Commercial Dive Safety Organization

Dedicated to a safe work place through education

Proposed additions to:

The United States Coast Guard

Commercial Diving Regulations

46CFR Chapter 1. Sub Part A

Submitted By the:

Commercial Dive Safety Organization

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Part 1

Introduction

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Docket Management Facility [USCG-1998-37861
U.S. Department of Transportation, Room PL-401
400 Seventh Street S.W.
Washington, D.C. 20590-0001

September 23, 1998

Subject: Commercial Diving Operations; 46 CFR 197
Advanced notice of Proposed Rulemaking

Gentlemen:
The Commercial Dive Safety Organization is a group of concerned citizens, past and present commercial divers and dive safety consultants who with the assistance of other interested individuals has compiled the attached documentation. Included here is the direct response to the questions posed in the Federal Register on June 26, 1998. In addition we have included a suggested revision to the current regulations, Part 2 attached. A comparison of the current regulation to the Association of Diving Contractors Proposal and the Commercial Dive Safety Proposal along with comments pertaining to all three, Part 3. Parts 4 and Part 5 are included for reference only and included the current Canadian and Australian Commercial Diving Regulations respectively.

1. *Based on your review of the ADC submission to the Coast Guard.Which revisions should the Coast Guard include in its proposed rule, not include in a proposed rule, or revise and include in a proposed rule? Why?*

In reviewing the proposal presented please refer to Part 3 attached for the individual comment addressed in the ADC submission

2. *Should the Coast Guard adopt the ADC Consensus Standards or any other written industry standards? If so, which ones and why?*

It is our contention that The ADC Consensus Standard should not be adopted and or considered as an "industry standard" in this rulemaking procedure. Although many of the areas addressed in the ADC proposal are valid and show attention to areas not currently addressed by the existing regulation the ADC does not represent the entirety of the industry. Nor has the industry had sufficient input to suggest that the Consensus Standard is an "industry standard." The province of rulemaking should remain where it currently resides. By referencing a document that could potentially be revised without public review could jeopardize the integrity of the adopted regulation. The Association of Diving Contractors does not now nor has it ever established a means of requiring their member companies to follow the guidelines established within their current Consensus Standard. In addition the ANSI Standard suggested for consideration as a minimum standard for diver training is in need of serious review.

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3. *Is ADC's cost estimate of $300,000.00 for implementing their proposed regulatory changes reasonable? If not, please explain why and, if possible, provide your own cost estimate.*

The safety regulations proposed for inclusion within the ADC proposal and the proposal attached to this document would have no financial impact upon the Department of Transportation. There could potentially be additional costs incurred by those entities that have elected to work on the fringes of employee safety. The question here might better be asked. What is the reasonable cost of worker safety?

4. *What definitions in the existing regulations should be updated or deleted? Please explain. Are there other terms that the Coast Guard should define in the regulations? Please explain.*

Please refer to Part 2, attached

5. *Should dynamically positioned vessels (vessels with an installed system that automatically maintains the position of the vessel within a specified tolerance by controlling onboard thrusters to counter the forces of the wind, waves and currents) and remotely operated vehicles be addressed in the regulations? If so, what particular issues should the Coast Guard propose to regulate?*

Please refer to Part 2, attached

6. *Should the Coast Guard propose regulations concerning diving in contaminated waters? If yes, how should it be addressed?*

Please refer to Part 2, attached

7. *Should the Coast Guard propose regulations concerning one atmosphere observation bells, suits or submersibles? If yes, how should it be addressed?*

Please refer to Part 2. attached

8. *Should the Coast Guard propose regulations concerning bell bounce (a diving procedure whereby a diving bell is used to transport divers under atmospheric pressure to a work site, and subsequently to transport the divers back to the surface in a decompression status)? If yes, how should it be addressed?*

Please refer to Part 2, attached

9. *Should the Coast Guard propose regulations concerning saturation diving in more detail? If yes, how should it be addressed?*

Please refer to Part 2, attached

10. *Should the Coast Guard propose regulations concerning requirements for back-up equipment at the dive site? If yes, how should it be addressed?*

Please refer to Part 2, attached

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11. Should the Coast Guard propose regulations concerning minimum training requirements for divers? If yes, how should it be addressed?

Please refer to Part 2, attached. In addition to a minimum level of training the United Coast Guard must consider a program of diver certification. A program not controlled by an industry group but rather an independent licensing authority with a standard approved by the Department of Transportation.

12. If you think the regulations should include minimum training requirements, please answer the following questions:

a. What courses or information should the training include?
b. What should be the minimum number of hours required for training?
c. What would be the benefits of establishing minimum training requirements?
d. Should training organizations or providers meet certification requirements? If so, what organization should certify the training organizations or providers?

The United States Coast Guard should consider a multi-leveled program of staged commercial licensing. One blanket certification or standard of education could not be deemed appropriate due to the complexity and varied situations under which commercial divers must operate. An individual retrieving golf balls in twenty feet of fresh water in land does not require the same level of training as a saturation diver working at 1000 feet of sea water off the coast. In conjunction with the training there must also be a uniform competency exam and minimum hours of not only training but experience to qualify for each level of certification. This certification should not be in the control of the employer but rather an independent third party or agency approved by the Department of Transportation, deemed qualified to evaluate the abilities of the applicant. A diver entering the water today has no assurance that his tender, standby diver or even dive supervisor has the required training or knowledge to assist in time of need. Without a comprehensive system of training, certification and qualification tied to a standardized diving record as described in section 197.406 (d) attached, there can be no verifiable control in practice. As in the case of most safety issues the majority of injuries are a result of human error. The only effective manor to reduce that possibility of human error is through a system of proper training and competency review.

13. Should diving supervisors be licensed by the Coast Guard to ensure compliance with federal regulations? Please explain the reason for your choice and, if your answer is "yes" provide examples, if possible, of situations in which a licensed diving supervisor would have improved a situation.

As in the case of the diver the dive supervisor not only should be licensed but also certified for the type of work being performed. A dive supervisor accustom to working in river conditions will not necessarily be capable of supervising a saturation dive. Conversely a supervisor accustom to sea conditions not necessarily attuned to the safety conditions at a hydroelectric station. A diving supervisor, as any other person of responsibility, must be required to pass schedule exams of competency to prove his or her knowledge of the arena in which the work is to be performed.

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The question goes on to ask : *provide examples, if possible, of situations in which a licensed diving supervisor would have improved a situation.* For this writer this is all to easy to answer but with an example all to hard to relate. Two years and six months ago my oldest son entered the water under the watchful eye of a dive supervisor. A dive supervisor who's only formal dive training had been at the YMCA. A dive supervisor who now admits he had no knowledge of Coast Guard Regulations, no knowledge of the requirement for standby equipment and no knowledge of the need for air quality testing as he stood by as carbon monoxide was pumped to the diver under his supervision. If my son were alive today I am certain he could give you the response you seek here but in place of his statement I offer this brief example.

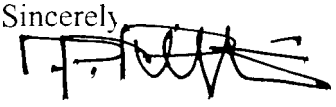
14. If you are a small entity as defined under "Small Entities" and believe you will be affected by potential changes to the commercial diving regulations, please explain what flexibility or compliance options the Coast Guard should consider and how these options would minimize the burden on small entities, while promoting commercial diving safety.

There should be no exemption granted to small entities. Why should the size of a company or organization exempt them from regulations relating to safety? Why should a small entity be permitted to jeopardize safety because of an inability to properly maintain a safe work place according to industry standards? Such an exemption would only provide an unfair advantage to the small entity that was willing to jeopardize their own safety or the safety of their employees when competing in the market place.

In addition to the 14 questions posed in the Request for comment the following statement is included. *The Coast Guard is not yet able to prepare a benefit-cost analysis assessing the impact of potential changes to the commercial diving operations regulations because specific changes have not been identified.* In an attempt to determine the *benefit-cost* analysis it would first be necessary to establish the value of the benefit. In an attempt to do that we have contacted the parents, wives, friends and associates of some of the persons adversely affected by the current regulations. To date we have not been able to establish that value to insert within the formula.

If the United States Coast Guard considers it necessary to open this rule making process to public hearing we at the Commercial Dive Safety Organization would like to be included.

Sincerely



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Part 2

Proposed 46CFR Chapter 1
Subpart A

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Subpart A- [Reserved]

Subpart B-Commercial Diving Operations

General

Equipment

OPERATIONS

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SPECIFIC DIVING MODE PRODEDURES

PERIODIC TESTS AND INSPECITONS OF DIVING EQUIPMENT

RECORDS

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Subpart A-[Reserved]

Subpart B-Commercial Diving Operations

General

§ 197.200 Purpose of subpart.

The subpart prescribes rules for the design, construction, and use of equipment, and inspection, operation, and safety and health standards for commercial diving operations taking place from vessels and facilities under Coast Guard jurisdiction.

§ Applicability.

(a) This subpart applies to commercial diving operations taking place at any deepwater port or the safety zone thereof as defined in 33 CFR 150; from any artificial island, installation, or other device on the Outer Continental Shelf and the waters adjacent thereto as defined in 33 CFR 147 or otherwise related to activities on the Outer Continental Shelf; and from all vessels required to have a certificate of inspection issued by the Coast Guard including mobile offshore drilling units regardless of their geographic location, or from any vessel connected with a deep water port or within the deep water port safety zone, or from any vessel engaged in activities related to the Outer Continental Shelf; except that this subpart does not apply to any diving operation-

(1) Performed solely for marine scientific research and development purposes by educational institutions;

(2) Performed solely for research and development for the advancement of diving equipment and technology; or

(3) Performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.

(b) Diving operations may deviate from the requirements of this subpart to the extent necessary to prevent or minimize a situation, which is likely to cause death, injury, or major environmental damage. The circumstances leading to the situation, the deviations made, and the corrective action taken, if appropriate, to reduce the possibility of recurrence shall bc recorded by the diving supervisor in the logbook as required by § 197.482(c).

§ 197.203 Right of Appeal

Any person directly affected by a decision or action taken under this subchapter, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

§ 197.204 Definitions

As used in this subpart:

ACFM means actual cubic feet per minute.

ANSI Code1 means the B3 I 1 American National Standards Institute "Code for Pressure Piping: Power Piping."

ASME Code means the American Society of Mechanical Engineers "Boiler and Pressure Vessel Code."

ASME PVHO-1 means the ANSI/ASME "Standard safety Standard for Pressure Vessels for Human Occupancy."

ATA means a measure of pressure expressed in terms of atmosphere absolute (includes barometric pressure).

Air Diving means any diving mode in which the diver's breathing media is contpressed air.

Air Gap means the distance from the surface of the water to the hull of a jack-up, semi-submersible, or fixed platform, while it is elevated above the water.

Open Bell- means a suspended platform, incorporating an ambient bubble, constructed to cam: one or more divers, and used for transporting the diver(s) to, and from, the underwater work site from the dive station allows the diver(s) access to the surrounding environment, and is capable of being used as a refuge during diving operations.

Closed Bell- means a suspended PVHO, used for transporting the divers to, and from, the underwater work site from the dive station while maintaining internal, or external, working pressure, allows the diver(s) access to the surrounding environment, and is capable of being used as a refuge during diving operations.

Bottom time means the total elapsed time the diver leaves the surface in descent to the time to the next whole minute that the diver begins ascent.

Breathing gas breathing mixture means the mixed-gas, oxygen, or air as appropriate supplied to the diver for breathing.

Bursting pressure means the pressure at which a pressure containment device would fail structurally.

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CGA means Compressed Gas Association

Commercial diver means a properly trained, certified, and competent diver engaged in underwater work for

Commercial diving operation means all activities in support of a commercial diver.

Cylinder means a pressure vessel for the storage of gases under pressure.

IX'S [See "Decompression Sickness."]

Deck Decompression Chamber means a PVHO located at the surface, on the deck of the dive support vessel, or the dive location, specially equipped to re-compress, decompress, or to treat divers with decompression-related illnesses.

Decompression Buoy means a floating device used to support the diver during in-water decompression.

Decompression chamber means a pressure vessel for human occupancy such as a deck decompression chamber, closed bell, or deep diving system especially equipped to recompress, de-compress, and treat divers.

Decompression sickness means a condition caused by the formation of gas or gas bubbles in the blood or body tissue as a result of pressure reduction.

Decompression table means a profile or set of profiles of ascent rates and breathing mixtures designed to reduce the pressure on a diver safely to atmospheric pressure after the diver has been exposed to a specific depth and bottom time.

Depth means the maximum pressure expressed in feet of seawater attained by a diver and is used to express the depth of a dive.

Dive location means that portion of a vessel or facility from which a diving operation is conducted.

Dive team means the divers and diver support personnel involved in a diving operation, including the diving supervisor.

Diver means a person working beneath the surface, exposed to hyperbaric conditions, and using underwater breathing apparatus.

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Diver-carried reserve breathing gas means a supply of air or mixed-gas, as appropriate, carried by the diver in addition to the primary or secondary breathing gas supplied to the diver.

Diver Tender means a properly trained, certified, and competent person who has completed the tender phase of their training/apprenticeship, but who has not yet acquired sufficient experience in the water to work beyond a specified depth.

Diving installation means all of the equipment used in support of a commercial diving operation.

Diving mode means the method of life-support provided to the diver (e.g. SCUBA, surface-supplied air, ~~or~~ surface-supplied mixed-gas, or saturation), with related procedures and techniques.

Diving stage means a suspended platfonn constructed to carry one or more divers and used for putting divers into the water and bringing them to the surface when in-water decompression or a heavy-weight diving outfit is used.

Diving supervisor means the properly trained, certified, and competent person having complete responsibility for the safety of a commercial diving operation including the responsibility for the safety and health of all diving personnel in accordance with this subpart.

Diving Superintendent means the properly trained, certified, and competent person who, when the extent of the diving operation exceeds the capability of one *Diving Supervisor*, manages the *Supervisors* and the overall diving operation.

Diving Support Vessel (DSV) means a vessel (including Dynamically Positioned, anchored, or live-boating operations) whose primary purpose is to provide support for a commercial diving operation.

Facility means a deepwater port, or an artificial island, installation, or other device on the Outer Continental Shelf subject to Coast Guard jurisdiction.

Freeboard means the distance from the surface of the water to the deck of a floating vessel.

Fsw means feet of seawater (or equivalent static pressure head).

Gas embolism means a condition caused by expanding gases, which have been taken into the blood stream or other tissues during ascent or decompression.

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Heavy-weight diving outfit means diver-worn surface-supplied deep-sea dress.

High Pressure Compressor means a compressor with a discharge pressure of 500 psig or greater.

Hyperbaric conditions means pressure conditions in excess of surface atmospheric pressure.

Injurious corrosion means an advanced state of corrosion which may impair the structural integrity or safe operation of the equipment.

Life Support Technician means the properly trained, certified, and competent person responsible for management of the diver's life-support systems and decompression, especially in a saturation diving mode.

Live boating means the support of a surfaced-supplied diver from a vessel underway.

Low Pressure Compressor means a compressor with a discharge pressure, which is less than 500psig.

Maximum working pressure means the maximum pressure to which a pressure containment device can be exposed under operating conditions (usually the pressure setting of the pressure relief device).

Mixed-Gas Diving means any diving mode in which the diver's breathing media is a mixture of gases other than air (e.g. helium/oxygen, nitrogen/oxygen, etc.)

No-decompression limits means the air depth and bottom time limits of appendix A

*Physically Confining space means a*ny space which would restrict the diver's ability to rotate himself head to toe, 180 degrees in any plane and/or when the diver has no direct access to the surface. ~~or~~ bell, or stage.

Pressure vessel means a container capable of with standing an internal maximum working pressure over 15 psig.

