one individual shall be designated as the Lead Diver. He/she shall be at the dive location during the diving operation and can cancel any dive at any time for any reason of safety, or disqualify any diver for any reason of safety. The Lead Diver shall be responsible for:

- Coordination with other known activities in the vicinity, which are likely to interfere with diving operations.
- Ensuring all dive team members possess current certification and prepared and qualified for the type of diving operation.
- Planning dives in accordance with Section 2.20
- Ensuring safety and emergency equipment is in working order and at the dive site.
- Briefing the dive team members on:
  a) Dive objectives.
  b) Unusual hazards or environmental conditions likely to affect the safety of the diving operation.
  c) Modifications to diving or emergency procedures necessitated by the specific diving operation.
- Suspending diving operations if in his/her opinion conditions are not safe.
- Reporting to the DSO and DCB any physical problems or adverse physiological effects including symptoms of pressure-related injuries.

Reciprocity and Visiting Scientific Diver

When the Florida State University Academic Diving Program conducts a joint diving operation with another organization, or engages jointly in the use of diving resources, both parties shall mutually designate one of the participating Diving Control Boards to govern the dive project.

A scientific diver from one organization shall apply for permission to dive under the auspices of another organization by submitting to the Diving Safety Officer of the host organization Member a document containing all the information described in the letter of reciprocity signed by the Diving Safety Officer or Chairperson of the home Diving Control Board.

A visiting scientific diver may be asked to demonstrate his/her knowledge and skills for the planned diving.

If a host organization denies a visiting scientific diver permission to dive, the host Diving Control Board shall notify the visiting scientific diver and his/her Diving Control Board with an explanation of all reasons for the denial.

Waiver of Requirements

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

Consequence of Violation of Regulations by Scientific Divers

Failure to comply with the regulations of the Florida State University diving manual may be cause for the revocation or restriction of the diver's scientific diving certificate by action of the FSU Diving Control Board.

1.30 Consequences of Violation of Regulations by Organizational Members

Failure to comply with the regulations of these standards may be cause for the revocation or restriction of The Florida State University's recognition by the AAUS.

1.40 Record Maintenance

The Diving Safety Officer or his/her designee shall maintain permanent records for each individual scientific diver certified. The file shall include evidence of certification level, log sheets, results of current physical examination, reports of disciplinary actions by the Florida State University Diving Control Board, and other pertinent information deemed necessary.

Availability of Records

- The Florida State University Academic Diving Program does not maintain diver medical records. Information on the location of medical records is included on all active dive plans for use by the attending physician of a diver when needed.
- Records and documents required by these standards shall be retained by the FSU ADP for the following period:

    1. Physician's written reports of medical examinations for dive team members - 5 years.
    2. Manual for diving safety - current document only.
    3. Records of dives - 1 year, except 5 years where there has been an incident of pressure-related injury.
    4. Pressure-related injury assessment - 5 years.
    5. Equipment inspection and testing records – From first inspection or testing until equipment is withdrawn from service.

SECTION 2.00: DIVING REGULATIONS FOR SCUBA

(OPEN CIRCUIT, COMPRESSED AIR)

2.10 Introduction

No person shall engage in scientific diving operations under the auspices of the Florida State University Academic Diving Program unless he/she holds a current certification issued pursuant to the provisions of this manual.

2.20 Pre-Dive Procedures

Dive Plans

Dives should be planned around the competency of the least experienced diver. Before conducting any diving operations under the auspices of the FSU ADP, the Lead Diver for a proposed operation must formulate a dive plan that should include the following:

- Divers qualifications and the type of certificate or certification held by each diver.
- Emergency plan with the following information:
  a) Name, telephone number, and relationship of person to be contacted for each diver in the event of an emergency.
  b) nearest operational recompression chamber
  c) nearest accessible hospital
  d) available means of transport
- Approximate number of proposed dives.
- Location(s) of proposed dives.
- Estimated depth(s) and bottom time(s) anticipated.
- Decompression status and repetitive dive plans, if required.
- Proposed work, equipment, and boats to be employed.
- Any hazardous conditions anticipated.

Proposed Plan of Diving Operation:
https://www.marinelab.fsu.edu/marineops/diving/policies-forms-diverlogs

The Diving Safety Officer must approve the dive plan prior to the commencement of a diving operation. It is strongly encouraged that diving operations be discussed while in the planning stage. The lead diver should allow sufficient time for dive plan review prior to the diving operation. Copies of approved dive plans must be filed with the DSO and also be available on the dive site

Pre-dive Safety Checks

Diver's Responsibility:

- Each scientific diver shall conduct a functional check of his/her diving equipment in the presence of the diving buddy or tender.
- It is the diver's responsibility and duty to refuse to dive if, in his/her judgment, conditions are unfavorable, or if he/she would be violating the precepts of his/her training, of the AAUS standards, or the Florida State University diving manual.

- No dive team member shall be required to be exposed to hyperbaric conditions against his/her will, except when necessary to prevent or treat a pressure-related injury.
- No dive team member shall be permitted to dive for the duration of any known condition which is likely to adversely affect the safety and health of the diver or other dive members.

Equipment Evaluations

- Each diver shall ensure that his/her equipment is in proper working order and that the equipment is suitable for the type of diving operation.
- Each diver shall have the capability of achieving and maintaining positive buoyancy.

Site Evaluation

- The environmental conditions at the site will be evaluated.

2.30 Diving Procedures

Solo Diving Prohibition

All diving activities shall assure adherence to the buddy system (Two comparably equipped scuba divers in the water in constant communication) for scuba diving. This buddy system is based upon mutual assistance, especially in the case of an emergency.

Refusal to Dive

The decision to dive is that of the diver. A diver may refuse to dive, without fear of penalty, whenever he/she feels it is unsafe for them to make the dive (see Sec2.20.).

Safety

The ultimate responsibility for safety rests with the individual diver. It is the diver's responsibility and duty to refuse to dive if, in his/her 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.

Termination of the Dive

It is the responsibility of the diver to terminate the dive, without fear of penalty, whenever he/she feels it is unsafe to continue the dive, unless it compromises the safety of another diver already in the water (see Sec 2.20).

The dive shall be terminated while there is still sufficient cylinder pressure to permit the diver to safely reach the surface, including decompression time, or to safely reach an additional air source at the decompression station.

Emergencies and Deviations from Regulations.

Any diver may deviate from the requirements of this manual to the extent necessary to prevent or minimize a situation that is likely to cause death, serious physical harm, or major environmental damage.

A written report of such actions must be submitted to the Diving Control Board explaining the circumstances and justifications.

Diving Operations

Whenever practical, divers should make a stop between 10 and 30 feet for 5 minutes, especially for dives below 60 feet Multiple deep dives exceeding 100 feet require special consideration, and submission of a plan for decompression schedules

Dive Team Organization

All diving activities shall assure adherence to the buddy system (Two comparably equipped scuba divers in the water in constant communication) for scuba diving. This buddy system is based upon mutual assistance, especially in the case of an emergency.

Diver Deployment From and Recovery to Vessels.

Divers shall not enter the water from a vessel unless the propeller has stopped; the engine may be in neutral or stopped. Divers shall not be recovered or picked up unless the vessel propeller has stopped. During live boating operations (divers in the water while the vessel is underway), vessel operators will ensure that the propeller is stopped when a diver is within a vessel's length of the vessel. Surface supplied live boating operations will follow the recommendations of the Association of Diving Contractors consensus standards.

2.40 Post-Dive Procedures

Post-Dive Safety Checks

After the completion of a dive, each diver shall report any physical problems, symptoms of decompression sickness, or equipment malfunctions.

When diving outside the 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 transport him/her to a hyperbaric chamber if necessary.

2.50 Emergency Procedures

The Florida State University has developed emergency procedures that follow the standards of care of the community, including procedures for emergency care, recompression, and evacuation for each dive location (See Appendix).

2.60 Flying After Diving

Divers who have completed dives must have a minimum surface interval, at sea level, of 12 hours before ascending to altitudes over 1000 feet or flying in an airplane. Divers who have completed decompression dives should have a minimum surface interval, at sea level, of 24 hours before ascending to altitudes above 1000 feet or flying in an airplane, which can be pressurized to a maximum altitude of 8,000 feet (7.35 psi).

2.70 Recordkeeping and Requirements

Personal Diving Log

Each certified scientific diver shall log every dive made under the auspices of the Florida State University scientific diving program, and is encouraged to log all other dives. Standard forms will be provided by the Academic Diving Program and are available in a downloadable format on the ADP website. Log sheets shall be submitted monthly to the Diving Safety Officer. An online dive log will be maintained by the scientific diver via the FSU AAUS Web Logging Service (http://fsu.diveaaus.com/). The diving log shall include at least the following:

- Name of diver, partner, and Lead Diver.
- Date, time, and location.
- Diving modes used.
- General nature of diving activities.
- Approximate surface and underwater conditions.
- Maximum depths, bottom time, and surface interval time.
- Diving tables or computers used.
- Detailed report of any incidents or problems.

Dive Logs: https://www.marinelab.fsu.edu/marineops/diving/policies-forms-diverlogs

Required Incident Reporting

All diving incidents requiring recompression treatment, or resulting in moderate or serious injury, or death shall be reported to the Florida State University Diving Control Board and the AAUS using the appropriate form. Incidents shall also be reported to the Director of the Florida State University Department of Environmental Health and Safety. The report will specify the circumstances of the incident and the extent of any injuries or illnesses. Additional information must meet the following reporting requirements:

Occupational injuries and illnesses shall be recorded and reported in accordance with requirements of the appropriate Labor Code section.

If pressure-related injuries are suspected, or if symptoms are evident, the following additional information shall be recorded and retained by the FSU DCB, with the record of the dive, for a period of 5 years:

Complete AAUS Incident Report Form at www.aaus.org.

- Written descriptive report to include:
  a) Name, address, phone numbers of the principal parties involved.
  b) Summary of experience of divers involved.
  c) Location, description of dive site and description of conditions that led up to incident.
  d) Description of symptoms, including depth and time of onset.
  e) Description and results of treatment.
  f) Disposition of case.
  g) Recommendations to avoid repetition of incident.

The Florida State University DCB shall investigate and document any incident of pressure-related injury and prepare a report which is to be forwarded to the AAUS during the annual reporting cycle. This report must first be reviewed and released by the Diving Control Board.

SECTION 3.00: DIVING EQUIPMENT

3.10 General Policy

All equipment shall meet standards as determined by the Diving Safety Officer and the Diving Control Board. All equipment shall be regularly examined by the person using them, and serviced according to manufacturer recommendations. Equipment that is subjected to extreme usage under adverse conditions should require more frequent testing and maintenance.

3.20 Equipment

Regulators

- Approval. Only those makes and models specifically approved by the Diving Safety Officer and the Diving Control Board shall be used.
- Inspection and testing. Scuba regulators shall be inspected and tested prior to first use and every twelve months thereafter.
- Regulators will consist of a primary second stage and an alternate air source (such as an octopus second stage or redundant air supply).

