Appendix 1 Diving Medical Exam for the Examining Physician

To the examining physician,

This person, __________________________, requires a SCUBA diving medical examination to assess their fitness for certification as a Scientific Diver for San Francisco State University (SFSU). Their answers on the Diving Medical History Form may indicate potential health or safety risks as noted. Your evaluation is requested on the attached Medical Evaluation of Fitness for Scuba Diving Report. If you have questions about diving medicine, you may wish to consult one of the references on the attached list or contact one of the physicians with expertise in diving medicine whose names and phone numbers appear on an attached list or the Divers Alert Network (919-684-2948). If you have questions regarding SFSU medical standards, please contact the SFSU Diving Safety Officer at (415-435-7123), more information can be found on our website at marineops.sfsu.edu.

__________________________________________  ___________________
SFSU Diving Safety Officer                      Date

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).
Conditions Which May Disqualify Candidates from Scientific Diving

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]
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]
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.

Appendix 2A Medical Evaluation of Fitness for Scuba Diving Report

To The Examining Physician
Scientific divers require periodic scuba diving medical examinations to assess their fitness to engage in diving with self-contained underwater breathing apparatus (scuba). Their answers on the Diving Medical History Form may indicate potential health or safety risks as noted. Scuba diving is an activity that puts unusual stress on the individual in several ways. Your evaluation is requested on this Medical Evaluation form. Your opinion on the applicant's medical fitness is requested. Scuba diving requires heavy exertion. The diver must be free of cardiovascular and respiratory disease (see references, following page). An absolute requirement is the ability of the lungs, middle ears and sinuses to equalize pressure. Any condition that risks the loss of consciousness should disqualify the applicant. Please proceed in accordance with the AAUS Medical Standards (Sec. 6.0). If you have questions about diving medicine, please consult with the Undersea Hyperbaric Medical Society or Divers Alert Network.

The Following Tests Are Required

During all initial and periodic re-exams (under the age of 40)
- Medical history
- Complete physical exam, with emphasis on neurological and otological components
- Urinalysis
- Any further tests deemed necessary by the physician

Additional Tests Required During First Exam Over Age 40 and 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
- (age, lipid profile, blood pressure, diabetic screening, smoking) Note: Exercise stress testing may be indicated based on Multiple-Risk-Factor Assessment.
Physician’s Statement

Diver IS medically qualified to dive for:

___ 2 years (over age 60)
___ 3 years (age 40-59)
___ 5 years (under age 40)

Diver IS NOT medically qualified to dive:

___ Permanently
___ Temporarily

I have evaluated the above mentioned 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.

Signature: _____________________________ MD or DO Date of Exam: ________________

Printed Name: ________________________ Phone: ______________________

Address: ________________________________________________________________

Telephone Number: ____________________

My familiarity with applicant is: __ This exam only ___ Regular physician for ___ years.

My familiarity with diving medicine is: ____________________________________________
Appendix 2B Medical Evaluation of Fitness for Scuba Diving Report

Applicants Release of Medical Information Form
SFSU scientific diving applicants, please complete this form and submit along with Appendix 2A and Appendix 3 to the Diving Safety Officer.

Name of Applicant: __________________________

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

________________________________________   __________________
Signature of Applicant                        Date
Appendix 3 Diving Medical History Form

SFSU scientific diving applicants, please complete this form and submit along with Appendix 2A-2B to the Diving Safety Officer.

Name ______________________________ Date ___/___/___ Sex ___ Age ___ Wt. ___ Ht. ___
(Mo/Day/Yr)