Psi(g) means pounds per square inch (gage)

PVHO means pressure vessel for human occupancy but does not include pressure vessels for human occupancy that may be subjected to external pressures in excess of 15 psig or less (i.e., submersibles, or one-atmosphere observation bells).

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Saturation diving means saturating a diver's tissues with the inert gas in the breathing mixture to allow an extension of bottom time without additional decompression.

Saturation Technician means the properly trained, certified, and competent person responsible for the maintenance of saturation life support systems.

SCUBA diving means a diving mode in which the diver is supplied with a compressed breathing mixture from diver carried equipment.

Standby diver means a suitably dressed and adequately briefed diver at the dive station, ready to assist the diver in the water.

Surface-Supplied Diving means a diving mode in which the diver is tended from, and tethered by his umbilical directly to, the dive station.

Tender means a properly trained, certified, and competent person responsible for directly supporting the diver during all surface phases of the dive, including, but not limited to, dressing and undressing the diver, management of the diver's umbilical, and management of the diver's decompression.

Timekeeper means a person responsible for managing the decompression-related details of the dive, including Bottom Time, depth, decompression, and diving log maintenance.

Timekeeping device means a device for measuring the time of a dive in minutes.

Treatment table means a depth, time, and breathing gas profile designed to treat a diver for decompression sickness.

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

Vessel means any waterborne craft including mobile offshore drilling units required to have a Certificate of Inspection issued by the Coast Guard or any waterborne craft connected with a deepwater port or within the deepwater port safety zone, or any waterborne craft engaged in activities related to the Outer Continental Shelf.

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

Working pressure means the pressure to which a pressure containment device is exposed at any particular instant during normal operating conditions.

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§ 197.205 Availability of standards

(a) Several standards have been incorporated by reference in this subchapter. The incorporation by reference has been approved by the Director of the FEDERAL REGISTER under the provisions of 1 CFR Part 5 1.

(b) The standards re available from the appropriate organizations whose addresses are listed below:

(1) American National Standards Institute
1430 Broadway
New York, NY 100 18

(2) American Society of Mechanical Engineers
United Engineering Center
345 east 47"' Street
New York, NY 100 17

§ 197.206 Substitutes for required equipment, materials, apparatus, arrangements, procedures, or tests.

(a) The Coast Guard may accept substitutes for equipment, materials, apparatus, arrangements, procedures, or tests required in this subpart if the substitute provides an equivalent level of safety.

(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment , material, apparatus, arrangement, procedure, or test is unreasonable, or impracticable, the Commandant may permit the use of alternate equipment, material, apparatus, arrangement, procedure, or test to such an extent and upon such condition as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subpart.

(c) Such deviation requires prior written approval of the Commandant, or his designee.

$197.208 Designation of person-in-charge.

(a) The owner or agent of a vessel or facility without a designated Master shall designate, in writing, an individual to be the person-in-charge of the vessel or facility.

(b) Where a master is designated, the master is the person-in-charge.

$197.210 Designation of diving supervisor

(a) Prior to the commencement, the name of the diving Supervisor for each commercial diving operation shall be –
(1) Designated in writing by the diving contractor; ~~and~~
(2) A copy of the written designation shall be-
(i) Given to the person-in-charge prior to the commencement of any commercial diving operation.; and
(ii) Delivered to the Commandant, or his designee.

(b) Only one Supervisor shall be designated to supervise a diving operation at any one time.
(c) No person shall be designated, nor shall act, as Supervisor unless he or she is properly trained, certified, and competent in respect of the diving operation which he or she is designated to supervise; and
(d) During the Supervisor's dive, another person satisfying the requirements of this section shall be designated, in writing by the diving contractor, to supervise in the Supervisor's absence.

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Equipment

$197.300 Applicability.

(a) Each diving installation used on each vessel or facility subject to this subpart must meet the requirements of this subpart.

(b) In addition to the requirements of this subpart, equipment, which is permanently installed on vessels and is part of the diving installation must meet Subchapters F and J of this chapter.

(c) All repairs and modifications to pressure vessels used for commercial diving operations must be made in accordance with the requirements of section VIII, division 1 or division 2 of the ASME Code, ASME PVHO-1, part 54 of this chapter, or 49 CFR 173.34 as applicable.

(d) All repairs and modifications to pressure piping used for commercial diving operations must be made in accordance with the requirements of the ANSI Code or Part 56 of this chapter, as applicable.

(e) An equipment maintenance log shall be established and maintained.

(1) Each piece of diving equipment shall have a unique identity traceable to it's own equipment maintenance log. Equipment maintenance logs are -

(i) to accompany the associated equipment at all times;
(ii) to be maintained for the working life of the equipment; and
(iii) to be retained for a period of five years thereafter.

(2) Entries made in the equipment log shall describe the nature of the work performed, and shall include the date of modification, repair or test, and the name of the individual performing the repair work or test.

(3) Individual persons performing maintenance repair test or modification to diving equipment shall both print and sign his or her name in the equipment log.

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§ 197.310 Air Compressor system.

Low pressure compressor systems used to supply breathing air to a diver must have
(a) A volume tank that is
1) built and stamped in accordance with section VIII, division 1 of the ASME Code with-
(i) a check valve on the inlet side;
(ii) a pressure gage;
(iii)a relief valve; and
(iv)a drain valve; and
2) Tested after every repair, modification, or alteration to the pressure boundaries as required by § 197.462;
(b) Intakes that are located away from areas containing exhaust fumes of internal combustion engines or other hazardous contaminants;
(c) An efficient filtration system; and
(d) Slow-opening shut-off valves when the maximum allowable working pressure of the system exceeds 500 psig.

§ 197.312 Breathing supply hoses.
(a) Each breathing supply hose must-
1) have a maximum working pressure that is equal to or exceeds –
(i) the maximum working pressure of the section of the breathing supply system in which used; and
(ii) the pressure equivalent of the maximum depth of the dive relative to the supply source plus 150 psig;

2) Have a bursting pressure of four times its maximum working pressure;

3) Have connectors that-
(i) Are made of corrosion-resistant material;
(ii) Are resistant to accidental disengagement and
(iii) Have a maximum working pressure that is at least equal to the maximum working pressure of the hose to which they are attached; and

4) Resist kinking by-
(i) Being made of kink-resistant materials; or
(ii) Having exterior support.

(b) Each umbilical must

1. Meet the requirements of paragraph (a) of this section; and

2. Be marked from the diver or open bell end in 1 O-foot intervals to 100 feet and in 50-foot intervals thereafter to an industry recognized standard.

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197.314 First aid and treatment equipment.

(a) Each dive location must have-

1. A medical kit approved by a physician that consists of --
   (i) Basic first aid supplies; and
   (ii) any additional supplies necessary to treat minor trauma and illnesses resulting from hyperbaric exposure;

2. A copy of and American Red Cross Standard First Aid handbook, or equivalent approved by a physician; and

3. A capability to remove an injured diver from the water.

(b) Each diving installation must have a readily available two-way communications system to obtain emergency assistance.

(c) Each dive location supporting mixed-gas dives, dives deeper than 80 fsw, or dives outside the no-decompression limits must meet the requirements of paragraph (a) of this section and have-

1) A decompression chamber;

2) Decompression and treatment tables;

3) A supply of breathing gases sufficient to treat for decompression sickness;

   (i) The medical kit required by paragraph (a)(1) of this section that is -capable of being carried into the decompression chamber and
   (ii) suitable for use under hyperbaric conditions; and

4) A capability to assist an injured diver into, and out of, the decompression chamber.

§ 197.318 Gages and timekeeping devices.

(a) A gage indicating diver depth must be at each dive location for surface-supplied dives;

(1) It shall be of appropriate range and graduation to indicate a diver's depth;

(2) It shall be graduated in units, which are consistent with decompression table to be utilized.

(b) A timekeeping device must be at each dive location; and

(1) All timekeeping devices must be synchronized with a referenced timekeeping device on the dive location.

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§ 197.320 Diving ladders and stage.

(a) Each diving ladder must

(1) Be capable of supporting the weight of at least two divers;

(2) Be of sufficient length to allow the diver to enter and exit the water safely.

(3) Be firmly in place

(4) Be available at the dive location for the diver to enter or exit the water unless a diving stage or bell is provided; and

(5) Be-

(i) Made of corrosion-resistant material;

(ii) Or protected against and maintained free from injurious corrosion.

(b) Each diving stage must-

(1) Be capable of supporting the weight of at least two divers;

(2) Have an open-grating platform;

(3) Be available for a diver to enter or exit the water from the dive location, and for in-water decompression if the diver is-

(i) Wearing a heavy-weight diving out fit; or

Diving outside the no-decompression limits, except when a bell is provided;

(4) Be-

(i) Made of corrosion-resistant material; or

(ii) Protected against and maintained free from injurious corrosion.

$197.322 Surface-supplied helmets and masks.

(a) Each surface-supplied helmet or mask must have-

(1) A non-return valve at the attachment point between helmet, or mask, and umbilical that closes readily and positively;

(2) An exhaust valve; and

(3) A two-way voice communication system between the diver and the dive location or bell.

(b) Each surface-supplied air helmet or mask must-

(1) Ventilate at least 4.5 ACFM at any depth at which it is operated; or

(2 j Be able to maintain the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

§ 197.324 Diver's safety harness

Each safety harness used in surface supplied diving must have-

(a) A positive buckling device; and

(b) An attachment point for the umbilical life line that-

(1) Distributes the pulling force of the umbilical over the diver's body; and

(2) Prevents strain on the mask or helmet.

§ 197.326 Oxygen safety.

(a) Equipment used exclusively for oxygen must be designed for such use.

(b) Oxygen systems with pressures greater than 125 psig must have slow-opening shut-off valves except pressure boundary shut-off valves may be ball valves.

197.328 PVHO-GENERAL.

(a) Each PVHO must be built and stamped in accordance with ASME PVHO-1, or equivalent international standard as approved by the Commandant, or his designee.

(b) Each PVHO not Coast Guard approved must be submitted to the Coast Guard for approval prior to being placed in service.

(c) To be approved under paragraph (b), a PVHO must be-

(1) Constructed in accordance with Part 54 of this chapter; or-

(2) Be built in accordance with section VIII, division 1 or division 2 of the ASME Code; and

(i) Have plans approved in accordance with 54.0 1-l 8 of this Chapter

(ii) Pass the radiographic and other survey tests of welded joints required by section VIII, division 1 or division 2 of the ASME Code; and-

(iii) Pass-

(A) The hydrostatic test described in §54.10-10 of this chapter; or
(B) The pneumatic test described in 954.1 O-l 5 of this chapter and such additional tests as the Officer-in-Charge, Marine Inspection (OCMI) may require.

(d) Each PVHO must-

(i j A valve, with a maximum working pressure (MWP) of 1.5 times the MWP of the system on which they are installed, on each side of the hull, within one foot of the penetration;

(ii) A plug, with a maximum working pressure (MWP) of 1.5 times the MWP of the system on which they are installed. on each side of the penetration; or

(iii)A combination of (i j and (ii).

(1) Have a check valve located within 1 foot of the pressure boundary on all piping exclusively carrying fluids into the PVHO;

(2) Have the pressure relief device required by ASME PVHO-1, or equivalent international standard;

(3) Have a built-in breathing system with at least one mask per occupant stored inside each separately pressurized compartment;

(4) Have a two-way voice communications system allowing comminations between an occupant in one pressurized compartment of the PVHO and-

(i) The diving supervisor at the dive location;

(ii) Any divers being supported from the same PVHO; and

(iii) Occupants of other separately pressurized compartments of the same PVHO;

(5) If designed to mechanically couple to another PVHO, have a two-way communications system allowing communications between occupants of each PVHO when mechanically coupled;

(6) Have a pressure gage in the interior of each compartment that is-

(i) Designed for human occupancy; and

(ii) Capable of having the compartment pressure controlled from inside the PVHO;

(7j Have view ports that allow observation of occupants from the outside;

(8) Have viewports that meet the requirements of ASME PVHO-1 except those PVHO's approved under paragraph (b) of this section which have non-acrylic viewports;

(9) Have means of illumination sufficient to allow an occupant to-

(i) Read gages; and
(ii) Operate the installed systems within each compartment;

(10) Be designed and equipped to minimize sources of combustible materials and ignition;

(11) Have a protective device on the inlet side of PVHO exhaust lines;

(12) Have a means of extinguishing a fire in the interior;

(13) Have a means of maintaining the oxygen content of the interior atmosphere below 25 percent surface equivalent by volume when pressurized with air as the breathing mixture;

(14) Have a means of maintaining the interior atmosphere below 2 per-cent surface equivalent carbon dioxide by volume;

(15) Have a means of overriding and controlling from the exterior all interior breathing and pressure supply controls;

(16) Have a speech unscrambler when used with mixed-gases;

(17) Have interior electrical systems that are designed for the environment in which they will operate to minimize the risk of fire, electrical shock to personnel, and galvanic action of the PVHO; and

(18) Be tested after every repair, modification, or alteration to the pressure boundaries as required by 197.462.

197.330 **PVHO -** Closed Bells.

(a) Except as provided in paragraph (b) of this section, each closed bell must meet the requirements of 197.328 and-

(1) Have underwater breathing apparatus for each occupant stored inside each separately pressurized compartment;

(2) Have an umbilical for each occupant;

(3 j Have lifting equipment attached to the closed bell capable of returning the occupied closed bell, when fully flooded, to the dive location;

(4) Be capable of recompressing on the surface to the maximum design diving depth;

(5) Have an emergency locating device designed to assist personnel on the surface in acquiring and maintaining contact with the submerged PVHO if the umbilical to the surface is served;

(6) Have a capability to remove an injured driver from the water; and

(i) Sufficient onboard breathing gas to allow a diver to remain outside the bell for 30 minutes at the maximum depth rating of the bell, or dive site natural bottom, at a breathing rate of 1.5 ACFM; and

(ii) Sufficient onboard life support systems to support the number of occupants for a period of 24 hours at a consumption rate of .017 cubic feet per minute; or

(b) A closed bell that does not meet the requirements of paragraphs (a)(3), and (a)(4), of this section, must be capable of attachment to another PVHO that-

(1) Allows the transfer of personnel and diver's equipment under pressure from the closed bell to the PVHO;

(2) Meets the requirements of paragraph(a)(J) of this section;

(3) Is capable of attachment to a decompression chamber meeting the requirements of paragraphs (a)(4) and (a)(5) of this section; and

(4) Allows the transfer of personnel and diver's equipment under pressure from the PVHO to the decompression chamber.

§ 197.332 **PVHO-Decompression** chambers.

(a) Each decompression chamber must- Meet the requirements of § 197.328;

(b) Have internal dimensions sufficient to accommodate a diver lying in a horizontal position and another person tending the diver;

(c) Have a capability for ingress and egress of personnel and equipment while the occupants are under pressure;

(d) Have a means of operating all installed man-way locking devices, except disabled shipping dogs, from both sides of a closed hatch;

(e) Have interior illumination sufficient to allow visual observation, diagnosis, and medical treatment of an occupant.

(f) Have one bunk for each two occupants;

(g) Have a capability that allows bunks to be seen over their entire lengths from the exterior;

(h) Have a minimum pressure capability of-

(1) 6 ATA, when used for diving to 300 fsw; or

(2) The maximum depth dive, when used for diving operations deeper than 300 fsw, unless a closed bell meeting the requirements of §197.330(a)(3), (4), and (5) is used;

(i) Have a minimum pressurization rate of 2 ATA per minute to 60 fsw and at least 1 ATA per minute thereafter;

(ii) Have a decompression rate of 1 ATA per minute to 33 fsw;

(iii) Have an external pressure gage for each pressurized compartment;

(iv) Have a capability to supply breathing mixtures at the maximum rate required by each occupant doing heavy work; and

(v) Have a sound-powered headset or telephone, as a backup to the communications system required by § 197.328(c) (5) and (6), except when that communications system is a sound-powered system.