Breathing Masks and Helmets

Breathing masks and helmets shall have:

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

Scuba Cylinders

- Scuba cylinders shall be designed, constructed, and maintained in accordance with the applicable provisions of the Unfired Pressure Vessel Safety Orders.
- Scuba cylinders must be hydrostatically tested in accordance with DOT standards.
- Scuba cylinders must be externally inspected prior to each filling and an internally inspected at intervals not to exceed twelve months.
- Scuba cylinder valves shall be functionally tested at intervals not to exceed twelve months.

Backpacks

- Backpacks without integrated flotation devices and weight systems shall have a quick release device designed to permit jettisoning with a single motion from either hand.

Gauges

- Gauges shall be inspected and tested before first use and every twelve months thereafter.

Flotation Devices

- Each diver shall have the capability of achieving and maintaining positive buoyancy.
- Personal flotation systems, buoyancy compensators, dry suits, or other variable volume buoyancy compensation devices shall be equipped with an exhaust valve.

- Exhaust valves and inflator systems shall be functionally inspected and tested at intervals not to exceed twelve months.

Timing Devices, Depth and Pressure Gauges

Both members of the diving pair must have an underwater timing device, an approved depth indicator, and a submersible pressure gauge.

Determination of Decompression Status: Dive Tables, Dive Computers

- Dive computers or a set of diving tables at least as conservative as the US Navy Diving Tables must be available at the dive location.
- Dive computers must be approved by the Diving Safety Officer.

3.30 Auxiliary Equipment

Hand held underwater power tools

The use of power tools is outside of the purview of the exemption granted to scientific divers by OSHA. The Florida State University diving programs using power tools (hydraulic drills, water jets) underwater, lifting heavy objects underwater, or engaging in such activities such as underwater cutting or welding must follow the OSHA commercial diving standards. All such projects must be approved in the conceptual phase by the Florida State University Diving Control Board and managed by the ADP.

3.40 Support Equipment

First aid supplies.-- A first aid kit and emergency oxygen shall be available on the dive site.

Diver's Flag.-- The appropriate diver's flag shall be displayed prominently whenever diving is conducted under circumstances where required or where water traffic is probable.

Compressor Systems - Organizational Member Controlled.-- The following will be considered in design and location of compressor systems:

- Low pressure compressors used to supply air to the diver if equipped with a volume tank shall have a check valve on the inlet side, a relief valve, and a drain valve.
- Compressed air systems over 500 psig shall have slow-opening shut-off valves.
- All air compressor intakes shall be located away from areas containing exhaust or other contaminants

.

Oxygen System

- Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designed and maintained for oxygen service.
- Components exposed to oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be cleaned of flammable materials before being placed into service.
- Oxygen systems over 125 psig shall have slow-opening shut-off valves.

3.50 Equipment Maintenance

Record Keeping

Each equipment modification, repair, test, calibration, or maintenance service shall be logged, including the date and nature of work performed, serial number of the item, and the name of the person performing the work for the following equipment:

- Regulators
- Submersible pressure gauges
- Depth gauges
- Scuba cylinders
- Cylinder valves
- Diving helmets
- Submersible breathing masks
- Compressors
- Gas control panels
- Air storage cylinders
- Air filtration systems
- Analytical instruments
- Buoyancy control devices
- Dry suits

Compressor Operation and Air Test Records

Gas analyses and air tests shall be performed on all The Florida State University breathing air compressors 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.

A log shall be maintained showing operation, repair, overhaul, filter maintenance, and temperature adjustment for each compressor.

3.60 Air Quality Standards

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

CGA Grade E Component	Maximum
Oxygen	20 - 22%/v
Carbon Monoxide	10 PPM/v
Carbon Dioxide	500 PPM/v
Condensed Hydrocarbons	5 mg/m3
Total Hydrocarbons as Methane	25 PPM/v
Water Vapor	(2)
Objectionable Odors	None

3.70 Dive Computers

Dive computers are defined as the digital devices used in the determination of decompression status.

- Only those makes and models of dive computers specifically approved by the Diving Control Board may be used.
- Any diver desiring the approval to use a dive computer as a means of determining decompression status must apply to the Diving Control Board, complete an appropriate practical training session and pass a written examination.
- Each diver relying on a dive computer to plan dives and indicate or determine decompression status must have his/her own unit.
- On any given dive, both divers in the buddy pair must follow the most conservative dive computer.
- If the dive computer fails at any time during the dive, the dive must be terminated and appropriate surfacing procedures should be initiated immediately.
- A diver should not dive for 18 hours before activating a dive computer to use it to control their diving.
- Once the dive computer is in use, it must not be switched off until it indicates complete out gassing has occurred or 18 hours have elapsed, whichever comes-first.
- When using a dive computer, non-emergency ascents are to be at a rate specified for the make and model of dive computer being used, but not faster than 1ft every two seconds.
- Whenever practical, divers using a dive computer should make a stop between 10 and 30 feet for 5 minutes, especially for dives below 60 feet
- Multiple deep dives exceeding 100 feet require special consideration, and submission of a plan for decompression schedules

SECTION 4.00: ENTRY-LEVEL TRAINING REQUIREMENTS

4.10 General Policy

It is Florida State University policy that training and certification as an entry-level diver is a prerequisite to AAUS Scientific Diver Training. Entry level training must have been conducted under the auspices and standards of an internationally recognized diver training agency.

SECTION 5.00: SCIENTIFIC DIVER CERTIFICATION

5.10 Prerequisites

Administrative

The applicant/candidate must complete all administrative and legal documentation required by Florida State University and ADP.
Forms: *https://www.marinelab.fsu.edu/marineops/diving/policies-forms-diverlogs*

Diver Certification

The applicant/ candidate must, at minimum, show documented proof of entry-level diver certification from an internationally recognized training agency.

Medical Examination

The applicant/candidate must be medically qualified for diving as described in Section 6.0 of this manual and AAUS Standards for Scientific Diving.
Medical forms: https://www.marinelab.fsu.edu/marineops/diving/policies-forms-diverlogs

Swimming/Watermanship Evaluation

The applicant/candidate must demonstrate the following in the presence of the Diving Safety Officer, instructor, or other approved examiner. All tests are to be performed without swim aids, however, where exposure protection is needed, the applicant must be appropriately weighted to provide for neutral buoyancy.

a) Swim underwater for a distance of 25 yards/meters without surfacing.
b) Swim 400 yards/meters in less than 12 minutes.
c) Tread water for 10 minutes, or 2 minutes without the use of hands.
d) Transport a passive person of equal size a distance of 25 yards/meters in the water.

5.20 Training

The diver must complete theoretical aspects and practical training for a minimum cumulative time of 100 hours. Theoretical aspects shall include principles and activities appropriate to the intended area of scientific study.

Theoretical Training/ Knowledge Development

a) Required Topics:

1. Diving Emergency Care Training
   - Cardiopulmonary Resuscitation (CPR)
   - Standard or Basic First Aid
   - Recognition of DCS and AGE
   - Accident Management
   - Field Neurological Exam
   - Oxygen Administration

2. Dive Rescue
3. Dive Physics
4. Dive Physiology
5. Dive Environments
6. Decompression Theory and its Application
7. AAUS Scientific Diving Regulations and History
    - Scientific Dive Planning
    - Coordination with other Agencies
    - Appropriate Governmental Regulations
8. Scientific Method
9. Data Gathering Techniques (Only Items specific to area of study required)
    - Transect Sampling (Quadrating)
    - Transecting
    - Mapping
    - Coring
    - Photography
    - Tagging
    - Collecting
    - Animal Handling
    - Archaeology
    - Common Biota
    - Organism Identification
    - Behavior
    - Ecology
    - Site Selection, Location, and Re-location
    - Specialized Equipment for data gathering
10. HazMat Training
    - HP Cylinders
    - Chemical Hygiene, Laboratory Safety (Use Of Chemicals)

b) Suggested Topics:

1. Specific Dive Modes (methods of gas delivery)
    - Open Circuit
    - Hooka
    - Surface Supplied diving
2. Small Boat Operation
3. Rebreathers
    - Closed
    - Semi-closed
4. Specialized Breathing Gas
    - Nitrox
    - Mixed Gas
5. Specialized Environments and Conditions
    - Blue Water Diving,
    - Ice and Polar Diving (Cold Water Diving)
    - Zero Visibility Diving
    - Polluted Water Diving

- Saturation Diving
- Decompression Diving
- Overhead Environments
- Aquarium Diving
- Night Diving
- Kelp Diving
- Strong Current Diving (Live-boating)
- Potential Entanglement

6. Specialized Diving Equipment
   - Full face mask
   - Dry Suit
   - Communications

Practical Training/ Skill Development

Confined Water Evaluation

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

1. Enter water with full equipment.
2. Clear face mask.
3. Demonstrate air sharing, including both buddy breathing and the use of alternate air source, as both donor and recipient, with and without a face mask.
4. Demonstrate ability to alternate between snorkel and scuba while kicking.
5. Demonstrate understanding of underwater signs and signals.
6. Demonstrate simulated in-water mouth-to-mouth resuscitation.
7. Rescue and transport, as a diver, a passive simulated victim of an accident.
8. Demonstrate ability to remove and replace equipment while submerged.
9. Demonstrate watermanship ability, which is acceptable to the instructor.

Open Water Evaluation

The trainee must satisfy an instructor, approved by the Diving Safety Officer, of their ability to perform at least the following in open water:

1. Surface dive to a depth of 10 feet in open water without scuba.
2. Demonstrate proficiency in air sharing as both donor and receiver.
3. Enter and leave open water or surf, or leave and board a diving vessel, while wearing scuba gear.
4. Kick on the surface 400 yards while wearing scuba gear, but not breathing from scuba unit.
5. Demonstrate judgment adequate for safe diving.
6. Demonstrate, where appropriate, the ability to maneuver efficiently in the environment, at and below the surface.
7. Complete a simulated emergency swimming ascent.
8. Demonstrate clearing of mask and regulator while submerged.
9. Demonstrate ability to achieve and maintain neutral buoyancy while submerged.
10. Demonstrate techniques of self-rescue and buddy rescue.
11. Navigate underwater.
12. Plan and execute a dive.

Checkout Dive/ Additional Experience

Practical training must include an Open Water checkout dive(s), with evaluation of the skills listed in Open Water Evaluation, with the DSO or qualified delegate followed by at least 11 ocean or open water dives in a variety of dive sites and diving conditions, for a cumulative bottom time of 6 hours. Dives following the checkout dive must be supervised by a certified Scientific Diver with experience in the type of diving planned, with the knowledge and permission of the DSO.

5.30 Examinations

Written Exams

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

1. Function, care, use, and maintenance of diving equipment.
2. Physics and physiology of diving.
3. Diving regulations and precautions.
4. Near-shore currents and waves.
5. Dangerous marine animals.
6. Emergency procedures, including buoyant ascent and ascent by air sharing.
7. Currently accepted decompression procedures.
8. Demonstrate the proper use of dive tables.
9. Underwater communications.
10. Aspects of freshwater and altitude diving.
11. Hazards of breath-hold diving and ascents.
12. Planning and supervision of diving operations.
13. Diving hazards.
14. Cause, symptoms, treatment, and prevention of the following: near drowning, air embolism, carbon dioxide excess, squeezes, oxygen poisoning, nitrogen narcosis, exhaustion, and panic, hypoxia/anoxia.
15. Suggested topics (from Sec. 5.20) at the DSO's discretion.