To the applicant,

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 will be asked to 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.
Applicants, please answer each of the following questions:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Please indicate whether or not the following apply to you</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Convulsions, seizures, or epilepsy</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Fainting spells or dizziness</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Been addicted to drugs</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Motion sickness or sea/air sickness</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Claustrophobia</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Mental disorder or nervous breakdown</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Are you pregnant?</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Do you suffer from menstrual problems?</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Anxiety spells or hyperventilation</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Frequent sour stomachs, nervous stomachs or vomiting spells</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Had a major operation</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Presently being treated by a physician</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Taking any medication regularly (even non-prescription)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Been rejected or restricted from sports</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Headaches (frequent and severe)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Wear dental plates</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Wear glasses or contact lenses</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>Bleeding disorders</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>Alcoholism</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Please indicate whether or not the following apply to you</strong></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>-------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>Any problems related to diving</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Nervous tension or emotional problems</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>Take tranquilizers</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>Perforated ear drums</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>Hay fever</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Frequent sinus trouble, frequent drainage from the nose, post-nasal drip, or stuffy nose</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>Frequent earaches</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>Drainage from the ears</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>Difficulty with your ears in airplanes or on mountains</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Ear surgery</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>Ringing in your ears</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>Frequent dizzy spells</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>Hearing problems</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
<td>Trouble equalizing pressure in your ears</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>Asthma</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>Wheezing attacks</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td></td>
<td>Cough (chronic or recurrent)</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td></td>
<td>Frequently raise sputum</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td></td>
<td>Pleurisy</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>Collapsed lung (pneumothorax)</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td></td>
<td>Lung cysts</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Pneumonia</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td></td>
<td>Tuberculosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Please indicate whether or not the following apply to you</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
<td>----</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td>Shortness of breath</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td>Lung problem or abnormality</td>
</tr>
<tr>
<td>46</td>
<td></td>
<td></td>
<td>Spit blood</td>
</tr>
<tr>
<td>47</td>
<td></td>
<td></td>
<td>Breathing difficulty after eating particular foods, after exposure to particular pollens or animals</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td></td>
<td>Are you subject to bronchitis</td>
</tr>
<tr>
<td>49</td>
<td></td>
<td></td>
<td>Subcutaneous emphysema (air under the skin)</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td>Air embolism after diving</td>
</tr>
<tr>
<td>51</td>
<td></td>
<td></td>
<td>Decompression sickness</td>
</tr>
<tr>
<td>52</td>
<td></td>
<td></td>
<td>Rheumatic fever</td>
</tr>
<tr>
<td>53</td>
<td></td>
<td></td>
<td>Scarlet fever</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td></td>
<td>Heart murmur</td>
</tr>
<tr>
<td>55</td>
<td></td>
<td></td>
<td>Large heart</td>
</tr>
<tr>
<td>56</td>
<td></td>
<td></td>
<td>High blood pressure</td>
</tr>
<tr>
<td>57</td>
<td></td>
<td></td>
<td>Angina (heart pains or pressure in the chest)</td>
</tr>
<tr>
<td>58</td>
<td></td>
<td></td>
<td>Heart attack</td>
</tr>
<tr>
<td>59</td>
<td></td>
<td></td>
<td>Low blood pressure</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td>Recurrent or persistent swelling of the legs</td>
</tr>
<tr>
<td>61</td>
<td></td>
<td></td>
<td>Pounding, rapid heartbeat or palpitations</td>
</tr>
<tr>
<td>62</td>
<td></td>
<td></td>
<td>Easily fatigued or short of breath</td>
</tr>
<tr>
<td>63</td>
<td></td>
<td></td>
<td>Abnormal EKG</td>
</tr>
<tr>
<td>64</td>
<td></td>
<td></td>
<td>Joint problems, dislocations or arthritis</td>
</tr>
<tr>
<td>65</td>
<td></td>
<td></td>
<td>Back trouble or back injuries</td>
</tr>
<tr>
<td>66</td>
<td></td>
<td></td>
<td>Ruptured or slipped disk</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Please indicate whether or not the following apply to you</td>
<td>Comments</td>
</tr>
<tr>
<td>-----</td>
<td>----</td>
<td>---------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>67</td>
<td></td>
<td>Limiting physical handicaps</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td></td>
<td>Muscle cramps</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td></td>
<td>Varicose veins</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>Amputations</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td></td>
<td>Head injury causing unconsciousness</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td></td>
<td>Paralysis</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td></td>
<td>Have you ever had an adverse reaction to medication?</td>
<td></td>
</tr>
<tr>
<td>74</td>
<td></td>
<td>Do you smoke?</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>Have you ever had any other medical problems not listed?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If so, please list or describe below;</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td></td>
<td>Is there a family history of high cholesterol?</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td></td>
<td>Is there a family history of heart disease or stroke?</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td></td>
<td>Is there a family history of diabetes?</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td></td>
<td>Is there a family history of asthma?</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>Date of last tetanus shot?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vaccination dates?</td>
<td></td>
</tr>
</tbody>
</table>

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 of Applicant                     Date
Appendix 4 Recommended Physicians With Expertise In Diving Medicine

Below is a partial list of local Medical Doctors that have training and expertise in diving or undersea medicine. For more information, please visit the website for SFSU Scientific Diving, marineops.sfsu.edu.