§ 197.334 Open diving bells.

Each open diving bell must-

(a) Have an upper section that provides an envelope capable of maintaining a bubble of breathing mixture available to a diver standing on the lower section of the platform with his body through the open bottom and his head in the bubble;

(b) Have lifting equipment capable of returning the occupied open bell to the dive location;

(c) Have an umbilical; and be-

(d) Made-

(1) Of corrosion-resisting material; or

(2) Protected against and maintained free form injurious corrosion.

197.336 Pressure piping

Piping systems that are not an integral part of the vessel or facility, carrying fluids under pressures exceeding 15 psig must
(a) Meet the ANSI code;
(b) Have the point of connection to the vessel or facility clearly marked; and
(c) Be tested after every repair, modification, or alteration to the pressure boundaries as set forth in § 197.462.

§ 197.338 Compressed gas cylinders.
Each compressed gas cylinder must-
(a) Be stored in a ventilated area;
(b) Be protected from excessive heat;
(cj Be prevented from falling;
(d) Be tested after any repair, modification, or alteration to the pressure boundaries as set forth in 197.462; and
(e) Be visually examined, annually, for damage or corrosion.
(f) Be inspected internally, annually, if used underwater.
(g) Be labeled as to contents.
(h) Meet the requirements of-
(1) Part 54 of this Chapter; or 49 CFR 173.34 and
(2) CFR 178 Subpart C.

$197.340 Breathing gas supply.

(a) A primary breathing gas supply must be sufficient to support the following for the duration of the planned dive:
(1) The diver.
(2) The standby diver.
(3) The decompression chamber, when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and for one hour after completion of the planned dive.
(4) A decompression chamber, when provided but not required by this subpart.
(5) A closed bell when provided or required by § 197.434(d).
(6)An open bell when provided or required by§ 197.432 (e)(4) or by 4 197.434(c).
(b) A secondary breathing gas supply must be sufficient to support the following:
(1) The diver while returning to the surface or the bell.
(2) The diver during decompression.
(3) The standby diver.
(4) The decompression chamber when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and one-hour after the completion of the planned dive.
(5) The closed bell while returning the diver to the surface.
(6) The open bell while returning the diver to the surface.

(c) A diver-carried reserve breathing gas supply must be sufficient to allow the diver to-
(1) Reach the surface or the bell;
(2) Reach another source of breathing gas; or
(3) Be reached by a standby diver equipped with another source of breathing gas for the diver.
(d) A primary breathing gas supply for SCUBA diving must be sufficient to support the diver for the duration of the planned dive through his return to the dive location or planned pick-up point.
(e) A diver-carried reserve breathing gas supply for SCUBA diving must be sufficient to allow the diver to return to the dive location or planned pick-up point from the greatest depth of the planned dive.
(f) Oxygen used for breathing mixtures must-
(1) Meet the requirements of Federal Specification BB-O-925a; and
(2) Be type 1 (gaseous) grade A or B.
(g) Nitrogen used for breathing mixtures must-
(1) Meet the requirements of Federal Specification BB-N-411 c;
(2) Be type 1 (gaseous);
(3) Be class 1 (oil free); and
(4) Be grade A, B, or C.
(h) Helium used for breathing mixtures must be grades A, B, or C produced by the Federal Government, or equivalent.
(i) Compressed air used for breathing mixtures must –
(1) Meet the requirements of ANSI/CGA 7.1 Grade "D," or equivalent;
(2) Be CGA grade "E" for svnthesized air.

197.342 Buoyancy-changing devices.

(a) A dry suit or other buoyancy-changing device not directly connected to the exhaust valve of the helmet or mask must have an independent exhaust valve.

(b) When used for SCUBA diving, a buoyancy-changing device must have an inflation source separate from the breathing gas supply.

$197.344 Inflatable floatation devices.

An inflatable floatation device for SCUBA diving must-

(a) Be capable of maintaining the diver at the surface in a face up position;
(b) Have a manually activated inflation device;
(c) Have an oral inflation device;
(d) Have an over-pressure relief device; and
(e) Have a manually operated exhaust valve.

$197.346 Diver's equipment

(a) Each diver using SCUBA must have-

(1) Self-contained underwater breathing equipment including-

(i) A primary breathing gas supply with a cylinder pressure gage readable by the diver during the dive; and

(ii) A diver-carried reserve breathing gas supply provided by an independent reserve cylinder connected and ready for use;

(2) A face mask;

(3) An inflatable floatation device;

(4) A weight belt capable of quick release;

(5) A knife;

(6) Swim fins or shoes;

(7) A diving wristwatch; and

(8) A depth gage

(b) Each diver using a heavyweight diving outfit must-

(1) Have a helmet group consisting of helmet, breastplate, and associated valves and connections;

(2) Have a diving dress group consisting of a basic dress that encloses the body (except for head and hands) in a tough, waterproof cover, gloves, shoes, weight assembly, and knife;

(3) Have a hose group consisting of the breathing gas hose and fittings , the control valve, the lifeline, communications cable, and a pneumofathometer; and

(4) Be provided with a helmet cushion and weighted shoes.

(c) Each surface-supplied dive operation using a heavyweight diving outfit must have an extra breathing gas hose with attaching tools available to the standby diver.

(d) Each diver using a lightweight diving outfit must have-

(1) A safety harness;

(2) A weight assembly capable of quick release;

(3) A mask group consisting of a lightweight mask and associated valves and connections;

(4) A diving dress group consisting of a diving dress that provides suitable protection for existing environmental conditions and maintains the divers thermal balance within normal limits; and

(5) A hose group shall consist of;

(i) a breathing gas hose,

(ii) communications cable,

(iii) a means of determining the divers depth and

(iv) an included strength member and

V Have the nominal breaking strength of the hose group assembly, including the terminating hardware shall be 1,000 lbs.

(e) Each surface-supplied dive operation-must have at the dive location -

(i) a primary breathing gas supply; and

(ii) a secondary breathing gas supply.

(f) Each diver entering the water shall have a diver-carried reserve breathing gas supply, except when using a heavyweight diving outfit.

OPERATIONS

§ 197.400 Applicability.

Diving operations may only be conducted from a vessel or facility subject to the subpart if the regulations in this subpart are met.

$197.401 DESIGNATION OF PERSON-IN-CHARGE

(a) The person in charge shall be the owner of the vessel or facility, or

(b) Designated in writing by the owner.

$197.402 Responsibilities of the person-in-charge.

(a) The person-in-charge shall-

(I) Be fully cognizant of the provisions of this subpart;

(2) Prior to permitting any commercial diving operation to commence, have, in writing -

(i) The designation of the diving supervisor for each diving operation as required by § 197.210;
(ii)A report on -

(A) The nature and planned times of the planned diving operation; and

(B) The planned involvement of the vessel or facility, its equipment, and its personnel in the diving operation.

(b) Prior to permitting any commercial diving operation involving liveboating to commence, the person-in-charge shall insure that -

(1) A means of rapid communications with the diving supervisor while the diver is entering, in, or leaving the water is established; and

(2) A boat and crew are available for diver pickup in the event of an emergency is provided.

(c) The person-in-charge shall coordinate the activities on and of the vessel or facility with the diving supervisor.

(d) The person-in-charge shall insure that the vessel or facility equipment and personnel are kept clear of the dive location except after coordinating with the diving supervisor.

§ 197.403 DESIGNATION OF DIVING SIJPERVISOR

(a) The diving supervisor shall be designated in writing and

(b) written designation supplied to the person in charge prior to the commencement of dive operations

§ 197.404 Responsibilities of the Diving Supervisor

(c) The Diving Supervisor shall -

(1) Be trained and experienced in the responsibilities of the Diving Supervisor, *a Standard* lo he *determined by the Commandant of The United States Coast Guard* Commercial Diver Training – Minimum Standards;

(2) Be trained and experienced in the type of diving for which he or she will be responsible as per § 197.406 of this subpart;

(3) Be fully cognizant of the provisions of this subpart;

(4) Be fully cognizant of the provisions of the operations manual required by 197.420;

(5) Insure that diving operations conducted from a vessel or facility subject to this subpart meet the regulation in this subpart;

(6) Prior to the commencement of any commercial diving operation, provide the report required by § 197.402 to the person-in-charge;

(7) Coordinate with the person-in-charge any changes that are made to the report required by § 197.402; and

(8) Promptly notify the person-in-charge of any diving related casualty, accident, or injury.

(d) The diving supervisor is in charge of the planning and execution of the diving operation including the responsibility for the safety and health of the dive team.

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§ 197.405 Responsibilities of the Diving: Superintendent

(a) Where the nature or size of a diving; operation requires a Diving Superintendent, a person shall not be a Diving; Superintendent unless that person has –
(b) Been appointed, in writing: by the Diving Contractor;
(c) Is able to supervise diving operations competently, and
(d) Complies with the requirements of § 197.404 Responsibilities of the Diving Supervisor.

197.406 Responsibilities of the Diver

(a) The diver shall -

(i) Be trained and experienced in the type of diving for which he or she will be involved as per a standard to be approved by the Commandant of The United States Coast Guard;

(ii) No person shall dive unless he or she, has undergone a medical examination to determine fitness to dive during the 24-month period preceding the dive or during such shorter period preceding the dive as has been recommended by the person's examining physician; and

(iii) has obtained a written statement from the examining physician who performed the most recent examination under clause indicating whether the diver is fit to dive or fit to dive with limitations, and

(iv) An examination under this subsection shall be performed by a physician who is knowledgeable in diving and hyperbaric medicine, and

(v) Has obtained a written statement from the examining physician that meets the requirements of this subsection including the examining phvsician's name and address and shall be signed by the physician.

(b) Be fully cognizant of the provisions of this subpart;

(c) Be fully cognizant of the provisions of the operations manual required by § 197.420;

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(d) Maintain the Diver's Logbook

(i) No person shall dive in a diving operation unless he or she has a diving log book that, is permanently bound;

(ii) has numbered pages; contains the diver's signature and photograph; and

(iii) has attached to it or entered into it a record of any qualifications obtained by the diver that relate to diving; and

(iv) has attached to it or entered into it a record of the certification

(v) Each person who dives in a diving operation shall make an entry in the diving logbook in respect of each dive, each medical recompression and each hyperbaric exposure carried out or undergone by the person in connection with the diving operation.

(vi) No person shall dive in a diving operation unless he or she has made an entry in the diving logbook.

(vii) Entries shall be made within 48 hours of the dive, medical recompression or hyperbaric exposure and shall appear in the logbook in chronological order.

(viii) An entry in respect of a dive shall be signed by the diving supervisor and or

(is) In the event of a medical recompression or a hyperbaric exposure an entry shall be signed by the diving supervisor or presiding physician.

(x) The type of diving equipment used;

(si) the breathing mixture used;

(xii) the time the diver left the surface;the maximum depth attained;

(xiii) the time the diver left the bottom;

(xiv) the time the diver reached the surface;

(xv) the time of the surface interval, if a repetitive dive was undertaken;

(xvi) the decompression table used;

(xvii) the date;

(xviii) any unusual incidents; and

(xix) the environmental conditions.

(xx) in respect of a dive originating from a submersible compression chamber or other submerged base shall state,

(A) The depth at the base;

(B) the maximum and minimum depths attained; and

(C) the duration of the excursions from the base.

(e) A person who is required to have a diving log book shall retain the log book

(f) Be certified in general and hyperbaric first aid and CPR.

§ 197.407 - Systems maintenance, life support and diver medical technicians

(a) Where required under the provisions of this subpart, there shall be provided an experienced maintenance technician who shall personally, under the supervision of a Diving Supervisor, undertake and be responsible for the repair, maintenance and safe functioning of equipment used in diving operations.

(1) A person shall not perform the functions referred to in sub-clause (a) unless that person has such knowledge and experience as approved necessary to perform those duties.

(b) Where required under the provisions of this subpart, there shall be provided an experienced life support technician who shall, under the supervision of the Diving Supervisor, control and monitor all the systems functions which relate to the "life support", safety and health of any person inside a surface compression chamber. A person shall not perform the functions referred to in sub-clause (b) unless that person has such knowledge and experience as approved necessary to perform those duties.

(c) Where required under the provisions of this subpart, there shall be provided a diver medical technician who shall, where required, render advanced first-aid treatment. A person shall not perform the functions referred to in sub-clause (c) unless that person complies with the provisions of sub-clause 808(3).

§ 197.408 – Responsibilities of the Diver's Attendant (Tender)

(a) A Tender shall have sufficient knowledge of –

(1) Underwater work;

(2') The signals and communication devices used in diving operations;

(3) Decompression procedures; and

(4) Be certified in medical first aid and CPR.

§ 197.409 – Responsibilities of the Diving Contractor

(a) The Diving Contractor shall be fully cognizant of the requirements of this subpart.

(b) Shall maintain coverage under the Longshore Act 33 USC932

§ 197.410 Dive procedures

(a) The diving supervisor shall insure that-

(1) Before commencing diving operations, dive team members are briefed on-

(i) The tasks to be undertaken;
(ii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and
(iii) Any modifications to the operation manual or procedures including safety procedures necessitated by the specific diving operation;

(2) The breathing gas supply system, masks, helmets, thermal protection, when provided, and bell lifting equipment, when a bell is provided or required, are inspected prior to each diving operation;

(3) Each diver is instructed to report any physical problems or physiological effects including aches, pains, current illnesses, sickness prior to each dive;

(4) A depth, bottom time profile, including any breathing mixture changes, is maintained at the dive location for each diver during the dive, except that SCUBA divers shall maintain their own profiles.

(5) A two-way voice communication system is used between-

(i) Each surface-supplied diver and a dive team member at the dive location
(ii) The Bell (when provided) and the dive location:

(6) A two-way communication system is available at the dive location to obtain emergency assistance;

(7) During the dive –

(i) The Diving Supervisor shall not undertake or be assigned any secondary duties, which might limit his or her ability to carry out the primary duties of supervising the dive.
(ii) Any dive team member shall not undertake or be assigned any secondary task that might interfere with those members' primary duties.

(8) After the completion of each dive the supervisor shall insure that;

(i) The physical condition of the diver is checked by -

(A) Visual observation; and
(B) Questioning the diver about his wellbeing;

(ii) The diver is instructed to report any physical problems or adverse physiological effects including aches, pains, current illnesses, or symptoms of decompression sickness or gas embolism;
(iii) The diver is advised of the location of an operational decompression chamber; and

(iv) The diver is alerted to the potential hazards of flying after diving;

(9) For any dive outside the no-decompression limits, deeper than 80 fsw, or using mixed-gas as a breathing mixture –

(i) A depth, time, decompression profile including breathing mixture changes is maintained for each diver at the dive location;
(ii) The diver is instructed to remain awake and in the vicinity of the dive location decompression chamber for at least one hour after the completion of a dive, decompression, or treatment; and
(iii) A dive team member, other than the diver, is trained and available to operate the decompression chamber; and

(10) When decompression sickness or gas embolism is suspected or symptoms are evident, a report is completed containing-

(i) The investigation for each incident including-

(A) The dive and decompression profiles;
(B) The composition, depth, and time of breathing mixture changes;

(C)A description of the symptoms including depth and time of onset; and
(D)A description and results of the treatment;

(ii)The evaluation for each incident based on

(A) The investigation;
(B) Consideration of the past performance of the decompression table used ; and
(C)Individual susceptibility; and

(iii)The corrective action taken, if necessary, to reduce the probability of recurrence.