Equipment

The trainee will be subject to examination/review of:

1. Personal diving equipment
2. Task specific equipment

5.40 Diver Permits and Certifications

The Florida State University requires that no person shall engage in scientific diving unless that person is authorized by the DCB pursuant to the provisions of this standard. The following are minimal standards for a scientific diver certification.

Scientific Diver-In-Training Permit

This is a permit to participate in training dives with The Florida State University as determined by the DSO. This permit signifies that a diver has completed and been certified as at least an entry level diver through an internationally recognized certifying agency or scientific diving program, and has the knowledge skills and experience necessary to continue training as a scientific diver under supervision, as approved by the DSO.

Scientific Diver Certification

This permit signifies a diver has completed all requirements in Section 5.0 and is authorized by The Florida State University to engage in scientific diving without supervision, as approved by the DSO. Submission of documents and participation in aptitude examinations does not automatically result in certification. The applicant must convince the Diving Safety Officer and members of the DCB that they are sufficiently skilled and proficient to be certified. This skill will be acknowledged by the signature of the DSO. Any applicant who does not possess the necessary judgment, under diving conditions, for the safety of the diver and their partner may be denied organizational member scientific diving privileges.

5.50 Depth Certification

Depth Certification Levels and Progression to Next Depth Level

A scientific diver diving under the auspices of The Florida State University may progress to the next depth level after successfully completing the required dives for the next level. A diver may exceed his/her depth limit by one depth level if dives are planned and executed under close supervision of a diver who is currently certified by the DCB to dive to the greater depth, and with the knowledge and permission of the DSO.

a) Certification to 30 Foot Depth - A diver will be permitted to dive to 30 FSW upon the successful completion of the ADP scientific diver program entry requirements (see Section 5.00). This diver will also enter the program as a Diver-in-Training (Sec.5.40) pending completion of the requirements to progress to the Scientific Diver status.
b) Certification to 60 Foot Depth - A diver holding a 30-foot depth certificate may be permitted to dive to a depth of 60 feet after successfully completing, under supervision of the ADP, 12 logged training dives to depths between 31 and 60 feet for a minimum cumulative bottom time of 4 hours. The diver must show proficiency in the use of appropriate dive tables and other skills as requested by the DSO.
c) Certification to 100 Foot Depth - A diver holding a 60-foot depth certificate may be permitted to dive to a depth of 100 feet after successfully completing four dives to depths between 61 and 100 feet. The diver shall also demonstrate proficiency in the use of the appropriate dive tables and any other skills as requested by the DSO.
d) Certification to 130 Foot Depth - A diver holding a 100-foot depth certificate may be permitted to dive to a depth of 130 feet after successfully completing four dives to depths between 101 and 130 feet. The diver shall also demonstrate proficiency in the use of the appropriate dive tables and any other skills as requested by the DSO.
e) Certification to 150 Foot Depth - A diver holding a 130-foot depth certificate may be permitted to dive to a depth of 150 feet after successfully completing four dives to depths between 131 and 150 feet. Dives shall be planned and executed under close supervision of a diver authorized by the ADP and certified to this depth. The diver must also demonstrate knowledge of the special problems of deep diving, and of special safety requirements. Divers seeking permission to dive to 150 feet must demonstrate proficiency with the appropriate dive tables for these depth ranges and any other skills as requested by the DSO.
f) Diving is not permitted beyond a depth of 150 feet

5.60 Continuation of Certification

Minimum Activity to Maintain Certification

During any 12-month period, each certified scientific diver must log a minimum of 12 dives. At least one dive must be logged near the maximum depth of the diver's certification during each 6- month period. Divers certified to 130 feet or deeper may satisfy these requirements with dives to 130 feet or over. Divers who fail to meet these requirements may have their The Florida State University diving status revoked or restricted. Divers who fail to submit dive logs to the ADP may result in the suspension of diving privileges.

Re-qualification of Depth Certificate

Once the initial certification requirements of Section 5.00 are met, divers whose depth certification has lapsed due to lack of activity may be re-qualified by conducting and logging dives as required by the DSO with the advice of the DCB.

Medical Examination

All certified scientific divers shall pass a medical examination at the intervals specified in Section 6.0. After each major illness or injury, as described in Section 6.0, a certified scientific diver shall receive clearance to return to diving from a physician before resuming diving activities.

Emergency Care Training

The scientific diver must provide proof of current training in the following:

- Adult CPR (must be current).
- Emergency oxygen administration (must be current)
- First aid for diving accidents (must be current)

5.70 Revocation of Certification

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

5.80 Recertification

If a diver's certificate expires or is revoked, they may be re-certified after complying with such conditions as the Diving Safety Officer or the DCB may impose. The diver shall be given an opportunity to present their case to the DCB before conditions for re-certification are stipulated.

5.90 Waiver of Requirements – Temporary Diver

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

Requirements of Section 5.0 may be waived by the Diving Safety Officer if the person in question has demonstrated proficiency in diving and can contribute measurably to a planned dive. A statement of the temporary diver's qualifications shall be submitted to the Diving Safety Officer as a part of the dive plan. Temporary permits shall be restricted to the planned diving operation and shall comply with all regulations, and standards of this standard, including medical requirements.

SECTION 6.00: MEDICAL STANDARDS

6.10 Medical Requirements

General

Medical forms: https://www.marinelab.fsu.edu/marineops/diving/policies-forms-diverlogs

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

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.

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

6.20 Frequency of Medical Evaluations

Medical evaluation shall be completed:

- Before a diver may begin diving unless the diver has been given an equivalent initial medical evaluation within the preceding 5 years (3 years if over the age of 40 and 2 years if over the age of 60), the Florida State University ADP has obtained the results of that examination, and those results have been reviewed and found satisfactory by the DSO or the Program Physician.
- Thereafter, at five year intervals up to age 40, every three years after the age of 40, and every two years after the age of 60.
- Clearance to return to diving must be obtained by the Program Physician following any major injury or illness, or any condition requiring hospital care. If the injury or illness is pressure related, then the clearance to return to diving must come from the Program Physician or a physician trained in diving medicine.

6.30 Information Provided Examining Physician

The Florida State University ADP shall provide a copy of the medical evaluation requirements of this standard to the examining physician.

6.40 Content of Medical Evaluations

Medical examinations conducted initially and at the intervals specified in Section 6.2 shall consist of the following:

- Applicant agreement for release of medical information to the Diving Safety Officer and the DCB.
- Diver's medical history
- Diving physical examination.

6.50 Conditions that may disqualify candidates from diving (Adapted from Bove 1998)

1. Abnormalities of the tympanic membrane, such as perforation, presence of a monomeric membrane, or inability to autoinflate the middle ears.
2. Hearing loss; Vertigo including Meniere's Disease.
3. Stapedectomy or middle ear reconstructive surgery.
4. Recent ocular surgery.
5. Psychiatric disorders including claustrophobia, suicidal ideation, psychosis, anxiety states, depression.
6. Substance abuse, including alcohol.
7. Episodic loss of consciousness.
8. History of seizure.
9. History of stroke or a fixed neurological deficit.
10. Recurring neurologic disorders, including transient ischemic attacks.
11. History of intracranial aneurysm, other vascular malformation, or intracranial hemorrhage.
12. History of neurological decompression illness with residual deficit.
13. Head injury.
14. Hematologic disorders including coagulopathies.
15. Risk factors or evidence of coronary artery disease.
16. Atrial septal defects.
17. Significant valvular heart disease - isolated mitral valve prolapse is not disqualifying.
18. Significant cardiac rhythm or conduction abnormalities.
19. Implanted cardiac pacemakers and cardiac defibrillators (ICD).
20. Inadequate exercise tolerance.
21. Hypertension.
22. History of pneumothorax.
23. Asthma.
24. Chronic pulmonary disease, including radiographic evidence of pulmonary blebs, bullae, or cysts.
25. Diabetes mellitus.
26. Pregnancy.

6.60 Laboratory Requirements for Diving Medical Examination and Intervals:

Initial examination under age 40:

1. Medical History
2. Complete physical exam, emphasis on neurological and otological components
3. Urinalysis
4. Any further tests deemed necessary by the physician

Periodic re-examination under age 40 (every 5 years):

1. Medical History
2. Complete physical exam, emphasis on neurological and otological components
3. Urinalysis
4. Any further tests deemed necessary by the physician

First exam over the age of 40:

1. Medical History
2. Complete physical exam, emphasis on neurological and otological components

3. Detailed assessment of coronary artery disease risk factors using Multiple-Risk-Factor Assessment[12] (age, family history, lipid profile, blood pressure, diabetic screening, smoking history). Further cardiac screening may be indicated based on risk factor assessment.
4. Resting EKG
5. Chest X-Ray
6. Urinalysis
7. Any further tests deemed necessary by the physician

Periodic re-examination over age 40 (every 3 years); over age 60 (every 2 years):

1. Medical History
2. Complete physical exam, emphasis on neurological and otological components
3. Detailed assessment of coronary artery disease risk factors using Multiple-Risk-Factor Assessment[1] (age, family history, lipid profile, blood pressure, diabetic screening, smoking history). Further cardiac screening may be indicated based on risk factor assessment.
4. Resting EKG
5. Urinalysis
6. Any further tests deemed necessary by the physician[3]

6.70 Physician's Written Report.

After any medical examination relating to the individual's fitness to dive, the Florida State University ADP shall obtain a written report prepared by the examining physician that shall contain the examining physician's opinion of the individual's fitness to dive, including any recommended restrictions or limitations. This report will be reviewed by the DCB.

The Florida State University ADP shall make a copy of the physician's written report available to the individual.

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[1] Grundy, R.J. et. al. 1999. Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations. AHA/ACC Scientific Statement http://www.acc.org/clinical/consensus/risk/risk1999.pdf

[2] Bove, A.A. 2011. The cardiovascular system and diving risk. *Undersea and Hyperbaric Medicine* 38(4): 261-269.

SECTION 7.00 Nitrox Diving Guidelines

The following guidelines address the use of nitrox by scientific divers under the auspices of The Florida State University. Nitrox is defined for these guidelines as breathing mixtures composed predominately of nitrogen and oxygen, most commonly produced by the addition of oxygen or the removal of nitrogen from air.

7.10 Prerequisites

Eligibility

Only a certified Scientific Diver or Scientific Diver-in-Training (see Sections 5.00) diving under the auspices of The Florida State University is eligible for authorization to use nitrox. The diver must have completed training specific to the use of nitrox either with FSU or under the auspices and standards of an internationally recognized diver training agency.

7.20 Requirements for Authorization to Use Nitrox

Previous training does not automatically result in authorization to use nitrox. The applicant must convince the DSO and members of the DCB that they are sufficiently skilled and proficient.