Apicella, Amanda  
San Diego CA  
858-232-3093  
aapicella.md@gmail.com

Benson, Peter C.  
Alamo CA  
925-895-2519  
pcbenson@gmail.com

Brett, Kaighley  
San Diego CA  
619-488-0802  
Kaighley.brett@gmail.com

Crebassa, Leslie  
Fresno CA  
707-364-5004  
crebassa@cal.berkeley.edu

Gorenberg, Pete  
Sausalito CA  
415-332-1577  
gorenberg@hotmail.com

Kelly, Jason  
Travis AFB CA  
707-423-3987  
jak6477@gmail.com
Appendix 5 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.

**fN₂** - Fraction of nitrogen in a gas mixture, expressed as either a decimal or percentage, by volume.

**fO₂** - 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 pO₂ 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 be referred to as Enriched Air Nitrox, abbreviated EAN.


**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.

**pN₂** - Inspired partial pressure of nitrogen, usually expressed in units of atmospheres absolute.

**pO₂** - 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 (29 CFR 1910.402) as diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks.

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

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

**Surface Supplied Diving** - 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 6 Request For Diver Reciprocity and Verification of Diver Training And Experience

This letter certifies that _____________________ has been issued a _____ foot sea water depth certification under the current *San Francisco State University (SFSU) Scientific Diving Safety Manual* regulations and is currently a certified SFSU Scientific Diver In-training. The SFSU Scientific Diving Program is a current Organizational Member of the American Academy of Underwater Sciences and adheres to the *AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs*. The following is a brief summary of this divers file regarding diving status at SFSU. Unless otherwise specified under “Specialty Certifications”, this diver is authorized to perform no-decompression, open water, compressed air scuba dives to the depth certification indicated above when accompanied by a lead scientific diver.

Today’s date......................................................

Last diving medical exam.................................

Diving equipment service.................................

CPR training conducted on..............................

O2 administration training conducted on...........

First aid training conducted on........................

Number of dives in past 12 months...................

Date of last dive............................................

Maximum depth in last 6 months....................

Any restrictions to diving..............................

As Dive Safety Officer for SFSU I hereby verify all training and experience has been completed as required by the AAUS to attain Scientific Diver status. If you have further questions, please contact me.

David Bell
San Francisco State University
Marine Superintendent & Diving Safety Officer
Voice: 415-435-7123 | dbell@sfu.edu | marineops.sfu.edu
Appendix 7 Diving Emergency Management Procedures

Introduction

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

General Procedures

Depending on and according to the nature of the diving accident:

1. Make appropriate contact with victim or rescue as required.
2. Establish Airway, Breathing, Circulation as required.
3. Stabilize the victim
4. Administer 100% oxygen, if appropriate (in cases of Decompression Illness, or Near Drowning).
5. Call local Emergency Medical System (EMS) for transport to nearest medical treatment facility. Explain the circumstances of the dive incident to the evacuation teams, medics and physicians. Do not assume that they understand why 100% oxygen may be required for the diving accident victim or that recompression treatment may be necessary.
6. Call appropriate Diving Accident Coordinator for contact with diving physician and decompression chamber.
7. Notify DSO or designee according to the SFSU Emergency Action Plan.
8. Complete and submit a diving incident report (form can be downloaded at http://marineops.sfsu.edu/content/forms-and-links) to the SFSU Diving Control Board and the AAUS (Section 2.70 Required Incident Reporting).

EMERGENCY SERVICES CONTACT INFORMATION
San Francisco State University Diving Safety Program

SFSU Diving Safety Officer
Work cell (415)819-3510
24/7 Personal Cell (707)775-0741

Divers Alert Network (DAN)
General/Medical Information (919)684-2948
EMERGENCIES ONLY (24 hours/7 days a week) (919)684-8111

SFSU Scientific Diving Standards Revised 2018
North Coast

Sonoma/Mendocino counties Emergency Medical Services (EMS)  911

US Coast Guard Station
Bodega Bay (Sonoma county)  (707)875-3596
Noyo River (Mendocino county)  (707)964-6611
VHF radio frequency  16

Monterey

Monterey/Santa Cruz counties Emergency Medical Services  911

US Coast Guard Station
Monterey Bay  (831)647-7303
VHF radio station  16

Lake Tahoe

Tahoe Basin Emergency Medical Services  911

US Coast Guard Station
Lake Tahoe  (916)583-4433
VHF radio channel  16

Catalina Island (Wrigley Institute)