(b) The diving supervisor shall ensure that the working interval of a dive is terminated when he so directs or when-

(1) A diver requests termination;

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

(3) Communications are lost and can not be quickly reestablished between-

(i) The diver and a dive team member at the dive location; or
(ii) The person-in-charge and the diving supervisor during liveboating operations; or

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(4) A diver begins to use his diver carried reserve breathing gas supply.

(c) A Lock-Out/Tap-Out (LOTO) procedure is used on main propulsion and/or other machinery controls onboard vessels or stationary platforms engaged in diving operations to provide a warning to anyone attempting to engage or operate machinery which may be potentially hazardous to the diver(s) safety.

$197.420 Operations manual

(a) The diving supervisor shall -

(1) Provide an operations manual to the person-in-charge prior to commencement of any diving operation; and

(2) Make an operations manual available at the dive location to all members of the dive team.

(b) The operations manual must be modified in writing when adaptation is required because of-

(1) The configuration or operation of the vessel or facility; or

(2) The specific diving operation as planned

(c) The operations manual must provide for the safety and health of the divers.

(d) The operations manual must contain the following:

(1) Safety procedures and checklist for each diving mode used.

(2) Assignments and responsibilities of each diving mode used

(3) Equipment procedures and checklists for each diving mode used.

(4) Emergency procedures for-
- (i) Fire;
- (ii) Equipment failure;
- (iii) Adverse environmental conditions including, but not limited to, weather and sea state;
- (iv) Medical illness; and treatment of injury.

(5) Procedures dealing with the use of –
- (i) Hand-held power tools.
- (ii) Welding and burning equipment; and
- (iii) Explosives.

SPECIFIC DIVING MODE PROCEDURES

§ 197.430 SCUBA diving.
(Consideration should be given to removing all reference to **SCUBA)**
The Diving supervisor shall insure that-

(a) SCUBA diving is not conducted-

(1) outside the no-decompression limits;

~~(2)~~ at depths greater than 130 fsw;

~~(3)~~ Against currents greater than one (1) knot unless line-tended; and

~~(4)~~ If a diver cannot directly ascend to the surface

(b) The SCUBA diver has the equipment required by § 197.346(a);

(c) A standby diver is available while a diver is in the water;

(d) A diver is line-tended from the surface or accompanied by another diver in the water in continuous visual contact during the diving operation;

(e) When a diver is in a physically confining space, another diver is stationed at her underwater point of entry and is in-tending the diver; and

(f) A boat is available for diver pickup when the divers are not line tended from the dive location.

§ 197.432 Surfaced-supplied air diving.

Surface-supplied air diving operations shall-

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

(b) Provide a primary breathing gas **supply;**

(c) Provide a secondary breathing gas supply;

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(d) Ensure that each diver is continuously tended by a separate dive team member while in the water;

(e) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;

(f) A suitably dressed, and adequately briefed standby diver is at the dive station, and ready to assist the diver in the water;

(g) Each diver has a diver-carried reserve breathing gas supply, except when the diver is using a heavy-weight diving outfit;

(h) For dives deeper than 80 FSW or outside the no-decompression limits

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

(2) A diving stage is available to enter or exit the water from the dive location and for in-water decompression if the diver is -

(i) wearing heavyweight diving outfit or
(ii) diving on a decompression table requiring in-water decompression, except when a bell is provided; or
(iii) exposed to an air gap of greater than 15 feet; or
(iv) where conditions or crew size prohibits the recovery of the diver to the dive station, and

(3) A bell is used for dives with an in-water decompression time greater than 100 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;

(4) A separate dive team member tends each diver in the water;

(5) The surface-supplied air diver has the equipment required by 197.346 (b) or (d).

§ 197.434 Mixed-gas diving.
(a) When mixed-gas diving is conducted,
(1) A decompression chamber or a closed bell meeting the requirements of 197.332 is ready for use at the dive location;

(2) A diving stage is used except when a bell is provided;

(3) An Open Bell is used for dives deeper than 220 fsw or when the dive involves in-water decompression times greater than 100 minutes

(4) A closed bell is used for dives at depths greater than 300 fsw

(5) A separate dive team member continuously tends each diver in the water;

(6) A standby diver is on station, suitably dressed and prepared to dive while the diver is in the water;

(7) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;

(8) Each diving operation has a primary and secondary breathing gas supply meeting the requirements of 197.340; and

(9) The surface-supplied mixed-gas diver has the equipment required by 197.346 (b) or (d).

(b) When saturation diving is conducted—

(1) A standby diver is available when the closed bell leaves the dive location until the divers are in saturation; and

(2) A member of the dive team at the dive location is a diver able to assist in the recovery of the closed bell or its occupants, if required;

(3) When closed bell operations are conducted, a diver is available in the closed bell to assist a diver in the water;

197.435 BELL BOUNCE AND SATURATION DIVING

(a) When closed bell diving operations are conducted.

(1) A member of the diver team at the dive location is a diver able to assist in the recovery of the closed bell or its occupants, if required.

(b) Bell bounce and saturation diving shall be conducted utilizing PVHO's fitted as per 197.328, 197.330, & 197.332.

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(c) Each diving operation from a closed bell shall;

(1) have primary and secondary breathing gas' supply meeting the requirements of 197.340:

(2) Have a diver in the bell equipped to assist the diver in the water;

(3) Have mixed gas divers equipped as required by 197.346.

(d) All saturation operations must have a hyperbrac life boat and:

(i) capable of being deployed within 15 minutes and

(ii) able to decompress the total number of occupants

(iii) Be rated for the deepest planed allowable working depth.

$197.436 Liveboating

(a) During liveboating operations, the person-in-charge shall insure that -

(1) Diving is not conducted in seas that impede station-keeping ability of the vessel;

(2) Liveboating operations are not conducted –

(i) From 1 hour after sunset to 1 hour before sunrise; or
(ii) During periods of restricted visibility;

(3) The propellers of the vessel are stopped before the diver enters or exits the water; and

(4) A boat is ready to be launched with crew in the event of an emergency.

(b) During liveboating operations, the diving supervisor shall insure that –

(1) Diving is not conducted at depths greater than 220 fsw;

(2) Diving is not conducted in seas that impede diver mobility, ~~or~~ work function, or ability to decompress safely;

(3) Measures are taken to prevent the diver's hose from entangling in the propellers of the vessel;

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(4) Each diver carries a reserve breathing gas supply;

(5) A standby diver is on station, suitably dressed and prepared to dive while a diver is in the water;

(6) Diving is not conducted with in-water decompression time greater than 100 minutes;

(7) The person in charge is notified before a diver enters or exits the water.

(8) A means of direct voice communication available between the dive station and the person in control of maneuvering the vessel,

(9) A kill switch is immediately available to the person in control of maneuvering the vessel. for immediate shutdown of the engines.

(10) A decompression buoy may be used in place of a diving stage to **support** in-water decompression so long as a suitable means exists for the diver to enter or exit the water as required by 197.320.

197.438 - WORKING WITH REMOTE OPERATED VEHICLES (ROV'S)

a.) Before commencement of any joint ROV/Diving operations, a clear chain of command must be established;

(i) All ROV operations conducted concurrent with diving operations shall be coordinated through the Diving Supervisor;

b.) Two-way voice communications shall be available between the ROV pilot & the dive control station;

c.) All ROV movements are to be cleared through the Diving Supervisor while a diver is in the water; and

d.) ROV thrusters are to be fitted with guards to prevent entanglement with the diver's umbilical.

§ 197.440 DIVING FROM A DYNAMICALLY POSITIONED VESSEL

(a) All **diving** operations conducted from a Dynamically Positioned Vessel shall be conducted in accordance with guidelines **approved by** the Commandant.

PERIODIC TESTS AND INSPECTIONS OF DIVING **EQUIPMENT**

§ 197.450 Breathing gas tests.

The diving supervisor shall insure that –

(a) The output of each air compressor has been tested, and meets the requirements of 197.340 for quality and quantity by means of samples taken at the connection point to the distribution system,

(1) Every 6 months; and

(2) After every repair or modification.

(b) Purchased supplies of breathing mixtures supplied to a diver are checked before being placed on line for –

(1) Certification that the supply meets the requirements of 197.340;

(2) Noxious or offensive odor; and
(3) Oxygen content;
(c) Each breathing supply system is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for noxious or offensive odor and presence of foreign material; and
(d) Each breathing supply system, supplying mixed gas to a diver, is checked. Prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for percentage of oxygen.

§ 197.452 Oxygen cleaning.

The diving supervisor shall ensure that equipment used with oxygen or oxygen measures greater that 40 percent by volume is cleaned of flammable materials-

(a) Before being placed into service; and

(b) After any repair, alteration, modification, or suspected contamination.

§ 197.454 First aid and treatment equipment.

The diving supervisor shall ensure that medical kits are checked prior to commencing diving operations to ensure that all required supplies are present.

§ 197.456 Breathing supply hoses.

(a) The diving supervisor shall insure that --

(1) Each breathing supply hose is pressure tested prior to being placed into initial service and every 12 months thereafter hydrostatically to 1.5 times its maximum working pressure;

(2) Each breathing supply hose assembly, prior to being placed into initial service and after any repair, modification, or alteration, is tensile tested by –

(i) Subjecting each hose-to-fitting connection to a 200 pound axial load; and

(ii) Passing a visual examination for evidence of separation, slippage, or other damage to the assembly;

(3) Each breathing supply hose is periodically checked for –

(i) Damage which is likely to affect pressure integrity; and

(ii) Contamination which is likely to affect the purity of the breathing mixture delivered to the diver; and

(4) The open ends of each breathing supply hose are taped, capped, or plugged when not in use.

(b) To meet the requirements of paragraph (a)(3) of this section each breathing supply hose must be—

(1) Pressure tested to its normal working pressure prior to commencing diving operations;

(2) Visually checked during daily operation; and

(3) Checked for noxious or offensive odor before each diving operation.

§ 197.458 Gages and timekeeping devices.

The diving supervisor shall insure that-

(a) Each depth gage and timekeeping device is tested or calibrated against a master reference gage or time- keeping device every 6 months;

(b) A depth gage is tested when a discrepancy exists in a depth gage reading greater than 2 percent of full scale between any two gages of similar range and calibration;

(c) A timekeeping device is tested when a discrepancy exists of greater than one-quarter of a minute in a 4-hour period between any two timekeeping devices; and

(dj Each depth gage and timekeeping device is inspected before diving operations are begun;

(i) All timekeeping devices on a diving location shall be synchronized, on a daily basis. against a referenced device.

197.460 Diving equipment

The diving supervisor shall insure that the diving equipment designated for the use in a dive under § 197.346 is inspected before each dive.

§ 197.462 Pressure vessels and pressure piping.

(a) The diving supervisor shall insure that each volume tank, cylinder. PVHO, and pressure piping system has been examined and tested every 12 months and after any repair, modification, or alteration to the extent necessary to determine that they are in condition and fit for the service intended.

(b) The following tests must be made to meet the annual requirements of paragraph (a) of this section:

(1) An internal and external visual examination for mechanical damage or deterioration. If a defect is found that may impair the safety of the pressure vessel, a hydrostatic test must be performed.

(2) A leak test

(3 **j** A Pneumatic test.

(c) The following tests must be made after any repair, modification or alteration to meet the requirements of paragraph (a) of this section:

(1) An internal and external visual examination for correctness and adequacy of repair, modification, or alteration.

(2j A leak test

(3)A hydrostatic test when the repair, modification, or alteration affects the pressure boundary.

(d) When the pneumatic test on pressure vessels is conducted-

(1) The test pressure must be the maximum allowable working pressure stamped on the pressure vessel; and

(2) The test may be conducted only after suitable precautions are to protect personnel and equipment

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(e) When the pneumatic test on pressure piping is conducted:

(1) The test pressure must be no less than 90 percent of the setting of the relief device; and

(2) The test may be conducted only after suitable precautions are taken to protect personnel and equipment.

(f) When a hydrostatic test on a pressure vessel is made, the test pressure must be:

(1) 1.25 times the pressure stamped on the pressure vessel built to division 2 of the ASME Code; and

(2)1.5 times the pressure stamped on pressure vessels built to division 1 of the ASME Code; or

(3)As required by the Code if construction.

(g) When a hydrostatic test on pressure piping is conducted, the test must be conducted in accordance with the Code of Construction

(h) When the leak test on pressure vessels or pressure piping is conducted:

(1) The test must be conducted with the breathing mixture normally used in service;

(2) The test must be conducted at maximum allowable working pressure; and

(3) The test pressure must be maintained for a minimum of 10 minutes to allow checking all joints, connection, and regions of high stress for leakage.

RECORDS

§ 197.480 Logbooks.

(a) The person-in-charge of a vessel or facility required by 46 U.S.C. 201 to have an official logbook shall maintain the logbook on form CG-706.

(b) The person-in-charge of a vessel or facility not required by 46 U.S.C. 201 to have an official logbook shall maintain, on board, a logbook for making the entries required by this subpart.

(c) The diving supervisor conducting commercial diving shall maintain a logbook for making the entries required by this subpart.

(d) The Diver Conducting a commercial diving operation shall maintain a log box as prescribed in § 197.406

§ 197.482 Logbook entries.

(a) The person-in-charge shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date: time, and location at the start and completion of dive operations.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Name of the diving supervisor.

(4) General nature of work performed.

(5) The person in charge will see that a written emergency contingency plan has been posted complete with-

(i) The dive site location

(ii) The nearest emergency facility:

(111) Location.

(iv) Radio channel and or

(v) Phone number

(vi) Name of the Person in Charge

(vii) Name of the Dive Supervisor

(viii) Owner

(ix) Address

(x) Phone

(xi) Contractor

(xii) Address

(xiii) Phone

(xiv) The United States Coast Guard (local district)

(xv) Location,

(xvi) Radio channel and or

(xvii) Phone number

(xviii) A description of the procedure to be implemented in the event of an emergency

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(b) The diving supervisor shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time: and location at the start and completion of dive operations.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Names of dive team members, diving supervisor (s) including diver certification numbers.

(4) General nature of work perfonned

(5) Repetitive dive designation or elapsed time since last hyperbaric exposure if less than 24 hours for each diver.

(6) Diving modes used

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

(8) Name of person-in-charge.

(9) For each dive the breathing gases and decompression table designations used.

(10) When decompression sickness or gas embolism is suspected or symptoms are evident-

(i) The name of the diver; and
(ii) A description and results of treatment

(11) For each fatality or any diving related injury or illness that requires professional medical assistance

(i) The date;
(ii) Time
(iii) Circumstances; and
(iv) Extent of any injury of illness.

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(c) The diving supervisor shall insure that the following is recorded in the logbook for each diving operation deviating from the requirements of this subpart;

(1) A description of the circumstances leading to the situation.
(2) The deviations made.
(3) The corrective action taken, if appropriate, to reduce the possibility of recurrence.

(d) the diving supervisor shall insure that a record of the following is maintained

(1) The date and results of each check of the medical kits.

(2) The date and results of each test of the air compressor.

(3) The date and results of each check of breathing mixtures.

(4) The date and results of each check of each breathing supply system.

(5) The date, equipment cleaned, general cleaning, procedure, and names of persons cleaning the diving equipment for oxygen service.

(6) The date and results of each test of the breathing supply hoses and system.

(7) The date and results of each inspection of the breathing gas supply system.

(8) The date and results of each test of depth gages and timekeeping devices.

(9) The date and results of each test and inspection of each PVHO.

(10) The date and results of each inspection of the diving equipment.

(11) The date and results of each test and inspection of pressure piping.