Prior to authorization to use nitrox, the following minimum requirements should be met:

Training.-- The diver must complete additional theoretical and practical training beyond the Scientific Diver-in-Training air certification level, to the satisfaction of the FSU DSO and DCB (see Section 7.30).

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

- Written examinations covering the information presented in the classroom training session(s) such as gas theory, oxygen toxicity, partial pressure determination, and decompression tables);
- Practical examinations covering the information presented in the practical training session(s) (i.e., gas analysis, documentation procedures, etc.);

Minimum Activity to Maintain Authorization.-- The diver should plan and log at least one (1) nitrox dive per year. Failure to meet the minimum activity level may be cause for restriction or revocation of nitrox authorization, in which case a written exam is required for requalification.

7.30 Nitrox Training Guidelines

Training in these guidelines should be in addition to training for Diver-in-Training authorization. It may be included as part of training to satisfy the Scientific Diver training requirements (Section 5.00).

Classroom Instruction

Topics should include, but are not limited to: review of physical gas laws, particularly pertaining to nitrox; calculations of gas partial pressures; partial pressure and its role in limiting divers; oxygen physiology and

oxygen toxicity; calculation of oxygen exposure and maximum safe operating depth (MOD); review of decompression theory and tables; equivalent air depth (EAD) concept and calculations; determination of decompression schedules (both by EAD method using approved air dive tables, and using approved nitrox dive tables); dive planning and emergency procedures; mixing procedures and calculations; gas analysis; personnel requirements; equipment marking and maintenance requirements; dive station requirements.

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

Practical Training

The practical training portion will consist of a review of skills as stated for scuba (Section 5.00), with additional training as follows:

- Oxygen analysis of nitrox mixtures.
- Determination of MOD, oxygen partial pressure exposure, and oxygen toxicity time limits, for various nitrox mixtures at various depths.
- Determination of nitrogen-based dive limits status by EAD method using air dive tables, and/or using nitrox dive tables at least as conservative as the NOAA nitrox tables.
- Nitrox dive computer use may be included, as approved by the DSO.

Written Examination (based on classroom instruction and practical training)

Before authorization, the trainee should successfully pass a written examination demonstrating knowledge of at least the following:

- Function, care, use, and maintenance of equipment cleaned for nitrox use.
- Physical and physiological considerations of nitrox diving (e.g., O_2 toxicity and its relationship to CO_2).
- Diving regulations and procedures as related to nitrox diving, either scuba or surface-supplied (depending on intended mode).
- Given the proper information, calculation of:
    1. Equivalent air depth (EAD) for a given fO_2 and actual depth;
    2. pO_2 exposure for a given fO_2 and depth;
    3. Optimal nitrox mixture for a given pO_2 exposure limit and planned depth;
    4. Maximum operational depth (MOD) for a given mix and pO_2 exposure limit;
    5. For nitrox production purposes, percentages/psi of oxygen present in a given mixture, and psi of each gas required to produce a fO_2 by partial pressure mixing.
- Dive table and dive computer selection and usage;
- Nitrox production methods and considerations;
- Oxygen analysis;
- Nitrox operational guidelines (Section 7.40), dive planning, and dive station components.

Open Water Dives--No open water dives are required. However, two supervised open water dives are encouraged.

7.40 Scientific Nitrox Diving Regulations

Dive Personnel Requirements

- Nitrox Diver in Training - A Diver in Training, who has completed the requirements of Section 4.00 and the training and authorization sections of these guidelines, may be authorized by the DSO to use nitrox under the direct supervision a Scientific Diver who also holds nitrox authorization. Dive depths should be restricted to those specified in the diver's authorization.
- Scientific Diver - A Scientific Diver, who has completed the requirements of Section 5.00 and the training and authorization sections of these guidelines, may be authorized by the DSO to use nitrox. Depth authorization to use nitrox should be the same as those specified in the diver's authorization, as described in Section 5.40.
- Lead Diver - On any dive during which nitrox will be used by any team member, the Lead Diver should be authorized to use nitrox, and hold appropriate authorizations required for the dive, as specified in the Florida State University Standards. Lead Diver authorization for nitrox dives by the DSO and/or DCB should occur as part of the dive plan approval process.

In addition to responsibilities listed in Section 1.20, the Lead Diver should:

1. As part of the dive planning process, verify that all divers using nitrox on a dive are properly qualified and authorized;
2. As part of the pre-dive procedures, confirm with each diver the nitrox mixture the diver is using, and establish dive team maximum depth and time limits, according to the shortest time limit or shallowest depth limit among the team members.
3. The Lead Diver should also reduce the maximum allowable pO_2 exposure limit for the dive team if on-site conditions so indicate (see Sec. 7.4)

Dive Parameters

Oxygen Exposure Limits

- The inspired oxygen partial pressure experienced at depth should not exceed 1.6 ATA. All dives performed using nitrox breathing mixtures should comply with the current *NOAA Diving Manual* "Oxygen Partial Pressure Limits for 'Normal' Exposures"
- The maximum allowable exposure limit should be reduced in cases where cold or strenuous dive conditions, or extended exposure times are expected. The DCB should consider this in the review of any dive plan application that proposes to use nitrox. The Lead Diver should also review on-site conditions and reduce the allowable pO_2 exposure limits if conditions indicate.
- If using the equivalent air depth (EAD) method the maximum depth of a dive should be based on the oxygen partial pressure for the specific nitrox breathing mix to be used.

Bottom Time Limits

- Maximum bottom time should be based on the depth of the dive and the nitrox mixture being used.
- Bottom time for a single dive should not exceed the NOAA maximum allowable "Single Exposure Limit" for a given oxygen partial pressure, as listed in the current NOAA Diving Manual.

Dive Tables and Gases

- A set of nitrox dive tables at least as conservative as the NOAA nitrox tables should be available at the dive site.

- When using the equivalent air depth (EAD) method, dives should be conducted using air dive tables approved by the DCB.
- If nitrox is used to increase the safety margin of air-based dive tables, the MOD and oxygen exposure and time limits for the nitrox mixture being dived should not be exceeded
- Breathing mixtures used while performing in-water decompression, or for bail-out purposes, should contain the same or greater oxygen content as that being used during the dive, within the confines of depth limitations and the oxygen partial pressure limits set forth in Section 7.4.

Nitrox Dive Computers

- Divers may only use nitrox diving decompression computers approved by the DCB. Manufacturer's guidelines and operations instructions should be followed.
- Nitrox dive computer users should demonstrate a clear understanding of the display, operations, and manipulation of the unit being used for nitrox diving prior to using the computer, to the satisfaction of the DSO or designee.
- If nitrox is used to increase the safety margin of an air based computer the MOD and oxygen exposure and time limits for the nitrox mixture being dived should not be exceeded.
- Dive computers capable of pO_2 limit and fO_2 adjustment should be checked by the diver prior to the start of each dive to ensure compatibility with the mixture being used.

Repetitive Diving

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

Oxygen Parameters

- Authorized Mixtures - Mixtures meeting the criteria outlined in Sec. 7.4 may be used for nitrox diving operations, upon approval of the DCB.
- Purity - Oxygen used for mixing nitrox breathing gas should meet the purity levels for "Medical Grade" (U.S.P.) or "Aviator Grade" standards.
- In addition to AAUS and FSU Air Purity Guidelines (Section 3.60), the following standard should be met for breathing air that is either:

    a) Placed in contact with oxygen concentrations greater than 40%.
    b) Used in nitrox production by the partial pressure mixing method with gas mixtures containing greater than 40% oxygen as the enriching agent.

Air Purity CGA Grade E (Section 3.60))	
Component	Maximum
Condensed Hydrocarbons	5mg/m3
Hydrocarbon Contaminants	No greater than 0.1 mg/m3

Gas Mixing and Analysis
Personnel Requirements

a) Individuals responsible for producing and/or analyzing nitrox mixtures should be knowledgeable and experienced in all aspects of the technique.
b) Only those individuals approved by the DSO and/or DCB should be responsible for mixing and/or analyzing nitrox mixtures.

Production Methods - It is the responsibility of the DCB to approve the specific nitrox production method used.

Analysis Verification by User

1. It is the responsibility of each diver to analyze, prior to the dive, the oxygen content of his/her scuba cylinder and acknowledge in writing the following information for each cylinder: fO_2, MOD, cylinder pressure, date of analysis, and user's name.
2. Individual dive log reporting forms should report fO_2 of nitrox used, if different than 21%.

7.50 Nitrox Diving Equipment

All of the designated equipment and stated requirements regarding scuba equipment required in the Florida State University Standards should apply to nitrox scuba operations. Additional minimal equipment necessary for nitrox diving operations includes:

- Labeled SCUBA cylinders
- Oxygen analyzers.

Oxygen Cleaning and Maintenance Requirements

Requirement for Oxygen Service

1. All equipment, which during the dive or cylinder filling process is exposed to concentrations greater than 40% oxygen at pressures above 150 psi, should be cleaned and maintained for oxygen service.

2. Equipment used with oxygen or mixtures containing over 40% by volume oxygen shall be designed and maintained for oxygen service. Oxygen systems over 125 psig shall have slow-opening shut-off valves. This should include the following equipment: scuba cylinders, cylinder valves, scuba and other regulators, cylinder pressure gauges, hoses, diver support equipment, compressors, and fill station components and piping.

Scuba Cylinder Identification Marking

Scuba cylinders to be used with nitrox mixtures should have the following identification documentation affixed to the cylinder.

1. Cylinders should be marked "NITROX," or "EANx" (Enriched Air Nitrox), or "Enriched Air"
2. Nitrox identification color-coding should include a 4-inch wide green band around the cylinder, starting immediately below the shoulder curvature. If the cylinder is not yellow, the green band should be bordered above and below by a 1-inch yellow band.
3. The alternate marking of a yellow cylinder by painting the cylinder crown green and printing the word "NITROX" parallel to the length of the cylinder in green print is acceptable.
4. Other markings, which identify the cylinder as containing gas mixes other than air, may be used with the approval of the DCB.
5. A contents label should be affixed, to include the current f O_2, date of analysis, and MOD.
6. The cylinder should be labeled to indicate whether the cylinder is prepared for oxygen or nitrox mixtures containing greater than 40% oxygen.

Regulators

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

Other Support Equipment

1. An oxygen analyzer is required which is capable of determining the oxygen content in the scuba cylinder. Two analyzers are recommended to reduce the likelihood of errors related to a faulty analyzer. The analyzer should be capable of reading a scale of 0 to 100% oxygen, within 1% accuracy.
2. All diver and support equipment should be suitable for the f O_2 being used.

Compressor system

1. The compressor/filtration system MUST produce oil-free air.
2. An oil-lubricated compressor placed in service for a nitrox system should be checked for oil and hydrocarbon contamination at least quarterly.

Fill Station Components

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

SECTION 8.00: SHALLOW-WATER SURFACE SUPPLIED (HOOKAH)

The following guidelines address the use of surface supplied or hookah diving technology by scientific divers under the auspices of The Florida State University. Diving operations requiring the use of hookah must be approved by the DSO.