Baywatch Isthmus  (310)510-0341
Catalina Hyperbaric Chamber  (310)510-1053
Isthmus Harbor Patrol  VHF channel 16 & 9

US Coast Guard Station
Terminal Island/LA Harbor  (310)732-2044
VHF radio channel  16
Appendix 8 Guidelines for the Use of Dive Computers

1. Only those makes and models of dive computers specifically approved by the Diving Control Board may be used.
2. Any diver desiring the approval to use a dive computer as a means of determining decomposition status must apply to the Diving Control Board, complete an appropriate practical training session and pass a written examination.
3. Each diver relying on a dive computer to plan dives and indicate or determine decomposition status must have his/her own unit.
4. On any given dive, both divers in the buddy pair must follow the most conservative dive computer.
5. If the dive computer fails at any time during the dive, the dive must be terminated and appropriate surfacing procedures should be initiated immediately.
6. A diver should not dive for 18 hours before activating a dive computer to use it to control their diving.
7. 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.
8. When using a dive computer, non emergency ascents are to be at a rate specified for the make and model of dive computer being used.
9. Whenever practical, divers using a dive computer should make a stop between 10 and 30 feet for 5 minutes, especially for dives below 60 fsw.
10. Multiple deep dives require special consideration.
Appendix 9 AAUS Statistics Collection Criteria and 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

1. Dive Time in Minutes is defined as the surface to surface time including any safety or
   required decompression stops.
2. 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.
3. Dives will not be differentiated as openwater or confined water dives. But openwater
   and confined water dives will be logged and submitted for AAUS statistics classified as
   either scientific or training/proficiency.
4. A "Diver Logging a Dive" is defined as a person who is diving under the auspices of your
   scientific diving organization.
5. Dives logged by divers from another AAUS Organization will be reported with the divers
   home organization. Only a diver who has actually logged a dive during the reporting
   period is counted under this category.
6. 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.

Dive Classification Definitions:

1. 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.
2. **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:**
1. Air: Dives where the bottom gas used for the dive is air.
2. Nitrox: Dives where the bottom gas used for the dive is a combination of nitrogen and oxygen other than air.
3. 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:**
1. 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.
2. 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.
3. 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.
4. 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:**
1. Dive Tables
2. Dive Computer
3. 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:
1. Required Decompression: Any dive where the diver exceeds the no-decompression limit of the decompression planning method being employed.
2. Overhead Environments: Any dive where the diver does not have direct access to the surface due to a physical obstruction.
3. Blue Water Diving: Openwater diving where the bottom is generally greater than 200 feet deep and requiring the use of multiple-tethered diving techniques.
4. 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.
5. 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.
6. 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:
1. Hyperbaric: Decompression Sickness, AGE, or other barotrauma requiring recompression therapy.
2. Barotrauma: Barotrauma requiring medical attention from a physician or medical facility, but not requiring recompression therapy.
3. Injury: Any non-barotrauma injury occurring during a dive that requires medical attention from a physician or medical facility.
4. Illness: Any illness requiring medical attention that can be attributed to diving.
5. Near Drowning/ Hypoxia: An incident where a person asphyxiates to the minimum point of unconsciousness during a dive involving a compressed gas. But the person recovers.
6. Hyperoxic/Oxygen Toxicity: An incident that can be attributed to the diver being exposed to too high a partial pressure of oxygen.
7. Hypercapnea: An incident that can be attributed to the diver being exposed to an excess of carbon dioxide.
8. Fatality: Any death accruing during a dive or resulting from the diving exposure.
9. Other: An incident that does not fit one of the listed incident types
Incident Classification Rating Scale:

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

2. Moderate: Injuries that the OM considers being moderate in nature. Examples of this classification would include, but not be limited to:
   1. DCS symptoms that resolved with the administration of oxygen, hyperbaric treatment given as a precaution.
   2. DCS symptoms resolved with the first hyperbaric treatment.
   4. Torn ligaments or cartilage.
   5. Concussion.

3. Serious: Injuries that the OM considers being serious in nature. Examples of this classification would include, but not be limited to:
   1. Arterial Gas Embolism.
   2. DCS symptoms requiring multiple hyperbaric treatment.
   4. Oxygen Toxicity.
   5. Hypercapnea.
   7. Heart attack.
   8. Fatality.