(12) The date and results of each test and inspection of volume tanks and cylinders

(e) The diving supervisor shall insure that a notation concerning the location of the infonnation required under paragraph (d) is made in the logbook.

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§ 197.484 Notice of casualty.

(a) In addition to the requirements of subpart 4.05 of this chapter and 33 CFR 146.01-20, the person-in-charge shall notify the Officer-in-Charge, Marine Inspection, as soon as possible after a diving casualty occurs, if the casualty involves any of the following:
(1) Loss of life.
(2) Diving -related injury to any person causing incapacitation for more than 48 hours.
(3) Diving-related injury to any person requiring hospitalization for more than 24 hours.
(b) The notice required by this section must contain the following:
(1) Name and official number (if applicable) of the vessel or facility.
(2) Name of the owner or agent of the vessel or facility.
(3) Name of the person-in-charge.
(4) Name of the diving supervisor.
(5) Description of the casualty including presumed cause.
(6) Nature and extent of the injury to persons.

§ 197.486 **Written** report of casualty

The person-in-charge of a vessel or facility for which a notice of casualty was made under § 197.484 shall submit a report to the Officer-in-Charge, marine Inspection, as soon as possible after the casualty occurs, as follows:
(a) On Form CG-2692, when the diving installations on a vessel.
(b) Using a written report, in narrative form, when the diving installation is on a facility. The written report must contain the information required by § 197.484.
(c) The report required by this section must be accompanied by a copy of the report required by § 197.410 (a)(9) when decompression sickness is involved.
(d) The report required by this section must include information relating to alcohol or drug involvement as required by §4.05-12 of this chapter.

$197.448 Retention of records after casualty
(a) The owner, agent, or person-in-charge of a vessel or facility for which a report of casualty is made under§ 197.484 shall retain all records onboard that are maintained on the vessel or facility and those records required by this subpart for 6 months after the report of casualty is made or until advised by the Officer-in-Charge, Marine Inspection, that records need not be retained on board.
(b) The records required by paragraph (a) of this section to be retained on board include, but are not limited to the following:
(1) All logbooks required by § 197.480.
(2) All reports required by
§ 197.402(a)(2)(ii), § 197.404(a)(4),
§ 197.4 1 O(a)(9).
(c) The owner, agent, person-in-charge, or diving supervisor shall, upon request, make the records described in this section available for examination by any Coast Guard official authorized to investigate the casualty.

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Part 3

Working Document

(Comparison, Current: USCG, ADC, and CDSO with comments)

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Existing 46CFR Chapter I

Subpart A- [Reserved]

Subpart B-Commercial Diving Operations

General

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197.202 Applicability.
197.203 Right of appeal.
197.204 Definitions.
197.205 Availability of standards
197.206 Substitutes for required equipment, materials, apparatus, arrangements, procedures, or tests.
197.208 Designation of person-in-charge.
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Equipment

197.300 Applicability.
197.3 10 Air compressor system.
197.3 12 Breathing supply hoses.
197.314 First aid and treatment equipment.
197.3 18 Gages and timekeeping devices.
197.320 Diving ladder and stage.
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197.328 PVHO-General.
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197.338 Compressed gas cylinders.
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Proposed modifications and or additions

Subpart A- [Reserved]

Subpart B-Commercial Diving Operations

General

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197.208 Designation of person-in-charge.
197.2 10 Designation of diving supervisor.

Equipment

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197.328 PVHO-General.
197.330 PVHO-Closed bells.
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197.336 Pressure piping.
197.338 Compressed gas cylinders.
197.340 Breathing gas supply
197.342 Buoyancy-changing devices.

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Comments

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
197.344 Inflatable tlotation dcviccs.	197.344 Inflatable flotation devices.	
197.346 Diver's equipment	197.346 Diver's equipment	
OPERATIONS	OPERATIONS	
197.400 Applicability.	197.400 Applicability.	
197.402 Responsibilities of the person-in-charge.	197.402 Responsibilities of the person-in-charge.	
197.404 Responsibilities of the diving supervisor.	197.404 Responsibilities of the diving supervisor.	
197.4 10 Dive procedures	197.4 10 Dive procedures	
197.420 Operations manual.	197.420 Operations manual.	
SPECIFIC DIVING MODE PRODEDURES	SPECIFIC DIVING MODE **PRODEDURES**	
197.430 SCUBA diving.	197.430 SCUBA diving.	
197.432 Surface-supplied air diving.	197.432 Surface-supplied air diving.	
197.434 Surface-supplied mixed gas diving.	197.434 Surface-supplied mixed gas diving.	
197.436 Liveboating	197.436 Liveboating	
PERIODIC TESTS AND INSPECITONS OF DIVING EQUIPMENT	PERIODIC TESTS AND INSPECITONS OF DIVING EQUIPMENT	
197.450 Breathing gas tests.	197.450 Breathing gas tests.	
197.452 Oxygen cleaning.	197.452 Oxygen cleaning.	
197.454 First aid and treatment equipment.	197.454 First aid and treatment equipment.	
197.456 Breathing supply hoses.	197.456 Breathing supply hoses.	
197.458 Gages and timekeeping devices.	197.458 Gages and timekeeping devices.	
197.460 Diving equipment	197.460 Diving equipment	
197.462 Pressure vessels and pressure piping.	197.462 Pressure vessels and pressure piping.	

Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
RECORDS	**RECORDS**	
197.480 Logbooks.	197.480 Logbooks.	
197.482 Logbook entries.	197.482 Logbook entries.	
197.484 Notice of casualty.	197.484 Notice of casualty.	
197.486 Written report of casualty.	197.486 Written report of casualty.	
197.488 Retention of records after casualty.	197.488 Retention of records after casualty.	
APPENDIX A TO PART 197-AIR NO-DECOMPRSSION LIMITS	APPENDIX A TO PART 197-AIR NO-DECOMPRSSION LIMITS	
AUTHORITY: 33 U.S.C. 1509; 43 U.S.C. 1333; 46 U.S.C. 3306, 3703, 6101; 49 CFR 1.46 SOURCE: CGD 76-009, 43 FR 53683, Nov. 16,1978, unless otherwise noted.	AUTHORITY: 33 U.S.C. 1509; 43 U.S.C. 1333; 46 U.S.C. 3306, 3703, 6101; 49 CFR 1.46 SOURCE: CGD 76-009, 43 FR 53683, *DATE of adoption*	

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Existing 46CFR Chapter 1

Subpart A-[Reserved]

Subpart B-Commercial Diving Operations

General

§ 197.200 Purpose of subpart.

The subpart prescribes rules for the design, construction, and use of equipment, and inspection, operation, and safety and health standards for commercial diving operations taking place from vessels and facilities under Coast Guard jurisdiction.

§ Applicability.

(a) This subpart applies to commercial diving operations taking place at any deepwater port or the safety zone thereof as defined in 33 CFR 150; from any artificial island, installation, or other device on the Outer Continental Shelf and the waters adjacent thereto as defined in 33 CFR 147 or otherwise related to activities on the Outer Continental Shelf; and from all vessels required to have a certificate of inspection issued by the Coast Guard including mobile offshore drilling units regardless of their geographic location, or from any vessel connected with a

Proposed modifications and or additions

Subpart A-[Reserved]

Subpart B-Commercial Diving Operations

General

§ 197.200 Purpose of subpart.

The subpart prescribes rules for the design, construction, and use of equipment, and inspection, operation, and safety and health standards for commercial diving operations taking place from vessels and facilities under Coast Guard jurisdiction.

§ Applicability.

(a) This subpart applies to commercial diving operations taking place at any deepwater port or the safety zone thereof as defined in 33 CFR 150; from any artificial island, installation, or other device on the Outer Continental Shelf and the waters adjacent thereto as defined in 33 CFR 147 or otherwise related to activities on the Outer Continental Shelf; and from all vessels required to have a certificate of inspection issued by the Coast Guard including mobile offshore drilling units regardless of their geographic location, or from any vessel connected with a

Comments

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deep water port or within the deep water port safety zone, or from any vessel engaged in activities related to the Outer Continental Shelf; except that this subpart does not apply to any diving operation-

(1) Performed solely for marine scientific research and development purposes by educational institutions;

(2) Performed solely for search and development for the advancement of diving equipment and technology; or

(3) Performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.

(b) Diving operations may deviate from the requirements of this subpart to the extent necessary to prevent or minimize a situation, which is likely to cause death, injury, or major environmental damage. The circumstances leading to the situation, the deviations made, and the corrective action taken, if appropriate, to reduce the possibility of recurrence shall be recorded by the diving supervisor in the logbook as required by § 197.482(c).

§ 197.203 Right of Appeal

Any person directly affected by a decision or action taken under this subchapter, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

deep water port or within the deep water port safety zone, or from any vessel engaged in activities related to the Outer Continental Shelf; except that this subpart does not apply to any diving operation-

(1) Performed solely for marine scientific research and development purposes by educational institutions;

(2) Performed solely for research and development for the advancement of diving equipment and technology; or

(3) Performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.

(b) Diving operations may deviate from the requirements of this subpart to the extent necessary to prevent or minimize a situation, which is likely to cause death, injury, or major environmental damage. The circumstances leading to the situation, the deviations made, and the corrective action taken, if appropriate, to reduce the possibility of recurrence shall be recorded by the diving supervisor in the logbook as required by § 197.482(c).

§ 197.203 Right of Appeal

Any person directly affected by a decision or action taken under this subchapter, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

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Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
[CGD 88-033,54 FR 50382, Dec. 6,1989]	[CGD 88-033,54 FR 50382, Revised date]	
§ 197.204 Definitions	§ 197.204 Definitions	
As used in this subpart:	As used in this subpart:	
	~~*ADC means Association of Diving Contractors*~~	There should be no reference to industry organization rules that are not equal to or of greater significance then these regulations. or that have the ability to be modified without PUBLIC review.
ACFM means actual cubic feet per minute.	*ACFM* means actual cubic feet per minute.	
ANSI Code1 means the B3 1.1 American National Standards Institute "Code for Pressure Piping, Power Piping."	*ANSI Code1* means the B3 1.1 American National Standards Institute "Code for Pressure Piping, Power Piping."	
ASME Code means the American Society of Mechanical Engineers "Boiler and Pressure Vessel Code."	*ASME Code* means the American Society of Mechanical Engineers "Boiler and Pressure Vessel Code."	
ASME PVHO-1 means the ANSI/ASME "Standard safety Standard For Pressure Vessels for Human Occupancy."	*ASME PVHO-1* means the ANSI/ASME "Standard safety Standard for Pressure Vessels for Human Occupancy."	
ATA means a measure of pressure expressed in terms of atmosphere absolute (includes barometric pressure).	*ATA* means a measure of pressure expressed in terms of atmosphere absolute (includes barometric pressure).	
	Air Diving means any diving mode in which the diver's breathing media is compressed air.	
	~~*Air Gap*—Distance from the surface of the water to the deck of a vessel or fixed platform.~~	

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Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
	Air Gap means the distance from the surface of the water to the hull of a iack-up, semi-submersible, or fixed platform, while it is elevated above the water.	
Bell means a compartment either at ambient pressure (open bell) or pressurized (closed bell) that allows the diver to be transported to and from the underwater work site, allows the diver access to the surrounding environment, and is capable of being used as a refuge during diving operations.	~~*Bell* means a compartment either at ambient pressure (open bell) or pressurized (closed bell) that allows the diver to be transported to and from the underwater work site, allows the diver access to the surrounding environment, and is capable of being used as a refuge during diving operations.~~	This definition differs from the oil industry standard, and is, therefore, misleading. SEE "*FREEBOARD.*" A more accurate definition of "air gap."
	Open Hell- means a suspended platform, incorporating an ambient bubble, constructed to carry one or more divers, and used for transporting the diver(s) to, and from, the underwater work site from the dive station allows the diver(s) access to the surrounding environment, and is capable of being used as a refuge during diving operations.	Delete this reference to the general term "Bell," because it may be misleading when used interchangeably for "Open Bell" and "Closed Bell." Recommend the tenns be defined separately.
	Closed Bell- means a suspended PVHO, used for transporting the divers to, and from, the underwater work site from the dive station while maintaining internal. or external, working pressure, allows the diver(s) access to the surrounding environment, and is capable of being used as a refuge during diving operations.	

Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
Bottom time means the total elapsed time the diver leaves the surface in descent to the time to the next whole minute that the diver begins ascent.	*Bottom time* means the total elapsed time the diver leaves the surface in descent to the time to the next whole minute that the diver begins ascent.	
Breathing gas breathing mixture means the mixed-gas, oxygen, or air as appropriate supplied to the diver for breathing.	*Breathing gas breathing mixture* means the mixed-gas, oxygen, or air as appropriate supplied to the diver for breathing.	
Bursting pressure means the pressure at which a pressure containment device would fail structurally.	*Bursting pressure* means the pressure at which a pressure containment device would fail structurally.	
	CGA means Compressed Gas Association	
Commercial diver means a diver engaged in underwater work for hire excluding sport and recreational diving and the instruction thereof.	*Commercial diver* means a properly trained, certified, and competent diver engaged in underwater work for hire ~~excluding sport and recreational diving and the instruction thereof~~.	Definition of "Commercial Diver" should include reference to required training and certification, and, perhaps, reference the training standard (e.g. ANSI). The phrase "excluding sport and recreational diving and the instruction thereof' is redundant.
Commercial diving operation means all activities in support of a commercial diver.	*Commercial diving operation* means all activities in support of a commercial diver.	
Cylinder means a pressure vessel for the storage of gases under pressure.	*Cylinder* means a pressure vessel for the storage of gases under pressure.	
	DCS [See "Decompression Sickness."]	

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	Deck Decompression Chamber means a PVHO located at the surface, on the deck of the dive support vessel, or the dive location, specially equipped to re-compress, decompress, or to treat divers with decompression-related illnesses.	"Deck decompression chamber," for clarification, is the industry standard terminology.
	Decompression Buoy means a floating device used to support the diver during in-water decompression.	
Decompression chamber means a pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system especially equipped to recompress, de-compress, and treat divers.	*Decompression chamber* means a pressure vessel for human occupancy such as a ~~surface~~ deck decompression chamber, closed bell, or deep diving system especially equipped to recompress, de-compress, and treat divers.	
Decompression sickness means a condition caused by the formation of gas or gas bubbles in the blood or body tissue as a result of pressure reduction.	*Decompression sickness* means a condition caused by the formation of gas or gas bubbles in the blood or body tissue as a result of pressure reduction.	
Decompression table means a profile or set of profiles of ascent rates and breathing mixtures designed to reduce the pressure on a diver safely to atmospheric pressure after the diver has been exposed to a specific depth and bottom time.	*Decompression table* means a profile or set of profiles of ascent rates and breathing mixtures designed to reduce the pressure on a diver safely to atmospheric pressure after the diver has been exposed to a specific depth and bottom time.	

Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
Depth means the maximum pressure expressed in feet of seawater attained by a diver and is used to express the depth of a dive.	*Depth* means the maximum pressure expressed in feet of seawater attained by a diver and is used to express the depth of a dive.	
Dive location means that portion of a vessel or facility from which a diving operation is conducted.	*Dive location* means that portion of a vessel or facility from which a diving operation is conducted.	
Dive team means the divers and diver support personnel involved in a diving operation, including the diving supervisor.	*Dive team* means the divers and diver support personnel involved in a diving operation, including the diving supervisor.	
Diver means a person working beneath the surface, exposed to hyperbaric conditions, and using underwater breathing apparatus.	*Diver* means a person properly trained and certified and competent to work beneath the surface, exposed to hyperbaric conditions, and using underwater breathing apparatus.	
Diver-carried reserve breathing gas means a supply of air or mixed-gas, as appropriate, carried by the diver in addition to the primary or secondary breathing gas supplied to the diver.	*Diver-carried reserve breathing gas* means a supply of air or mixed-gas, as appropriate, carried by the diver in addition to the primary or secondary breathing gas supplied to the diver.	
	Diver Tender means a properlv trained, certified, and competent person who has completed the tender phase of their training/apprenticeship, but who has not vet acquired sufficient experience in the water to work beyond a specified depth.	The classification of *"Diver Tender"* must be defined, with reference to training and certification.