8.10 Minimum Requirements

a) In addition to complying with basic ADP SOP, divers using the hookah mode shall be trained in the operation, care, and maintenance of hookah equipment.

b) Divers must be equipped with a diver-carried independent reserve breathing gas supply while diving on hookah.

c) Each hookah team will be hose-tended by a trained surface support team member while in the water.

d) Only hookah units approved by the DSO or designee shall be used while diving under the auspices of Florida State University.

SECTION 9.00: OTHER DIVING TECHNOLOGY

Certain types of diving, some of which are listed below, require specialized equipment or require additional training. Supplementary guidelines for these technologies are in development by the AAUS. Researchers that have a need to use such technologies must follow guidelines established by the Florida State University Diving Control Board. Divers shall comply with all scuba diving procedures in this manual unless specified.

9.10 Mixed Gas Diving

The use of mixed gas (gas mixtures other than air or nitrox) is not currently supported by the Florida State University DCB or ADP. Divers requiring the use of mixed gas must make application for approval and support to the DCB.

9.20 Saturation Diving

Divers requiring the use of saturation diving on open circuit SCUBA shall comply with the guidelines established by the Florida State University DCB.

9.30 Closed and Semi-closed Circuit Scuba (Rebreathers)

Closed and semi-closed circuit scuba (rebreathers) is currently not supported by the Florida State University DCB or ADP. Divers requiring the use of rebreather technology must make application for approval and support to the DCB.

9.40 Blue Water Diving

The Florida State University Diving Control Board does not currently support blue water diving, which is defined as diving in open water where the bottom is generally >200 feet deep. Blue-water diving requires special training and the use of multiple-tethered diving techniques. Specific guidelines that should be followed are outlined in "Blue Water Diving Guidelines" (California Sea Grant Publ. No. T-CSGCP-014). No blue-water diving activity shall take place without the prior approval of the DCB.

9.50 Ice and Polar Diving

Divers anticipating the need to dive under ice or in polar conditions should seek the approval of the DCB. Divers planning such diving activity should consult the following: "Guidelines for Conduct of Research Diving", National Science Foundation, Division of Polar Programs, 1990. No ice or polar diving is permitted without the prior approval of the DCB.

9.60 Overhead Environments

Overhead environments include cavern, cave, and shipwreck penetration diving. In cavern or confined space situations, where an enclosed or confined space is not large enough for two divers, a diver shall be stationed at the underwater point of entry and an orientation line shall be used. Diving in caves and penetration diving in shipwrecks are currently not supported by the Florida State University DCB or ADP. Divers with a demonstrated need to dive in overhead environments must make application for approval and support to the DCB.

9.70 Dry Suit Diving

Divers planning to conduct dives using dry suits shall be properly trained by the ADP staff or shall attend an equivalent training course. At a minimum, the diver should be familiar with the care and maintenance of the dry suit, proper fitting and dressing in the dry suit, thermal properties and buoyancy considerations of dry suits, diving techniques using dry suits, and repair of the dry suit. In addition, divers should be trained in emergency procedures for loss of or significant gain in buoyancy while wearing a dry suit. Divers should be initially exposed to the dry suit in a pool or confined water environment, and should also make at least 4 open water dives in the dry suit under the supervision of instructional personnel. No diver shall be permitted to check out a dry suit without the approval of the DSO or designee.

APPENDIX 1 – Medical Forms

(1) Diving Medical History Form

(2) Diving Medical Exam Overview for the Examining Physician

(3) AAUS Medical Evaluation of Fitness for Scuba Diving Report

The Florida State University

Diving Medical History Form

To be completed by applicant-diver and provided to physician

Applicant

Name _____ Sex ___ Age ___ Wt.___ Ht. ____

Sponsor _____ Date _____
(Department, School)

Scuba diving places considerable physical and mental demands on the diver. Certain medical and physical requirements must be met before beginning a diving or training program. Your accurate answers to the questions are more important, in many instances, in determining your fitness to dive than what the physician may see, hear, or feel as part of the diving medical certification procedure. This form shall be kept confidential by the examining physician. If you believe any question amounts to invasion of your privacy, you may elect to omit an answer, provided that you shall subsequently discuss that matter with your own physician who must then indicate, in writing, that you have done so and that no health hazard exists. Should your answers indicate a condition, which might make diving hazardous, you must review the matter with your physician. In such instances, their 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 they are concerned only with your well-being and safety.

	Yes	No	Please indicate whether the following apply to you	Comments
1			Convulsions, seizures, or epilepsy	
2			Fainting spells or dizziness	
3			Been addicted to drugs	
4			Diabetes	
5			Motion sickness or sea/air sickness	
6			Claustrophobia	
7			Mental disorder or nervous breakdown	
8			Are you pregnant?	
9			Do you suffer from menstrual problems?	
10			Anxiety spells or hyperventilation	
11			Frequent sour stomachs, nervous stomachs or vomiting spells	
12			Had a major operation	
13			Presently being treated by a physician	
14			Taking any medication regularly (even non-prescription)	
15			Been rejected or restricted from sports	
16			Headaches (frequent and severe)	
17			Wear dental plates	
18			Wear glasses or contact lenses	
19			Bleeding disorders	
20			Alcoholism	
21			Any problems related to diving	
22			Nervous tension or emotional problems	
24			Perforated ear drums	
25			Hay fever	

	Yes	No	Please indicate whether or not the following apply to you	Comments
26			Frequent sinus trouble, frequent drainage from the nose, post-nasal drip, or stuffy nose	
27			Frequent earaches	
28			Drainage from the ears	

29			Difficulty with your ears in airplanes or on mountains	
30			Ear surgery	
31			Ringing in your ears	
32			Frequent dizzy spells	
33			Hearing problems	
34			Trouble equalizing pressure in your ears	
35			Asthma	
36			Wheezing attacks	
37			Cough (chronic or recurrent)	
38			Frequently raise sputum	
39			Pleurisy	
40			Collapsed lung (pneumothorax)	
41			Lung cysts	
42			Pneumonia	
43			Tuberculosis	
44			Shortness of breath	
45			Lung problem or abnormality	
46			Spit blood	
47			Breathing difficulty after eating particular foods, after exposure to particular pollens or animals	
48			Are you subject to bronchitis	
49			Subcutaneous emphysema (air under the skin)	
50			Air embolism after diving	
51			Decompression sickness	
52			Rheumatic fever	
53			Scarlet fever	
54			Heart murmur	
55			Large heart	
56			High blood pressure	
57			Angina (heart pains or pressure in the chest)	
58			Heart attack	
59			Low blood pressure	
60			Recurrent or persistent swelling of the legs	
61			Pounding, rapid heartbeat or palpitations	

	Yes	No	Please indicate whether or not the following apply to you	Comments
62			Easily fatigued or short of breath	
63			Abnormal EKG	
64			Joint problems, dislocations or arthritis	
65			Back trouble or back injuries	
66			Ruptured or slipped disk	
67			Limiting physical handicaps	
68			Muscle cramps	
69			Varicose veins	
70			Amputations	

71			Head injury causing unconsciousness	
72			Paralysis	
73			Have you ever had an adverse reaction to medication?	
74			Do you smoke?	
75			Have you ever had any other medical problems not listed? If so, please list or describe below	
76			Is there a family history of high cholesterol?	
77			Is there a family history of heart disease or stroke?	
78			Is there a family history of diabetes?	
79			Is there a family history of asthma?	
80			Date of last tetanus shot? Vaccination dates?	

Please explain any "yes" answers to the above questions.

_____
_____
_____
_____

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

Signature Date

(This completed form remains with the attending physician)

The Florida State University
Diving Medical Exam Overview
For the Examining Physician

This person, _____, requires a medical examination to assess their fitness for certification as a Scientific Diver for the *Florida State University Academic Diving Program*. Their answers on the Diving Medical History Form (attached) may indicate potential health or safety risks as noted. We request that you evaluate their fitness on the attached scuba *Diving Fitness Medical Evaluation Report*. If you have questions about diving medicine, you may wish to consult one of the references or contact one of the physicians with expertise in diving medicine list below or the Undersea Hyperbaric and Medical Society, or the Divers Alert Network.
Please contact me if you have any questions or concerns about diving medicine or the *Florida State University Academic Program Standards for Scientific Diving*
(https://marinelab.fsu.edu/marineops/diving/documents/FSU_Standards_ScientificDiving_rev_2016_FINAL.pdf).

Thank you for your assistance.

_____
Diving Safety Officer (Printed) Diving Safety Officer (Signature) Date

Email: Fsucml-dso@fsu.edu Phone number: (850) 697 4120

CONDITIONS THAT MAY DISQUALIFY CANDIDATES FROM DIVING

Scuba and other modes of compressed-gas diving can be strenuous and hazardous. A special risk is present if the middle ear, sinuses, or lung segments do not readily equalize air pressure changes. The most common cause of distress is eustachian insufficiency. Recent deaths in the scientific diving community have been attributed to cardiovascular disease. Please consult the following list of conditions that usually restrict candidates from diving.
(Adapted from Bove, 1998: bracketed numbers are pages in Bove)

1. Abnormalities of the tympanic membrane, such as perforation, presence of a monomeric membrane, or inability to autoinflate the middle ears. [5, 7, 8, 9]
2. Vertigo, including Meniere 's disease. [13]
3. Stapedectomy or middle ear reconstructive surgery. [11]
4. Recent ocular surgery. [15, 18, 19]
5. Psychiatric disorders including claustrophobia, suicidal ideation, psychosis, anxiety states, untreated depression. [20 - 23]
6. Substance abuse, including alcohol. [24 - 25]
7. Episodic loss of consciousness. [1, 26, 27]
8. History of seizure. [27, 28]
9. History of stroke or a fixed neurological deficit. [29, 30]
10. Recurring neurologic disorders, including transient ischemic attacks. [29, 30]
11. History of intracranial aneurysm, other vascular malformation or intracranial hemorrhage. [31]
12. History of neurological decompression illness with residual deficit. [29, 30]
13. Head injury with sequelae. [26, 27]
14. Hematologic disorders including coagulopathies. [41, 42]
15. Evidence of coronary artery disease or high risk for coronary artery disease. [33 - 35]
16. Atrial septal defects. [39]
17. Significant valvular heart disease - isolated mitral valve prolapse is not disqualifying. [38]
18. Significant cardiac rhythm or conduction abnormalities. [36 - 37]
19. Implanted cardiac pacemakers and cardiac defibrillators (ICD). [39, 40]
20. Inadequate exercise tolerance. [34]

21. Severe hypertension. [35]
22. History of spontaneous or traumatic pneumothorax. [45]
23. Asthma. [42 - 44]
24. Chronic pulmonary disease, including radiographic evidence of pulmonary blebs, bullae, or cysts. [45, 46]
25. Diabetes mellitus. [46 - 47]
26. Pregnancy. [56]

LIST OF PHYSICIANS WITH TRAINING & EXPERTISE IN DIVING MEDICINE

Divers Alert Network
Medical Information Line
Phone: (919) 684-2948 Ext 222
Available: Mon-Fri, 9 AM to 5 PM EST