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
Diving installation means all of the equipment used in support of a commercial diving operation.	*Diving installation* means all of the equipment used in support of a commercial diving operation.	
Diving mode means a type of diving requiring SCUBA, surface-supplied air, or surface-supplied mixed-gas equipment, with related procedures and techniques.	*Diving mode* means the method of life-support provided to the diver ~~means a type of diving requiring~~ (e.g. SCUBA, surface-supplied air, ~~or~~ surface-supplied mixed-gas ~~equipment~~, or saturation), with related procedures and techniques.	
Diving stage means a suspended platform constructed to carry one or more divers and used for putting divers into the water and bringing them to the surface when in-water decompression or a heavy-weight diving outfit is used.	*Diving stage* means a suspended platform constructed to carry one or more divers and used for putting divers into the water and bringing them to the surface when in-water decompression or a heavy-weight diving outfit is used.	
Diving supervisor means the person having complete responsibility for the safety of a commercial diving operation including the responsibility for the safety and health of all diving personnel in accordance with this subpart.	*Diving supervisor* means the properly trained, certified, and competent person having complete responsibility for the safety of a commercial diving operation including the responsibility for the safety and health of all diving personnel in accordance with this subpart.	
	Diving Superintendent means the properly trained, certified, and competent person who, when the extent of the diving operation exceeds the capability of one *Diving Supervisor*, manages the *Supervisors* and the overall diving operation.	Consideration must be given to the licensing of the Diving Supervisor for the specific types of diving activities Rivers, Lakes, Saturation, Penetration, etc.

Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
	Diving Support Vessel (DSV) means a vessel (including Dynamically Positioned, anchored, or live-boating operations) whose primary purpose is to provide support for a commercial diving operation.	
Facility means a deepwater port, or an artificial island, installation, or other device on the Outer Continental Shelf subject to Coast Guard jurisdiction.	*Facility* means a deepwater port, or an artificial island, installation, or other device on the Outer Continental Shelf subject to Coast Guard jurisdiction.	
	Freeboard means the distance from the surface of the water to the deck of a floating vessel.	
Fsw means feet of seawater (or equivalent static pressure head).	*Fsw* means feet of seawater (or equivalent static pressure head).	
Gus *embolism* means a condition caused by expanding gases, which have been taken into the blood stream or other tissues during ascent or decompression.	*Gas embolism* means a condition caused by expanding gases, which have been taken into the blood stream or other tissues during ascent or decompression.	
Heavy-weight diving outfit means diver-worn surface-supplied deep-sea dress.	*Heavy-weight diving outfit* means diver-worn surface-supplied deep-sea dress.	
	High Pressure Compressor means a compressor with a discharge pressure of 500 psig or greater.	
Hyperbaric conditions means pressure conditions in excess of surface atmospheric pressure.	*Hyperbaric conditions* means pressure conditions in excess of surface atmospheric pressure.	

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~~*Industry Standards—Association of Diving Contractors Consensus Standards.*~~

Injurious corrosion means an advanced state of corrosion which may impair the structural integrity or safe operation of the equipment.	*Injurious corrosion* means an advanced state of corrosion which may impair the structural integrity or safe operation of the equipment.	This definition of "*Industry Standards*" is misleading, as it suggests that the ADC Consensus Standard is "the" standard of the industry. It is "an" industry standard, but this is a generic term that should not be misused.
	Life Support Technician means the properly trained, certified, and competent person responsible for management of the diver's life-support systems and decompression, especially in a saturation diving mode.	
Liveboating means the support of a surfaced-supplied diver from a vessel underway.	*Live boating* means the support of a surfaced-supplied diver from a vessel underway.	
	Low Pressure Compressor means a compressor with a discharge pressure, which is less than 500psig.	
Maximum working pressure means the maximum pressure to which a pressure containment device can be exposed under operating conditions (usually the pressure setting of the pressure relief device).	*Maximum working pressure* means the maximum pressure to which a pressure containment device can be exposed under operating conditions (usually the pressure setting of the pressure relief device).	

Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
	Mixed-Gas Diving means any diving mode in which the diver's breathing media is a mixture of gases other than air (e.g. helium/oxygen, nitrogen/oxygen, etc.)	
No-decompression limits means the air depth and bottom time limits of appendix A.	*No-decompression limits* means the air depth and bottom time limits of appendix A.	
	*Physically Confining space means a*ny space which would restrict the diver's ability to rotate himself head to toe, 180 degrees in any plane and/or when the diver has no direct access to the surface, ~~or~~ bell, or stage.	
Pressure vessel means a container capable of with standing an internal maximum working pressure over 15 psig.	*Pressure* vessel means a container capable of with standing an internal maximum working pressure over 15 psig.	
Psi(g) means pounds per square inch (gage).	*Psi(g)* means pounds per square inch (gage).	
PVHO means pressure vessel for human occupancy but does not include pressure vessels for human occupancy that may be subjected to external pressures in excess of 15 psig or less (i.e., submersibles, or one-atmosphere observation bells).	*PVHO* means pressure vessel for human occupancy but does not include pressure vessels for human occupancy that may be subjected to external pressures in excess of 15 psig or less (i.e., submersibles, or one-atmosphere observation bells).	
Saturation diving means saturating a diver's tissues with the inert gas in the breathing mixture to allow an extension of bottom time without additional decompression.	*Saturation diving* means saturating a diver's tissues with the inert gas in the breathing mixture to allow an extension of bottom time without additional decompression.	

Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
	Saturation Technician means the properly trained, certified, and competent person responsible for the maintenance of saturation life support systems.	
SCUBA diving means a diving mode in which the diver is supplied with a compressed breathing mixture from diver carried equipment.	*SCUBA diving* means a diving mode in which the diver is supplied with a compressed breathing mixture from diver carried equipment.	Consideration must be given to omitting any and all reference to SCUBA as an acceptable means of conducting work in the commercial arena.
Standby diver means a diver at the dive location available to assist a diver in the water.	*Standby diver* means a suitably dressed and adequately briefed diver at the dive station, ready to assist the diver in the water.	
	Surface-Supplied Diving means a diving mode in which the diver is tended from, and tethered by his umbilical directly to, the dive station.	
Surface-supplied air diving means a diving mode in which the diver is supplied from the dive location or bell with compressed breathing air if supplied for treatment.	~~*Surface-supplied air diving* means a diving mode in which the diver is supplied from the dive location or bell with compressed breathing air if supplied for treatment.~~	[SEE "AIR DIVING"]
Surfaced-supplied mixed-gas diving means a diving mode in which the diver is supplied from the dive location or bell with a compressed breathing mixture other than air.	~~*Surfaced-supplied mixed-gas diving* means a diving mode in which the diver is supplied from the dive location or bell with a compressed breathing mixture other than air~~	[SEE "MIXED-GAS DIVING"]

	Tender means a properly trained, certified, and competent person responsible for directly supporting the diver during all surface phases of the dive, including, but not limited to, dressing and undressing the diver, management of the diver's umbilical, and management of the diver's decompression.	
	Timekeeper means a person responsible for managing the decompression-related details of the dive, including Bottom Time, depth, decompression, and diving log maintenance.	
Timekeeping device means a device for measuring the time of a dive in minutes.	*Timekeeping device* means a device for measuring the time of a dive in minutes.	
Treatment table means a depth, time, and breathing gas profile designed to treat a diver for decompression sickness.	*Treatment table* means a depth, time, and breathing gas profile designed to treat a diver for decompression sickness.	
Umbilical means the hose bundle between a dive location and a diver or bell, or between a diver and a bell, that supplies the diver or bell with a life-line, breathing gas, communications, power, and heat as appropriate to the diving mode or conditions.	*Umbilical* means the hose bundle between a dive location and a diver or bell, or between a diver and a bell, that supplies the diver or bell with a life-line, breathing gas, communications, power, and heat as appropriate to the diving mode or conditions.	

Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
Vessel means any waterborne craft including mobile offshore drilling units required to have a Certificate of Inspection issued by the Coast Guard or any waterborne craft connected with a deepwater port or within the deepwater port safety zone, or any waterborne craft engaged in activities related to the Outer Continental Shelf.	*Vessel* means any waterborne craft including mobile offshore drilling units required to have a Certificate of Inspection issued by the Coast Guard or any waterborne craft connected with a deepwater port or within the deepwater port safety zone, or any waterborne craft engaged in activities related to the Outer Continental Shelf.	
Volume tank means a pressure vessel connected to the outlet of a compressor and used as an air reservoir.	*Volume tank* means a pressure vessel connected to the outlet of a compressor and used as an air reservoir.	
Working pressure means the pressure to which a pressure containment device is exposed at any particular instant during normal operating conditions.	*Working pressure* means the pressure to which a pressure containment device is exposed at any particular instant during normal operating conditions.	

Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
§ 197.205 Availability of standards	§ 197.205 Availability of standards	
(a) Several standards have been incorporated by reference in this subchapter. The incorporation by reference has been approved by the Director of the FEDERAL REGSITER under the provisions of 1 CFR part 5 1.	(a) Several standards have been incorporated by reference in this subchapter. The incorporation by reference has been approved by the Director of the FEDERAL REGISTER under the provisions of 1 CFR Part 5 1.	
(b) The standards are available from the appropriate organizations whose addresses are listed below:	(b) The standards re available from the appropriate organizations whose addresses are listed below:	
(1) American National Standards Institute 1430 Broadway New York, NY 10018	(1) American National Standards Institute 1430 Broadway New York, NY 100 18	
(2) American Society of Mechanical Engineers, United Engineering Center 345 East 47th Street New York, NY 100 17	(2) American Society of Mechanical Engineers United Engineering Center 345 east 47th Street New York, NY 100 17	
	~~(3) Association OF Diving Contractors 2611 FM 1960 West, Suite 204 Houston, Texas 77068~~	

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
§ 197.206 Substitutes for required equipment, materials, apparatus, arrangements, procedures, or tests.	§ 197.206 Substitutes for required equipment, materials, apparatus, arrangements, procedures, or tests.	
(a) The Coast Guard may accept substitutes for equipment, materials, apparatus, arrangements, procedures, or tests required in this subpart if the substitute provides an equivalent level of safety.	(a) The Coast Guard may accept substitutes for equipment, materials, apparatus, arrangements, procedures, or tests required in this subpart if the substitute provides an equivalent level of safety.	
(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment , material, apparatus, arrangement, procedure, or test is unreasonable, or impracticable, the Commandant may permit the use of alternate equipment, material, apparatus, arrangement, procedure, or test to such an extent and upon such condition as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subpart.	(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment , material, apparatus, arrangement, procedure, or test is unreasonable, or impracticable, the Commandant may permit the use of alternate equipment, material, apparatus, arrangement, procedure, or test to such an extent and upon such condition as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subpart.	
	(c) Such deviation requires prior written approval of the Commandant, or his designee.	

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Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
$197.208 Designation of person-in-charge.	$197.208 Designation of person-in-charge.	
(a) The owner or agent of a vessel or facility without a designated master shall designate, in writing, an individual to be the person-in-charge of the vessel or facility.	(a) The owner or agent of a vessel or facility without a designated Master shall designate, in writing, an individual to be the person-in-charge of the vessel or facility.	
(b) Where a master is designated, the master is the person-in-charge.	(b) Where a master is designated, the master is the person-in-charge.	[MISSING FROM THIS CLAUSE IS ANY REQUIREMENT OR ASSURANCE THAT THE P.I.C. IS QUALIFIED OR CERTIFIED TO FULFILL THIS RESPONSIBILITY. THEY ARE COMMONLY UNFAMILIAR WITH DIVING OPERATIONS AND THE REQUIREMENTS OF THIS SECTION.] ALSO, WHO "DESIGNATES" THE P.I.C.?
$197.210 Destination of diving supervisor The name if the diving supervisor for each commercial diving operation shall be – (a) Designated in writing; and (b) Given to the person-in-charge prior to the commencement of any commercial diving operation.	$197.210 Designation of diving supervisor (a) Prior to the commencement, the name of the diving Supervisor for each commercial diving operation shall be – (1) Designated in writing by the diving contractor; ~~and~~ (2) A copy of the written designation shall be- (i) Given to the person-in-charge prior to the commencement of any commercial diving operation.; and (ii) Delivered to the Commandant, or his designee.	THERE IS A CONFLICT BETWEEN THE ROLES AND RESPONSIBILITIES OF THE P.I.C IN THE U.S.C.G. REGULATIONS VERSUS THE O.S.H.A. REGULATIONS. It must be clarified that the contractor designates the Diving Supervisor.

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(b) Only one Supervisor shall be designated to supervise a diving operation at any one time;	Or, entered into the Supervisor's log, prior to the job.
(c) No person shall be designated, nor shall act, as Supervisor unless he or she is properly trained, certified, and competent in respect of the diving operation which he or she is designated to supervise; and	[Further clarification of the Supervisor's responsibility.]
(d) During the Supervisor's dive, another person satisfying the requirements of this section shall be designated, in writing by the diving contractor, to supervise in the Supervisor's absence.	

Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
Equipment	**Equipment**	
$197.300 Applicability.	§ 197.300 Applicability.	
a) Each diving installation used on each vessel or facility subject to this subpart must meet the requirements of this subpart.	(a) Each diving installation used on each vessel or facility subject to this subpart must meet the requirements of this subpart.	
b) In addition to the requirements of this subpart, equipment, which is permanently installed on vessels and is part of the diving installation must meet Subchapters F and J of this chapter.	(b) In addition to the requirements of this subpart, equipment which is permanently installed on vessels and is part of the diving installation must meet Subchapters F and J of this chapter.	
c) All repairs and modifications to pressure vessels used for commercial diving operations must be made in accordance with the requirements of section VIII, division 1 or division 2 of the ASME Code, ASME PVHO-1, part 54 of this chapter, or 49 CFR 173.34, as applicable.	(c) All repairs and modifications to pressure vessels used for commercial diving operations must be made in accordance with the requirements of section VIII, division 1 or division 2 of the ASME Code, ASME PVHO-1, part 54 of this chapter, or 49 CFR 173.34 as applicable.	
d) All repairs and modifications to pressure piping used for commercial diving operations must be made in accordance with the requirements of the ANSI Code or part 56 of this chapter, as applicable.	(d) All repairs and modifications to pressure piping used for commercial diving operations must be made in accordance with the requirements of the ANSI Code or Part 56 of this chapter, as applicable.	

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(e) An equipment maintenance log shall be established and maintained.

(1) Each piece of ~~All~~ diving equipment shall have a unique identity traceable to ~~the~~ it's own equipment maintenance log. Equipment maintenance logs are

(i) to accompany the associated equipment at all times;
(ii) to be maintained for the working life of the equipment; and
(iii) to be retained for a period of five years thereafter.

(2) Entries made in the equipment log shall describe the nature of the work performed, and shall include the date of modification, repair or test, and the name of the individual performing the repair work or test. ~~and the identity of the particular piece of equipment involved.~~

3) Individual persons performing maintenance repair test or modification to diving equipment shall both print and sign his or her name in the equipment log.

197.300(e) (I)
The equipment maintenance log must fulfill these requirements, or it will be unenforceable.

197.300(e)(2)
Deleted wording is redundant if the log is associated with a specific piece of equipment.

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
§ 197.310 Air Compressor system.	§ 197.310 Air Compressor system.	
A compressor used to supply breathing air to a diver must have	Low pressure compressor systems used to supply breathing air to a diver must have	
(a) A volume tank that is	(a) A volume tank that is	
1. built and stamped in accordance with section VIII, division 1 of the ASME Code with-	1) built and stamped in accordance with section VIII, division 1 of the ASME Code with-	
(i) a check valve on the inlet side;	(i) a check valve on the inlet side;	
(ii) a pressure gage;	(ii) a pressure gage;	
(iii) a relief valve;-	(iii)a relief valve; and	
(iv) and a drain valve;	(iv)a drain valve; and	
2. Tested after every repair, modification, or alteration to the pressure boundaries as required by § 197.462;	2) Tested after every repair, modification, or alteration to the pressure boundaries as required by § 197.462;	
(b) Intakes that are located away from areas containing exhaust fumes of internal combustion engines or other hazardous contaminants;	(b) Intakes that are located away from areas containing exhaust fumes of internal combustion engines or other hazardous contaminants;	
(c) An efficient filtration system; And	(c) An efficient filtration system; and	
(d) Slow-opening shut-off valves when the maximum allowable working pressure of the system exceeds 500 psig.	(d) Slow-opening shut-off valves when the maximum allowable working pressure of the system exceeds 500 psig.	
(e)		
§ 197.312 Breathing supply hoses.	§ 197.312 Breathing supply hoses.	
a) Each breathing supply hose must-	(a) Each breathing supply hose must-	
1) have a maximum working pressure that is equal to or exceeds –	1) have a maximum working pressure that is equal to or exceeds –	
(i) the maximum working pressure of the section of the breathing supply system in which used; and	(i) the maximum working pressure of the section of the breathing supply system in which used; and	
(ii) the pressure equivalent of the	(ii) the pressure equivalent of the	

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
maximum depth of the dive relative to the supply source plus 100 psig;	maximum depth of the dive relative to the supply source plus 150 psig;	
2) Have a bursting pressure of four times its maximum working pressure;	2) Have a bursting pressure of four times its maximum working pressure;	
3) have connectors that- (i) Are made of corrosion-resistant material; (ii) Are resistant to accidental disengagement and (iii) Have a maximum working pressure that is at least equal to the maximum working pressure of the hose to which they are attached; and	3) Have connectors that- (i) Are made of corrosion-resistant material; (ii) Are resistant to accidental disengagement and (iii) Have a maximum working pressure that is at least equal to the maximum working pressure of the hose to which they are attached; and	
4) Resist kinking by- (i) Being made of kink-resistant materials; or (ii) Having exterior support.	4) Resist kinking by- (i) Being made of kink-resistant materials; or (ii) Having exterior support.	
b) Each umbilical must –	(b) Each umbilical must –	
(1) Meet the requirements of paragraph (a) of this section; and	(1) Meet the requirements of paragraph (a) of this section; and	
(2) Be marked from the diver or open bell end in IO-foot intervals to 100 feet and in 50-foot intervals thereafter.	(2) Be marked from the diver or open bell end in IO-foot intervals to 100 feet and in 50-foot intervals <u>thereafter to an industry recognized standard.</u>	197.3 12 (4)(b)(2) The "industry recognized standard" for hose markings is the U.S. Navy, although, since it is not specified, individuals keep re-inventing "the standard."

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
$197.314 First **aid** and treatment equipment.	197.314 First aid and treatment equipment.	
(a) Each dive location must have-	(a) Each dive location must have-	197.3 14(a)(2) The ADC wording, "an appropriate first aid handbook" is too vague, and open to interpretation.
1. A medical kit approved by a physician that consists of – (i) Basic first aid supplies; and (ii) any additional supplies necessary to treat minor trauma and illnesses resulting from hyperbaric exposure;	1. A medical kit approved by a physician that consists of – (i) Basic first aid supplies; and (ii) any additional supplies necessary to treat minor trauma and illnesses resulting from hyperbaric exposure;	
2. A copy of and American Red Cross Standard First Aid handbook;	2. A copy of and American Red Cross Standard First Aid handbook, or equivalent approved by a physician; and	
3. A bag-type manual resuscitator with transparent mask and tubing; and	3. A capability to remove an injured diver from the water.	
4. A capability to remove an injured diver from the water.		
(b) Each diving installation must have a two-way communications system to obtain emergency assistance except when the vessel or facility ship to-shore, two-way communications system is readily available.	(b) Each diving installation must have a readily available two-way communications system to obtain emergency assistance ~~except when the vessel or facility ship to-shore, two-way communications system is readily available~~.	197.3 14(b) Simplification/clarification.
(c) Each dive location supporting mixed-gas dives, dives deeper than 130 fsw, or dives outside the no-decompression limits must meet the requirements of paragraph (a) of this section and have-	(c) Each dive location supporting mixed-gas dives, dives deeper than 80 fsw, or dives outside the no-decompression limits must meet the requirements of paragraph (a) of this section and have-	

1) A decompression chamber;

2) Decompression and treatment tables;

3) A supply of breathing gases sufficient to treat for decompression sickness;

(i) The medical kit required by paragraph (a)(1) of this section that is -capable of being carried into the decompression chamber and

(ii) suitable for use under hyperbaric conditions; and

4) A capability to assist an injured diver into the decompression chamber.

§ 197.318 Gages and timekeeping devices.

(a) A gage indicating diver depth must be at each dive location for surface-supplied dives.

1) A decompression chamber;

2) Decompression and treatment tables;

3) A supply of breathing gases sufficient to treat for decompression sickness;

(i) The medical kit required by paragraph (a)(1) of this section that is -capable of being carried into the decompression chamber and

(ii) suitable for use under hyperbaric conditions; and

4) A capability to assist an injured diver into, and out of, the decompression chamber.

§ 197.318 Gages and timekeeping devices.

(a) A gage indicating diver depth must be at each dive location for surface-supplied dives;

(1) It shall be of appropriate range and graduation-to indicate a diver's depth;

(2) It shall be graduated in units, which are consistent with decompression table to be utilized.

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(b) A timekeeping device must be at each dive location.	(b) A timekeeping device must be at each dive location; and (1) All timekeeping devices must be synchronized with a referenced timekeeping device on the dive location.	
§ 197.320 Diving ladder and stage.	§ 197.320 Diving ladder and stage.	
(a)Each diving ladder must (1) be capable of supporting the weight of at least two divers; (2) extend 3 feet below the water surface; (3) Be firmly in place (4) Be available at the dive location for the diver to enter or exit the water unless a diving stage or bell is provided; and (5) Be- (i) Made of corrosion-resistant material; (ii) or protected against and maintained free from injurious corrosion.	(a)Each diving ladder must (1) Be capable of supporting the weight of at least two divers; (2) Be of sufficient length to allow the diver to enter and exit the water safely. (3) Be firmly in place (4) Be available at the dive location for the diver to enter or exit the water unless a diving stage or bell is provided; and (5) Be- (i) Made of corrosion-resistant material; (ii) or protected against and maintained free from injurious corrosion.	Allows safer, more effective transition between personnel operating the systems.
(b)Each diving stage must- (1) Be capable of supporting the weight of at least two divers; (2) Have an open-grating platform; (3) Be available for a diver to enter or exit the water from the dive location and for in-water decompression if the diver is- (i) Wearing a heavy-weight diving out fit; or (ii) Diving out side the no-decompression limits, except when a bell is provided; and	(b)Each diving stage must- (1) Be capable of supporting the weight of at least two divers; (2) Have an open-grating platform; (3) Be available for a diver to enter or exit the water from the dive location, and for in-water decompression if the diver is- (i) Wearing a heavy-weight diving out fit; or (ii) Diving outside the no-decompression limits, except when a bell is provided; ~~and~~	197.320(b)(3)(ii) This should remain unchanged. If a diver is working outside the no-decompression limits, or has the potential of doing so, there exists the possibility that DCS, or a hyperbaric injury, could occur, requiring, therefore, the capability "to get an injured diver out of the water."

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~~Diving on a decompression table requiring in-water decompression~~

(4) Be-
- (i) Made of corrosion-resistant material; or
- (ii) Protected against and maintained free from injurious corrosion.

§197.322 Surface-supplied helmets and masks.

(a) Each surface-supplied helmet or mask must have-

(1) A non return valve at the attachment point between helmet or mask and umbilical that closes readily and positively;

(2) An exhaust valve; and

(3) A two-way voice communication system between the diver and the dive location or bell.

(b) Each surface-supplied air helmet or mask must-

(1)Ventilate at least 4.5 ACFM at any depth at which it is operated; or

(4) Be-
- (i) Made of corrosion-resistant material; or
- (ii) Protected against and maintained free from injurious corrosion.

§197.322 Surface-supplied helmets and masks.

(a) Each surface-supplied helmet or mask must have-

(1) A non-return valve at the attachment point between helmet, or mask, and umbilical that closes readily and positively;

(2) An exhaust valve; and

(3) A two-way voice communication system between the diver and the dive location or bell.

(b) Each surface-supplied air helmet or mask must-

(1)Ventilate at least 4.5 ACFM at any depth at which it is operated; or

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(2) Be able to maintain the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.	(2) Be able to maintain the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.	
§ 197.324 Diver's safety harness	§ 197.324 Diver's safety harness	
Each safety harness used in surface supplied diving must have-	Each safety harness used in surface supplied diving must have-	
(a) A positive buckling device; and	(a) A positive buckling device; and	
(b) An attachment point for the umbilical life line that-	(b) An attachment point for the umbilical life line that-	
(1) Distributes the pulling force of the umbilical over the diver's body; and	(1) Distributes the pulling force of the umbilical over the diver's body; and	
(2) Prevents strain on the mask or helmet.	(2) Prevents strain on the mask or helmet.	
$197.326 Oxygen safety.	$197.326 Oxygen safety.	
(a) Equipment used with oxygen or oxygen mixtures greater that 40 percent by volume must be designed for such use.	(a) Equipment used exclusively for oxygen ~~mixtures~~ must be designed for such use.	
(b) Oxygen systems with pressures greater than 125 psig must have slow-opening shut-off valves except pressure boundary shut-off valves may be ball valves.	(b) Oxygen systems with pressures greater than 125 psig must have slow-opening shut-off valves except pressure boundary shut-off valves may be ball valves.	

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
§197.328 PVHO- General	**197.328 PVHO-GENERAL.**	
(a) Each PVHO, contracted for or purchased after February l 1979, must be built and stamped in accordance with ASME PVHO- 1.	(a) Each ~~U.S. built~~ PVHO~~, contracted for or purchased after Februar; ,1979,~~ must be built and stamped in accordance with ASME PVHO-1, or equivalent international standard as approved by the Commandant, or his designee.	This wording more clearly allows the utilization of equipment certified to recognize international standards.
(b) Each PVHO, contracted for or constructed before February 1,1979, and not Coast Guard approved, must be submitted to the Coast Guard for approval prior to February 1,1984.	(b) Each PVHO not Coast Guard approved must be submitted to the Coast Guard for approval prior to being placed in service.	Allows the diving contractor/equipment owner an economic avenue by which they can bring their equipment into compliance with this regulation.
(c) To be approved under paragraph (b) a PVHO must be	(c) To be approved under paragraph (b), a PVHO must be-	
(1) Construction in accordance with part 54 of this chapter; or-	(1) Constructed in accordance with Part 54 of this chapter; or-	
(2) Be built in accordance with section VIII, division l or division 2 of the ASME Code; and	(2) Be built in accordance with section VIII, division 1 or division 2 of the ASME Code; and	
(i) Have the plans approved in accordance with § 54.1 O-l 8 of this chapter;	(i) Have plans approved in accordance with 54.01-18 of this Chapter	
(ii) Pass the radiographic and other survey tests of welded joints required by section VIII, division 1 or division 2 of the ASME Code; and-	(ii) Pass the radiographic and other survey tests of welded joints required by section VIII, division 1 or division 2 of the ASME Code; and-	

Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
(iii) Pass-	(iii) Pass-	
(A) The hydrostatic test described in §54.1O-l 0 of this chapter; or	(A) The hydrostatic test described in $54. 10- 10 of this chapter; or	
(B) The pneumatic test described in $54.1 O-l 5 of this chapter and such additional tests as the Officer-in-Charge, Marine Inspection (OCMI) may require.	(B) The pneumatic test described in $54. 10- 15 of this chapter and such additional tests as the Officer-in-Charge, Marine Inspection (OCMI) may require.	
	~~(d) PVHO's built to other recognized standards shall be sesigned, fabricated, inspected, tested, and certified in compliance with a recognized Classing Society with rules for diving systems and be maintained in class.~~	Unnecessary wording, due to the wording proposed in 197.328(a).
(c) Each PVHO must-	(d) Each PVHO must-	
(1) Have a shut-off valve located within 1 foot of the pressure boundary; on all piping penetrating the pressure boundary;	(1) ~~Have a shut-off valve located within 1 foot of the pressure boundary on all piping penetrating the pressure boundary~~; Have double hull integrity, consisting of –	These measures achieve an industry-recognized need of double hull integrity.
	(i) A valve, with a maximum working pressure (MWP) of 1.5 times the MWP of the system on which they are installed, on each side of the hull, within one foot of the penetration;	

(ii) A **plug,** with a maximum working pressure (MWP) of 1.5 times the MWP of the system on which they are installed, on each side of the penetration; or

(iii)A combination of(i) and (ii).