John T. MacKay, MD
2412 West Plaza Drive
Tallahassee, FL 32308
Phone: (850)-877-8171

William Kepper, MD
1910 Hillbrooke Trail, Suite 2
Tallahassee, FL 32311
Phone: (850) 878-2637

Thomas Bozzuto, DO
803 N. Jefferson Street, Suite A
Albany, GA 31701
Phone: (229) 312-7600

SELECTED REFERENCES IN DIVING MEDICINE

Available from Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100, the Divers Alert Network (DAN) or the Undersea and Hyperbaric Medical Society (UHMS), Durham, NC

- Elliott, DH. 1996. *Are Asthmatics Fit to Dive?* Kensington, MD. Undersea & Hyperbaric Medical Society.
- Bove, AA. 2011. The cardiovascular system & diving risk .*Undersea &Hyperbaric Medicine* 38(4):261-269.
- Thompson, PD. 2011.The cardiovascular risks of diving. *Undersea and Hyperbaric Medicine* 38(4): 271-277.
- Douglas, PS. 2011. Cardiovascular screening in asymptomatic adults: Lessons for the diving world. *Undersea & Hyperbaric Medicine* 38(4): 279-287.
- Mitchell, S.J., and A.A. Bove. 2011. Medical screening of recreational divers for cardiovascular disease: Consensus discussion at the Divers Alert Network Fatality Workshop. *Undersea and Hyperbaric Medicine* 38(4): 289-296.
- Grundy, SM, R Pasternak, P Greenland, S Smith, S., V Fuste. 1999. Assessment of cardiovascular risk by use of multiple-risk-ractor assessment equations. AHA/ACC Scientific Statement. *Journal of the American College of Cardiology* 34:1348-1359. http://content.onlinejacc.org/cgi/content/short/34/4/1348
- Bove, AA, J Davis. 2003. Diving Medicine, 4th Edition. W.B. Saunders Company, Philadelphia.
- Edmonds, C, C Lowry, J Pennefather, R Walker. 2002. Diving and subaqautic medicine, 4th Edition. Hodder Arnold Publishers, London.
- Bove, AA. 1998. Medical examination of sport scuba divers. Medical Seminars, Inc, San Antonio, TX.
- NOAA DIVING MANUAL, NOAA. Superintendent of Documents. Washington, DC: U.S. Government Printing Office.
- U.S. NAVY DIVING MANUAL. Superintendent of Documents, Washington, DC: U.S. Government Printing Office, Washington, D.C.

The Florida State University

AAUS Medical Evaluation of Fitness for Scuba Diving Report
For the Examining Physician

_____ _____
Name of Applicant (Print or Type) Date of Medical Evaluation (Month/Day/Year)

To The Examining Physician: Scientific divers require periodic medical exams to assess their fitness to engage in diving with self-contained underwater breathing apparatus (scuba). Scuba diving puts unusual stress on the individual in several ways. Scuba diving requires heavy exertion so the diver must be free of cardiovascular and respiratory disease[3]. An absolute requirement is the ability to equalize pressure in the lungs, middle ears and sinuses. Any condition that risks the loss of consciousness disqualifies the applicant. **We request on this form that you evaluate the applicant's medical fitness to dive.** The completed form must be returned to the Dive Safety Officer before the applicant can participate in Scientific Diving at the Florida State University. Please proceed in accordance with the AAUS Medical Standards. If you have questions about diving medicine, please consult with the Undersea Hyperbaric Medical Society or Divers Alert Network.

TESTS: THE FOLLOWING TESTS ARE REQUIRED:

DURING ALL INITIAL AND PERIODIC RE-EXAMS (UNDER AGE 40):

- Medical history
- Complete physical exam, with emphasis on neurological and otological components
- Urinalysis
- Any further tests deemed necessary by the physician

ADDITIONAL TESTS DURING FIRST EXAM & PERIODIC RE-EXAMS (OVER AGE 40):

- Chest x-ray (Required only during first exam over age 40)
- Resting EKG
- Assessment of coronary artery disease using Multiple-Risk-Factor Assessment[1]
  (age, lipid profile, blood pressure, diabetic screening, smoking)
  Note: Exercise stress testing may be indicated based on Multiple-Risk-Factor Assessment[2]

PHYSICIAN'S STATEMENT:

___ 01 Diver **IS** medically qualified to dive for:
____2 years (over age 60) ____3 years (age 40-59) ____5 years (under age 40)

_____ 02 Diver **IS NOT** medically qualified to dive:_____Permanently_____Temporarily.

I have evaluated the abovementioned individual according to the American Academy of Underwater Sciences medical standards and required tests for scientific diving (Sec. 6.00 and Appendix 1) and, in my opinion, find no medical conditions that may be disqualifying for participation in scuba diving. I have discussed with the patient any medical condition(s) that would not disqualify him/her from diving but which may seriously compromise subsequent health. The patient understands the nature of the hazards and the risks involved in diving with these conditions.

My familiarity with applicant is: ____This exam only ____Regular physician for _____ years

My familiarity with diving medicine is: _____

_____ (Circle One: MD or DO) _____ _____
NAME (PRINT) **NAME (SIGNATURE)** **DATE**

_____ ___ _____ _____
Address Telephone Number Email Address

[3] Grundy, S.M., Pasternak, R., Greenland, P., Smith, S., and Fuster, V. 1999. Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations. AHA/ACC Scientific Statement. *Journal of the American College of Cardiology,* 34: 1348-1359. http://content.onlinejacc.org/cgi/content/short/34/4/1348

APPENDIX 2 - Definition of Terms

Air sharing - Sharing of an air supply between divers.

ATA(s) - "Atmospheres Absolute", Total pressure exerted on an object, by a gas or mixture of gases, at a specific depth or elevation, including normal atmospheric pressure.

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

Buddy Breathing - Sharing of a single air source between divers.

Buddy Diver - Second member of the dive team.

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

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

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

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

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

Cylinder - A pressure vessel for the storage of gases.

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

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

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

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

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

Dive Site - Physical location of a diver during a dive.

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

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

Diver-In-Training - An individual gaining experience and training in additional diving activities under the supervision of a dive team member experienced in those activities.

Diver-Carried Reserve Breathing Gas - A diver-carried independent supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by another diver.

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

Diving Control Board (DCB) - Group of individuals who act as the official representative of the membership organization in matters concerning the scientific diving program (Section 1.24).

Diving Safety Officer (DSO) - Individual responsible for the safe conduct of the scientific diving program of the membership organization (Section 1.20).

EAD - Equivalent Air Depth (see below).

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

Enriched Air (EANx) - A name for a breathing mixture of air and oxygen when the percent of oxygen exceeds 21%. This term is considered synonymous with the term "nitrox" (Section 7.00).

Equivalent Air Depth (EAD) - Depth at which air will have the same nitrogen partial pressure as the nitrox mixture being used. This number, expressed in units of feet seawater or saltwater, will always be less than the actual depth for any enriched air mixture.

fN_2 - Fraction of nitrogen in a gas mixture, expressed as either a decimal or percentage, by volume.

fO_2 - Fraction of oxygen in a gas mixture, expressed as either a decimal or percentage, by volume.

FFW – Feet or freshwater, or equivalent static head.

FSW - Feet of seawater, or equivalent static head.

Hookah - While similar to Surface Supplied in that the breathing gas is supplied from the surface by means of a pressurized hose, the supply hose does not require a strength member, pneumofathometer hose, or communication line. Hookah equipment may be as simple as a long hose attached to a standard scuba cylinder supplying a standard scuba second stage. The diver is responsible for the monitoring his/her own depth, time, and diving profile.

Hyperbaric Chamber - See decompression chamber.

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

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

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

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

Mixed Gas - MG

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

MOD - Maximum Operating Depth, usually determined as the depth at which the pO_2 for a given gas mixture reaches a predetermined maximum.

MSW - Meters of seawater or equivalent static head.

Nitrox - Any gas mixture comprised predominately of nitrogen and oxygen, most frequently containing between 21% and 40% oxygen. Also might be referred to as Enriched Air Nitrox, abbreviated EAN.

NOAA Diving Manual - Refers to the *NOAA Diving Manual, Diving for Science and Technology*, 2001 edition. National Oceanic and Atmospheric Administration, Office of Undersea Research, US Department of Commerce.

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

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

Oxygen Clean - All combustible contaminants have been removed.

Oxygen Compatible - A gas delivery system that has components (o-rings, valve seats, diaphragms, etc.) that are compatible with oxygen at a stated pressure and temperature.

Oxygen Service - A gas delivery system that is both oxygen clean and oxygen compatible.

Oxygen Toxicity Unit - OTU

Oxygen Toxicity - Any adverse reaction of the central nervous system ("acute" or "CNS" oxygen toxicity) or lungs ("chronic", "whole-body", or "pulmonary" oxygen toxicity) brought on by exposure to an increased (above atmospheric levels) partial pressure of oxygen.

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

Pressure Vessel - See cylinder.

pN_2 - Inspired partial pressure of nitrogen, usually expressed in units of atmospheres absolute.

pO_2 - Inspired partial pressure of oxygen, usually expressed in units of atmospheres absolute.

Psi - Unit of pressure, "pounds per square inch.

Psig - Unit of pressure, "pounds per square inch gauge.

Recompression Chamber - see decompression chamber.

Scientific Diving - Scientific diving is defined (29CFR1910.402) as diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks.

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

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

Surface Supplied Diving - Surface Supplied: Dives where the breathing gas is supplied from the surface by means of a pressurized umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full-face mask. The diver may rely on the tender at the surface to keep up with the divers' depth, time, and diving profile.

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

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

Working Pressure - Normal pressure at which the system is designed to operate.

APPENDIX 3 – Reciprocity Form

(this form is automatically populated with diver information from the AAUS website)

AAUS REQUEST FOR DIVING RECIPROCITY FORM

Diver: Date:

This letter serves to verify that the above listed employee has met the training and pre-requisites as indicated below, and has completed all requirements necessary to be certified as a Scientific Diver as established by the **The Florida State University** Diving Safety Manual, and has demonstrated competency in the indicated areas. **The Florida State University** is an AAUS OM and meets or exceeds all AAUS training requirements.

The following is a brief summary of this diver's personnel file regarding dive status at The Florida State University

Original diving authorization:

Written scientific diving examination:

Last diving medical examination: Medical examination exp.:

Most recent checkout dive:

BC Service Expiration (scientific): Regulator Service Expiration (scientific):

CPR training (Agency): CPR Exp.:

Oxygen administration (Agency): O2 Exp.:

First aid for diving (Agency): F.A. Exp.:

Date of last dive : Depth:

Number of dives completed within previous 12 months:

Depth Certification: _____feet Total number of career dives:

Any restrictions? (Y/N) if yes, explain in the eneral Comments

Please indicate any pertinent specialty certifications or training:

Emergency Information:

Name: Relationship:

Best Phone #: Alternative Phone #:

Address:

General Comments:

This is to verify that the above individual is currently a certified scientific diver at **The Florida State University**

Diving Safety Officer:

_____ _____ _____

Signature Print Name Date

http://fsu.diveaaus.com/Reports/Reciprocity_Print.asp

APPENDIX 4 - Dive Plan and Emergency Procedures

(1) Dive Plan Submittal Form
    a. Dive Plan Diving Roster
    b. Operation Plan
    c. Dive site
    d. Safety Considerations
    e. International Travels

(2) Diving Accident Emergency Management Plan

(3) Hospitals with Recompression Chamber for Dive Incidents

(4) Emergency Contact Information for Each Diver

(5) FSU Academic Diving Program Dive Log

(6) Dive Plan Approval

Coastal and Marine Laboratory

Academic Diving Program
Dive Plan Submittal Form

All applicants must be familiar with the
FSU Standards for Scientific Diving

DSO Signature				
Dive Details				
Dive Plan Submitted by			Date Submitted	
Principal Investigator			Lead Diver	
General Dive Site Location			Phone #	
Is this associated with a Sponsored Project?			Project No.	
Proposed Number of Dives			# of Divers	
Proposed Expedition Dates	Start Date		End Date	

Will this Plan Involve (check all that apply)					
	Boats or larger vessels		Specialty Diving		Non-FSU personnel
	Multiple days of diving		Flying after Diving		
	Decompression Diving		International Travel		

General Dive Plan Considerations

- In the event of an Emergency: Call 911 and the Diver's Alert Network 24-hour Emergency line (919) 684-9111. See the FSU ADP Emergency Management Plan for procedures and hospitals/recompression chambers information.

- Any diver has the right to refuse to dive without fear of penalty if he or she feels the conditions are unsafe or unfavorable OR the dive violates the precepts of their training OR the regulations of the *Florida State University Standards for Scientific Diving & Operation of the Scientific Diving Program* (FSU Standards).

- It is the responsibility of each diver to terminate the dive, without fear of penalty, whenever he or she feels it is unsafe to continue the dive, unless it compromises the safety of another diver already in the water.

- All Dive Plans MUST be based on the competency of the least experienced diver. All Divers-In-Training must be buddied with a Scientific Diver.

- Absolutely No Solo Diving is allowed.

- For all diving conducted under hazardous conditions a plan must be formulated to deal with such conditions. If dives are to be conducted from vessels, a Float Plan must also be completed.

- An Emergency Plan MUST be completed for each expedition including the following: emergency contact information (including name, relationship, and telephone number) for each diver, nearest recompression chamber, nearest accessible hospital and anticipated means of transportation.

Dive Plan Diving Roster				
	Name	Parent Organization or Auspices (abbrev)	Level	Depth Certification
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
Purpose of Dives				

Operation Plan			
Maximum Depth (ft)		Number of dives/diver/day	
Dive Tables Used		Dive Computers Used	
Decompression schedules and repetitive dive plans (attach dive profile worksheet if necessary)			
Diving work plans (attach detailed explanation if necessary)			
Specialty dives if planned (see FSU Standards Sections 8.0 and 9.0)			
Nitrox, or mixed gases (include percentages)			
Tools or specialized equipment (diving sleds, scooters, drills, surface supply, hookah, tethers, etc.)			

Dive Location	
General Location	
Specific Dive Sites	
Name of Boat or Vessel	

Safety Considerations		
Nearest Hospital	Address	
	Phone	
Nearest Recompression Chamber (see page 10)	Address	
	Phone	

Emergency Communications (cell service, radio service)						
Hazardous Conditions Anticipated: (i.e., cold water, night diving, extreme currents, extreme depths)						
Safety Equipment: (check all that apply)	First Aid Kit		Emergency Oxyg		Dive Flag	
Others:						

International Travels

Attach a copy of all itineraries, including flight times and accommodations with contact information.

Contacts in Country	Name	Phone Number
U.S. Consulate or Embassy	Name	Phone number

Divers Emergency Contact Information

Diver					
Emergency Contact				Relation	
Work Phone		Mobile Phone		Home Phone	
City		State		Zip	
Diver					
Emergency Contact				Relation	
Work Phone		Mobile Phone		Home Phone	
City		State		Zip	
Diver					
Emergency Contact				Relation	
Work Phone		Mobile Phone		Home Phone	
City		State		Zip	
Diver					
Emergency Contact				Relation	
Work Phone		Mobile Phone		Home Phone	
City		State		Zip	
Diver					

Emergency Contact				Relation	
Work Phone		Mobile Phone		Home Phone	
City		State		Zip	
Diver					
Emergency Contact				Relation	
Work Phone		Mobile Phone		Home Phone	
City		State		Zip	

Dive Plan Approval

I certify that this dive plan has been completed in compliance with the Florida State University Diving Control Board policies and procedures. I further certify that all information provided in this plan is true and correct to the best of my knowledge.

All dive logs related to this plan should be returned to the Diving Safety Officer or designee within one week following completion of the planned dives(s). Individuals, within the same period, should enter their dives onto the AAUS website.

Principal Investigator			
Print Name		Signature	
Dive Team Leader			
Print Name		Signature	
SPACE BELOW FOR FLORIDA STATE UNIVERSITY ACADEMIC DIVING PROGRAM ONLY			
Dive Plan Reviewed By			
Name & Title		Signature	
Approved (Y or N)		Date approved	

The Florida State University Academic Diving Program
Emergency Management Plan

In the event of an Emergency call 911 and the Diver's Alert Network 24-hour Emergency line (919) 684-9111. Then activate the Emergency Management Plan.

The following procedures provide guidance for dealing with emergencies that arise in the course of compressed-gas diving. They do not substitute for project supervisors and participants using good judgment. Further, they do not cover all possible injuries. Proper emergency actions rely upon sound training, sound judgment, and rapid response. Divers must report all injuries, however slight, to the Diving Supervisor or Divemaster immediately.

Prior to the start of any diving operation, the Diving Supervisor of Divemaster establishes and verifies the following:

1. The nearest Medical Treatment Facility (Location, Phone Number, Point of Contact)
2. Contact information for the Divers Alert Network (DAN) and Nearest Operational Recompression Chamber (Location, Phone Number, Point of Contact)
3. Emergency Transportation Options ---vehicles, boats, aircraft, etc. (Location, Phone Number, Point of Contact)
4. Nearest Coast Guard Operations Base (Location, Phone Number, Radio Channels, Point of Contact)
5. Communication options (e.g., cell phone, telephone, radio) from the site of Diving Operations to all of the above
6. Copy of the Communications Plan available on the dive site.
7. FSU Standards for Scientific Diving and a copy of the appropriate diving tables available on the dive site.

Mechanical Injury

In the event of a Mechanical Injury, the following procedures apply:

1. Remove the affected diver from the water as soon as practicable, keeping in mind any decompression obligations
2. Recall all divers, if necessary
3. The Diving Supervisor or Divemaster evaluates the severity of the injury and recommends necessary First Aid.
4. Inform the FSU Diving Safety Officer
5. If the injury is severe, the Diving Supervisor or his/her designee should contact the Emergency Medical System (EMS). If EMS is unable to respond, transport the affected diver as rapidly as possible to the nearest hospital. Contact the hospital immediately by whatever means are available, providing the medical staff with all pertinent information regarding the victim and the injury.
6. The Diving Supervisor designates someone in the group to accompany the victim to the treatment facility with any required administrative forms.
7. If the injured person is an employee or volunteer of FSU, the FSU Diving Safety Officer initiates appropriate Worker's Compensation procedures.
8. **As soon as possible, the FSU Diving Safety Officer prepares a diving incident report, including facts of the injury and treatment rendered, and statements from pertinent witnesses. A copy of this report shall be forwarded to the FSU Diving Control Board, the FSU Department of Environmental Health & Safety, the FSU Coastal and Marine Laboratory's Human Resources personnel, and to AAUS or the National Institute for Occupational Safety and Health (NIOSH), depending on the nature of the operation.**

Diving-Hyperbaric Injury

In the event of a diving emergency that requires recompression treatment, the following procedure is implemented:

1. Remove the affected diver from the water as soon as practicable, keeping in mind any decompression obligations. Note the condition of the victim's diving buddy, because the buddy may be affected as well and develop symptoms. If practical, the victim and the victim's buddy should be treated simultaneously.
2. Cease all diving operations and recall all diver
3. The Diving Supervisor should evaluate the severity of the injury and recommend any necessary First Aid including the administration of 100% Oxygen.
4. The Emergency Management System (EMS) should be contacted by calling 911 or other local emergency telephone number. Offshore operations should call the Coast Guard on VHF Ch. 16 and the Divers Alert Network at (919) 684-8111 to arrange for evacuation and management of the incident. Note that a marine telephone call can be made over VHF; marine operators monitor Ch. 16 and will advise on local procedure. If EMS cannot respond, transport the affected diver as rapidly as possible to the nearest emergency care facility. Contact the facility immediately and provide medical staff with all pertinent information regarding the diving injury, including the following:
   - Victim's Name/Emergency Contact Information
   - Dive profile
   - Type of injury (if known)
   - Any treatment(s) provided (e.g., oxygen)

   If possible, the victim's dive buddy and the Diving Supervisor or designee should accompany the victim to the emergency facility so that they can provide the medical staff with additional information, if required.

   The victim should have a neurological exam administered as soon as possible to obtain baseline information and to evaluate the severity and progression of the injury. Neurological exams should be administered regularly.

5. The Diving Supervisor or designee should secure the injured person's dive gear (turning off the air) for subsequent examination by accident investigators.
6. If the injured person is an employee or volunteer of FSU, the FSU Diving Safety Officer initiates appropriate Worker's Compensation procedures.
7. Inform the FSU Diving Safety Officer as soon as possible. Follow reporting procedure as above.
8. If anyone acting in an official capacity for the Florida State University is asked for a statement, it is important that they follow these procedures:
   - *Law Enforcement.*—when speaking with law enforcement personnel, provide necessary facts only, not conjecture as to how the incident occurred. Offer no hypotheses.
   - *The Press.*-- do not offer information to anyone or discuss the events with anyone. In particular, do not speak to the press. Forward their questions to the Vice President of University Communications (850.644.8343).
   - Contact University counsel in the Office of Research and contact the FSU Department of Environmental Health and Safety as soon as is possible following incident.
9. As soon as possible, the FSU Diving Safety Officer prepares a diving incident report, including facts about the injury and treatment rendered, statements from pertinent witnesses, and any police reports. The DSO submits the incident report to the FSU Diving Control Board, the FSU Department of Environmental Health & Safety, the FSU Coastal and Marine Laboratory's Human Resources personnel, and to AAUS or the National Institute for Occupational Safety and Health (NIOSH), depending on the nature of the operation.

Omitted Decompression

Should a situation occur that causes a diver to omit any required decompression obligations, including uncontrolled rapid ascent from any depth, the diver must follow these procedures:

Any diver who experiences omitted decompression shall remain on the surface and be closely observed for symptoms of AGE and DCS for a period of at least 4 hours and will refrain from any further diving for a period of at least 12 hours.

1. Dive Emergency Plan: Conscious, Alert, Diving Accident Victim
   a) Evaluate Victim's Airway, Breathing and Circulation
   b) Call 911 and Diver's Alert Network 24-hour Emergency line (919) 684-9111
   c) Obtain permission from the diver. Put the victim on 100% oxygen using a demand valve mask or a non-rebreather mask at 15 Liters per minute (15 LM)
   d) Evaluate the victim for the type of diving injury
      i. Perform a rapid field neurological examination to assess problem areas
      ii. Gather as much information as possible
      iii. Keep the dive computer with victim, if he/she has one
      iv. Secure the divers gear for examination, BUT do not disassemble gear
      v. Interview the diver's buddy for information
   e) If you suspect decompression Illness or any other type of compressed gas injury (e.g., arterial gas embolism, pneumothorax) keep the victim flat on his/her back – do not raise victim's feet. Place the victim on his/her side if nauseated or vomiting – keep airway clear.
   f) The victim should be transported to
      i. Nearest Hospital:
      Tallahassee Memorial HealthCare
      1300 Miccosukee Road, Tallahassee, FL 32308
      Phone#: 850-431-1155

      ii. Nearest hospital with a chamber:
      Capital Regional
      Hyperbaric Medicine
      2626 Capital Medical Blvd, Tallahassee, FL 32308
      Phone: 850-325-5000, Phone: 850-325-4542 Chamber

   g) If not nauseated and not experiencing altered levels of consciousness, give the victim fluids during transportation to Tallahassee Memorial HealthCare
      i. Continue oxygen administration
      ii. Send the victim's dive computer with him/her to the hospital with any other records, such as results of the rapid neurological examination
      iii. Keep victim out of sun and watch for shock
   h) Based on the evaluation by the doctor at Tallahassee Memorial HealthCare, the victim may have to enter decompression chamber for treatment.

2. **Dive Emergency Plan:** Unconscious, Non-Responsive, Diving Accident Victim
   a) Evaluate victim's **A**irway, **B**reathing, **C**irculation
   b) Call 911 and **Diver's Alert Network** 24-hour Emergency line (919)684-9111
   c) Put the victim on 100% oxygen at 15 liters per minute (15 LM) using a demand valve mask or a non-rebreather mask. When administering 100% oxygen 15LM, use a bag valve mask (BVM) if it is available and the rescuer is trained in proper administration of oxygen with the BVM.
   d) Perform Cardio-Pulmonary Resuscitation, or rescue breathing if necessary.
   e) Evaluate the victim for the type of diving injury
      i. Gather as much information about the dive as possible
      ii. Keep dive computer with victim, if he/she has one
      iii. Secure victim's other dive gear for examination, DO NOT disassemble gear
      iv. Interview the victim's buddy for information about the dive

Send the victim's dive computer (if available) with him/her to the hospital with any other records

Hospitals with Recompression Chambers for Dive Incidents

1. Capital Regional
   Hyperbaric Medicine
   2626 capital Medical Blvd
   Tallahassee, Fl. 32308
   Phone: 850-325-5000
   Phone: 850-325-4542 Chamber

2. South Miami Hospital
   6200 SW 73rd St.
   South Miami, FL 33143
   Phone: 786-662-4000
   Phone: 786-662-5558 Chamber

3. Baptist Hospital
   Hyperbaric Medicine Unit
   1000 West Moreno Street
   Pensacola, Fl. 32501
   Phone: 850-434-4080
   Phone: 850-434-4479 Chamber

4. Springhill Memorial
   3719 Dauphin Street
   Mobile, AL 36608
   Phone: 251-344-9630
   Phone: 251-460-5259 Chamber
   8AM-4PM, Mon-Fri
   Has an emergency call team for after hours

For further information on recompression chambers or diving emergencies contact Diver's Alert Network

- 24-hour Emergency Hotline: 919-684-9111
- Non-Emergencies : 800-446-2671

The Florida State University
Academic Diving Program
Dive Log

SUPERVISOR:	
DIVE DATE:	
LOCATION:	
DIVE SITE:	
SURFACE CONDITIONS:	
UNDERWATER CONDITIONS:	
PURPOSE:	
SPECIALIZED ENVIRONMENT:	

EMERGENCY CONTACTS	
EMERGENCY SERVICES	911
DAN HOTLINE	(919) 684-9111
U.S. COAST GUARD	(800) 323-7233
DIVE SAFETY OFFICER	(850) 559-8107
FSU MARINE LAB	(850) 697-4120

DIVER NAME	SURFACE INTERVAL (Ex. >24hrs)	CYLINDER				START TIME (hh:mm)	END TIME (hh:mm)	TOTAL TIME (Surface to Surface)	MAX. DEPTH (FT)	NOTES
		Tank #	Air or EAN%	Starting (PSI)	Ending (PSI)					

APPENDIX 6 – AAUS Statistics Collection Criteria & Definitions

COLLECTION CRITERIA

The "Dive Time in Minutes", The Number of Dives Logged", and the "Number of Divers Logging Dives" will be collected for the following categories.

- Dive Classification
- Breathing Gas
- Diving Mode
- Decompression Planning and Calculation Method
- Depth Ranges
- Specialized Environments
- Incident Types

Dive Time in Minutes is defined as the surface-to-surface time including any safety or required decompression stops.

A Dive is defined as a descent into water, an underwater diving activity utilizing compressed gas, an ascent/return to the surface, and a surface interval of greater than 10 minutes.

Dives will not be differentiated as open water or confined water dives. However, open water and confined water dives will be logged and submitted for AAUS statistics classified as either scientific or training/proficiency.

A "Diver Logging a Dive" is defined as a person who is diving under the auspices of your scientific diving organization. Dives logged by divers from another AAUS Organization will be reported with the diver's home organization. Only a diver who has actually logged a dive during the reporting period is counted under this category.

Incident(s) occurring during the collection cycle. Only incidents occurring during, or resulting from, a dive where the diver is breathing a compressed gas will be submitted to AAUS.

DEFINITIONS:

Dive Classification:

- Scientific Dives: Dives that meet the scientific diving exemption as defined in 29 CFR 1910.402. Diving tasks traditionally associated with a specific scientific discipline are considered a scientific dive. Construction and trouble-shooting tasks traditionally associated with commercial diving are not considered a scientific dive.
- Training and Proficiency Dives: Dives performed as part of a scientific diver-training program, or dives performed in maintenance of a scientific diving certification/authorization.

Breathing Gas:

- Air: Dives where the bottom gas used for the dive is air.
- Nitrox: Dives where the bottom gas used for the dive is a combination of nitrogen and oxygen other than air.

- Mixed Gas: Dives where the bottom gas used for the dive is a combination of oxygen, nitrogen, and helium (or other "exotic" gas), or any other breathing gas combination not classified as air or nitrox.

Diving Mode:

- Open Circuit Scuba: Dives where the breathing gas is inhaled from a self-contained underwater breathing apparatus and all of the exhaled gas leaves the breathing loop.
- Surface Supplied: Dives where the breathing gas is supplied from the surface by means of a pressurized umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full-face mask. The diver may rely on the tender at the surface to keep up with the divers' depth, time, and diving profile.
- Hookah: While similar to Surface Supplied in that the breathing gas is supplied from the surface by means of a pressurized hose, the supply hose does not require a strength member, pneumofathometer hose, or communication line. Hookah equipment may be as simple as a long hose attached to a standard scuba cylinder supplying a standard scuba second stage. The diver is responsible for the monitoring his/her own depth, time, and diving profile.
- Rebreathers: Dives where the breathing gas is repeatedly recycled in the breathing loop. The breathing loop may be fully closed or semi-closed. Note: A rebreather dive ending in an open circuit bailout is still logged as a rebreather dive.

Decompression Planning and Calculation Method:
- Dive Tables
- Dive Computer
- PC Based Decompression Software

Depth Ranges - Depth ranges for sorting logged dives are 0-30, 31-60, 61-100, 101-130, 131-150, 151-190, and 191->. Depths are in feet seawater. A dive is logged to the maximum depth reached during the dive. Note: Only "The Number of Dives Logged" and "The Number of Divers Logging Dives" will be collected for this category.

Specialized Environments:
- Required Decompression: Any dive where the diver exceeds the no-decompression limit of the decompression planning method being employed.
- Overhead Environments: Any dive where the diver does not have direct access to the surface due to a physical obstruction.
- Blue Water Diving: Open water diving where the bottom is generally greater than 200 feet deep and requiring the use of multiple-tethered diving techniques.
- Ice and Polar Diving: Any dive conducted under ice or in polar conditions. Note: An Ice Dive would also be classified as an Overhead Environment dive.
- Saturation Diving: Excursion dives conducted as part of a saturation mission are to be logged by "classification", "mode", "gas", etc. The "surface" for these excursions is defined as leaving and surfacing within the Habitat. Time spent within the Habitat or chamber shall not be logged by AAUS.
- Aquarium: An aquarium is a shallow, confined body of water, which is operated by or under the control of an institution and is used for the purposes of specimen exhibit, education, husbandry, or research. (Not a swimming pool)

Incident Types:

- Hyperbaric: Decompression Sickness, AGE, or other barotrauma requiring recompression therapy.
- Barotrauma: Barotrauma requiring medical attention from a physician or medical facility, but not requiring recompression therapy.
- Injury: Any non-barotrauma injury occurring during a dive that requires medical attention from a physician or medical facility.
- Illness: Any illness requiring medical attention that can be attributed to diving.
- Near Drowning/ Hypoxia: An incident where a person asphyxiates to the minimum point of unconsciousness during a dive involving a compressed gas. However, the person recovers.
- Hyperoxic-Oxygen Toxicity: An incident that can be attributed to the diver being exposed to too high a partial pressure of oxygen.
- Hypercapnea: An incident that can be attributed to the diver being exposed to an excess of carbon dioxide.
- Fatality: Any death accruing during a dive or resulting from the diving exposure.
- Other: An incident that does not fit one of the listed incident types

Incident Classification Rating Scale:

- Minor: Injuries that the OM considers being minor in nature. Examples of this classification of incident would include, but not be limited to:
    - Mask squeeze that produced discoloration of the eyes.
    - Lacerations requiring medical attention but not involving moderate or severe bleeding.
    - Other injuries that would not be expected to produce long-term adverse effects on the diver's health or diving status.

- Moderate: Injuries that the OM considers being moderate in nature. Examples of this classification would include, but not be limited to:
    - DCS symptoms that resolved with the administration of oxygen, hyperbaric treatment given as a precaution.
    - DCS symptoms resolved with the first hyperbaric treatment.
    - Broken bones.
    - Torn ligaments or cartilage.
    - Concussion.
    - Ear barotrauma requiring surgical repair.
- Serious: Injuries that the OM considers being serious in nature. Examples of this classification would include, but not be limited to:
    - Arterial Gas Embolism
    - DCS symptoms requiring multiple hyperbaric treatments
    - Near drowning
    - Oxygen Toxicity.
    - Hypercapnea
    - Spinal injuries
    - Heart attack
    - Fatality