(2) Have a check valve located within 1 foot of the pressure boundary on all piping exclusively carrying fluids into the PVHO;

(2) Have a check valve located within 1 foot of the pressure boundary on all piping exclusively carrying fluids into the PVHO;

(3) Have the pressure relief device required by ASME PVHO-1:

(3) Have the pressure relief device required by ASME PVHO-1, or equivalent international standard;

(4) Have a built-in breathing system with at least one mask per occupant stored inside each separately pressurized compartment;

(4) Have a built-in breathing system with at least one mask per occupant stored inside each separately pressurized compartment;

(5) Have a two-way voice communications system allowing communications between an occupant in one pressurized compartment of the PVHO and-

(i) The diving supervisor at the dive location;

(ii) Any divers being supported from the same PVHO; and

(iii) Occupants of the other separately pressurized compartments of the same PVHO;

(5) Have a two-way voice communications system allowing comminations between an occupant in one pressurized compartment of the PVHO and-

(i) The diving supervisor at the dive location;

(ii) Any divers being supported from the same PVHO; and

(iii) Occupants of other separately pressurized compartments of the same PVHO;

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(6) if designed to mechanically couple to another PVHO, have a two-way communications system allowing communications between occupants of each PVHO when mechanically coupled;

(6) Ifdesigned to mechanically couple to another PVHO, have a two-way communications system allowing communications between occupants of each PVHO when mechanically coupled;

(7) Have a pressure gage in the interior of each compartment that is-

(i) Designed for human occupancy; and
(ii) Capable of having the compartment pressure controlled from inside the PVHO;

(7) Have a pressure gage in the interior of each compartment that is-

(i) Designed for human occupancy; and
(ii) Capable of having the compartment pressure controlled from inside the PVHO;

(8) Have viewpoints that allow observation of occupants from the outside;

(8) Have view ports that allow observation of occupants from the outside;

(9) Have viewports that meet the requirements of ASME PVHO- 1 except those PVHO's approved under paragraph (b) of this section which have non-acrylic viewports;

(9) Have viewports that meet the requirements of ASME PVHO- 1 except those PVHO's approved under paragraph (b) of this section which have non-acrylic viewpotts;

(10) Have means of illumination sufficient to allow an occupant to-

(i) read gages; and
(ii) Operate the installed systems within each compartment;

(10) Have means of illumination sufficient to allow an occupant to-

(i) Read gages; and
(ii) Operate the installed systems within each compartment;

(11) Be designed and equipped to minimize sources of combustible materials and ignition;

(11) Be designed and equipped to minimize sources of combustible materials and ignition;

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(12) Have a protective device on the inlet side of PVHO exhaust lines;	(12) Have a protective device on the inlet side of PVHO exhaust lines;	
(13) Have a means of extinguishing a fire in the interior;	(13) Have a means of extinguishing a fire in the interior;	
(14) Have a means of maintaining the oxygen content of the interior atmosphere below 25 percent surface equivalent by volume when pressurized with air as the breathing mixture:	(14) Have a means of maintaining the oxygen content of the interior atmosphere below 25 percent surface equivalent by volume when pressurized with air as the breathing mixture;	
(15) Have a means of maintaining the interior atmosphere below 2 percent surface equivalent carbon dioxide by volume;	(15)Have a means of maintaining the interior atmosphere below 2 per-cent surface equivalent carbon dioxide by volume;	
(16) Have a means of overriding and controlling from the exterior all interior breathing and pressure supply controls;	(16)Have a means of overriding and controlling from the exterior all interior breathing and pressure supply controls;	
(17) Have a speech unscrambler when used with mixed-gases;	(17) Have a speech unscrambler when used with mixed-gases;	
(18) Have interior electrical systems that are designed for the environment in which they will operate to minimize the risk of fire, electrical shock to personnel, and galvanic action of the PVHO and;	(18) Have interior electrical systems that are designed for the environment in which they will operate to minimize the risk of fire, electrical shock to personnel, and galvanic action of the PVHO; and	

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(19) Be tested after every repair, modification, or alteration to the pressure boundaries as required by § 197.462	(19) Be tested after every repair, modification, or alteration to the pressure boundaries as required by 197.462.	
§ 197.330 PVHO - Closed bells.	197.330 PVHO - Closed Bells.	
(a) Except as provided in paragraph (b) of this section, each closed bell must meet the requirements of § 197.328 and-	(a) Except as provided in paragraph (b) of this section, each closed bell must meet the requirements of 197.328 and-	
(1) have underwater breathing apparatus for each occupant stored inside each separately pressurized compartment;	(1) Have underwater breathing apparatus for each occupant stored inside each separately pressurized compartment;	
(2) Have an umbilical;	(2) Have an umbilical for each occupant;	
(3) Have lifting equipment attached to the closed bell capable of returning the occupied closed bell when fully flooded to the dive location;	(3) Have lifting equipment attached to the closed bell capable of returning the occupied closed bell, when fully flooded, to the dive location;	197.330(a)(3) Facilitates the responsibilities of the standby diver.
(4) Be capable of recompressing on the surface to the maximum design diving depth;	(4) Be capable of recompressing on the surface to the maximum design diving depth;	
(5) Be constructed and equipped as required by § 197.332;	(5) ~~Be constructed and equipped as required by § 197.332~~;	

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(6) Have an emergency locating device designed to assist personnel on the surface in acquiring and maintaining contact with the submerged PVHO if the umbilical to the surface is severed;	(5) Have an emergency locating device designed to assist personnel on the surface in acquiring and maintaining contact with the submerged PVHO if the umbilical to the surface is served;	
(7) Have a capability to remove an injured diver from the water; and	(6) Have a capability to remove an injured driver from the water; and	
(8) Have a life support capability for the intact closed bell and its occupants for-	(7) Have a life support with -	
(i) Twelve hours after an accident severing the umbilical to the surface when the umbilical to the surface is the only installed means of retrieving the closed bell; or	(i) Sufficient onboard breathing gas to allow a diver to remain outside the bell for 30 minutes at the maximum depth rating of the bell, or dive site natural bottom, at a breathing rate of 1.5 ACFM; and	
(ii) A period of time, at least equal to 1 hour plus twice the time required to retrieve the bell from its designed operating depth and attach an auxiliary life-support system, after an accident serving the umbilical to the surface when the umbilical is one of the two independent installed means of retrieving the closed bell, each meeting requirements of paragraph (a)(3) of this section.	(ii) Sufficient ~~metabolic oxygen~~ onboard life support systems to **support** the number of occupants for a period of 24 hours at a consumption rate of .017 cubic feet per minute; or	This should be interpreted to include metabolic oxygen plus an effective means of maintaining CO2 levels within safe limits (i.e. monitoring devices and CO2 removal systems).

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(b) A closed bell that does not meet the requirements of paragraphs (a)(3), (a)(4), and (a)(5) of this section, must be capable of attachment to another PVHO that-	(b) A closed bell that does not meet the requirements of paragraphs (a)(3), and (a)(4), ~~and (a)(5)~~ of this section, must be capable of attachment to another PVHO that-	
(1) Allows the transfer of personnel and diver's equipment under pressure from the closed bell to the PVHO;	(1) Allows the transfer of personnel and diver's equipment under pressure from the closed bell to the PVHO;	
(2) Meets the requirements of paragraph (a)(3) of this section;	(2) Meets the requirements of paragraph(a)(3) of this section;	
(3) Is capable of attachment to a decompression chamber meeting the requirements of paragraphs (a)(4) and (a)(5) of this section; and	(3) Is capable of attachment to a decompression chamber meeting the requirements of paragraphs (a)(4) and (a)(5) of this section; and	
(4) Allows the transfer of personnel and diver's equipment under pressure from the PVHO to the decompression chamber.	(4) Allows the transfer of personnel and diver's equipment under pressure from the PVHO to the decompression chamber.	
§ 197.332 PVHO-Decompression chambers.	§ 197.332 PVHO-Decompression chambers.	
(a) Each decompression chamber must- Meet the requirements of $197.328;	(a) Each decompression chamber must- Meet the requirements of § 197.328;	
(b) Have internal dimensions sufficient to accommodate a diver lying in a horizontal position and another person tending the diver;	(b) Have internal dimensions sufficient to accommodate a diver lying in a horizontal position and another person tending the diver;	

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(c) Have a capability for ingress and egress of personnel and equipment while the occupants are under pressure;

(d) Have a means of operating all installed man-way locking devices, except disabled shipping dogs, from both sides of a closed hatch;

(e) Have interior illumination sufficient to allow visual observation, diagnosis, and medical treatment of an occupant.

(f) Have one bunk for each two occupants;

(g) Have a capability that allows bunks to be seen over their entire lengths from the exterior;

(h) Have a minimum pressure capability of-

(1) 6 ATA, when used for diving to 300 fsw; or

(2) The maximum depth dive, when used for diving operations deeper than 300 fsw, unless a closed bell meeting the requirements of § 197.330(a) (3), (4), and (5) is used;

(i) Have a minimum pressurization rate of 2 ATA per minute to 60 fsw and at least 1 ATA per minute thereafter;

(c) Have a capability for ingress and egress of personnel and equipment while the occupants are under pressure;

(d) Have a means of operating all installed man-way locking devices, except disabled shipping dogs, from both sides of a closed hatch;

(e) Have interior illumination sufficient to allow visual observation, diagnosis, and medical treatment of an occupant.

(f) Have one bunk for each two occupants;

(g) Have a capability that allows bunks to be seen over their entire lengths from the exterior;

(h) Have a minimum pressure capability of-

(1) 6 ATA, when used for diving to 300 fsw; or

(2) The maximum depth dive, when used for diving operations deeper than 300 fsw, unless a closed bell meeting the requirements of §197.330(a) (3), (4), and (5) is used;

(i) Have a minimum pressurization rate of 2 ATA per minute to 60 fsw and at least 1 ATA per minute thereafter;

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(ii) Have a decompression rate of 1 ATA per minute to 33 fsw;

(iii) Have an external pressure gage for each pressurized compartment;

(iv) Have a capability to supply breathing mixtures at the maximum rate required by each occupant doing heavy work; and

(v) Have a sound-powered headset or telephone, as a backup to the communications system required by § 197.328(c) (5) and (6), except when that communications system is a sound-powered system.

(ii) Have a decompression rate of 1 ATA per minute to 33 fsw;

(iii) Have an external pressure gage for each pressurized compartment;

(iv) Have a capability to supply breathing mixtures at the maximum rate required by each occupant doing heavy work; and

(v) Have a sound-powered headset or telephone, as a backup to the communications system required by § 197.328(c) (5) and (6), except when that communications system is a sound-powered system.

§ 197.334 Open diving bells.

Each open diving bell must-

(a) Have an upper section that provides an envelope capable of maintaining a bubble of breathing mixture available to a diver standing on the lower section of the platform with his body through the open bottom and his head in the bubble;

§ 197.334 Open diving bells.

Each open diving bell must-

(a) Have an upper section that provides an envelope capable of maintaining a bubble of breathing mixture available to a diver standing on the lower section of the platform with his body through the open bottom and his head in the bubble;

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(b) Have lifting equipment capable of returning the occupied open bell to the dive location;

(c) Have an umbilical; and be-

(d) Made-

(1) Of corrosion-resisting material; or
(2) Protected against and maintained free form injurious corrosion.

§ 197.336 Pressure piping

Piping systems that are not an integral part of the vessel or facility, carrying fluids under pressures exceeding 15 psig must

(a) Meet the ANSI code;
(b) Have the point of connection to the vessel or facility clearly marked; and

(c) Be tested after every repair, modification, or alteration to the pressure boundaries as set forth in $197.462.

§ 197.338 Compressed gas cylinders.

Each compressed gas cylinder must-

(a) Be stored in a ventilated area;

(b) Be protected from excessive heat;

(b) Have lifting equipment capable of' returning the occupied open bell to the dive location;

(c) Have an umbilical; and be-

(d) Made-

(1) Of corrosion-resisting material; or
(2) Protected against and maintained free form injurious corrosion.

§ 197.336 Pressure piping

Piping systems that are not an integral part of the vessel or facility, carrying fluids under pressures exceeding 15 psig must

(a) Meet the ANSI code;
(b) Have the point of connection to the vessel or facility clearly marked; and

(c) Be tested after every repair, modification, or alteration to the pressure boundaries as set forth in § 197.462.

§ 197.338 Compressed gas cylinders.

Each compressed gas cylinder must-

(a) Be stored in a ventilated area;

(b) Be protected from excessive heat;

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(c) Be prevented from falling;

(d) Be tested after any repair, modification, or alteration to the pressure boundaries as set forth in § 197.462; and

(c) Be prevented from falling;

(d) Be tested after any repair, modification, or alteration to the pressure boundaries as set forth in 197.462; and

(e) Be visually examined, annually, for damage or corrosion.

(f) Be inspected internally, annually, if used underwater.

(g) Be labeled as to contents.

(e) Meet the requirements of-

(1) part 54 of this Chapter; or 49 CFR 173.34 and
(2) 49 CFR 178 subpart C.

(h) Meet the requirements of-

(1) Part 54 of this Chapter; or 49 CFR 173.34 and
(2) CFR 178 Subpart C.

§197.340 Breathing gas supply.

9197.340 Breathing gas supply.

(a) A primary breathing gas supply for surface-supplied diving must be sufficient to support the following for the duration of the planned dive:

(a) A primary breathing gas supply ~~for surface-supplied diving~~ must be sufficient to support the following for the duration of the planned dive:

(1) The diver.
(2) The standby diver.
(3) The decompression chamber, when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and for one hour after completion of the planned dive.

(1) The diver.
(2) The standby diver.
(3) The decompression chamber, when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and for one hour after completion of the planned dive.

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Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
(4) A decompression chamber, when provided but not required by this subpart.	(4) A decompression chamber, when provided but not required by this subpart.	
(5) A closed bell when provided or required by §197.434(d).	(5) A closed bell when provided or required by §197.434(d).	
(6)An open bell when provided or required by§ 197.432 (e)(4) or by § 197.434(c).	(6)An open bell when provided or required by§ 197.432 (e)(4) or by § 197.434(c).	
(b) A secondary breathing gas supply for surfaced-supplied diving must be sufficient to support the following:	(b) A secondary breathing gas supply ~~for surfaced-supplied diving~~ must be sufficient to support the following:	
(1) The diver while returning to the surface.	(1) The diver while returning to the surface or the bell.	
(2) The diver during decompression.	(2) The diver during decompression.	
(3) The standby diver.	(3) The standby diver.	
(4) The decompression chamber when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and one hour after the completion of the planned dive.	(4) The decompression chamber when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and one-hour after the completion of the planned dive.	
(5) The closed bell while returning the diver to the surface.	(5) The closed bell while returning the diver to the surface.	
(6) The open bell while returning the diver to the surface.	(6) The open bell while returning the diver to the surface.	
(c) A diver-carried reserve breathing gas supply for surface-supplied diving must be sufficient to allow the diver to-	(c) A diver-carried reserve breathing gas supply ~~for surface-supplied diving~~ must be sufficient to allow the diver to-	
(1) Reach the surface.	(1) Reach the surface or the bell;	
(2) Reach another source of breathing gas; or	(2) Reach another source of breathing gas; or	
(3) Be reached by a standby diver equipped with another source of breathing gas for the diver.	(3) Be reached by a standby diver equipped with another source of breathing gas for the diver.	

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(d) A primary breathing gas supply for SCUBA diving must be sufficient to support the diver for the duration of the planned dive through his return to the dive location or planned pick-up point.

(e) A diver-carried reserve breathing gas supply for SCUBA diving must be sufficient to allow the diver to return to the dive location or planned pick-up point from the greatest depth of the planned dive.

(f) Oxygen used for breathing mixtures must-

(1) Meet the requirements of Federal Specification BB-O-925a; and

(2) Be type 1 (gaseous) grade A or B.

(g) Nitrogen used for breathing mixtures must-

(1) Meet the requirements of Federal Specification BB-N-4 11 c;

(2) Be type 1 (gaseous);

(3) Be class 1 (oil free); and

(4) Be grade A, B, or C.

(h) Helium used for breathing mixtures must be grades A, B, or C produced by the Federal Government, or equivalent.

(d) A primary breathing gas supply for SCUBA diving must be sufficient to support the diver for the duration of the planned dive through his return to the dive location or planned pick-up point.

(e) A diver-carried reserve breathing gas supply for SCUBA diving must be sufficient to allow the diver to return to the dive location or planned pick-up point from the greatest depth of the planned dive.

(f) Oxygen used for breathing mixtures must-

(1) Meet the requirements of Federal Specification BB-O-925a; and

(2) Be type 1 (gaseous) grade A or B

(g) Nitrogen used for breathing mixtures must-

(1) Meet the requirements of Federal Specification BB-N-4 11 c;

(2) Be type 1 (gaseous);

(3) Be class 1 (oil free); and

(4) Be grade A, B, or C.

(h) Helium used for breathing mixtures must be grades A, B, or C produced by the Federal Government, or equivalent.

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(i) Compressed air used for breathing mixtures must –	(i) Compressed air used for breathing mixtures must –	
(1) Be 20 to 22 percent oxygen by volume;	(1) Meet the requirements of ANSI/CGA 7.1 Grade "D," or equivalent;	
(2) Have no objectionable odor ; and	(2) Be CGA grade "E" for synthesized air.	
(3) Have no more than-		
(i) 1,000 parts per million of carbon dioxide;		
(ii) 20 parts per million carbon monoxide		
(iii) 5 milligrams per cubic meter of solid and liquid particulates including oil; and		
(iv) 25 parts per million of hydrocarbons (includes methane and all other hydrocarbons expressed as methane).		
197.342 Buoyancy-changing devices.	197.342 Buoyancy-changing devices.	
(a) A dry suit or other buoyancy-changing device not directly connected to the exhaust valve of the helmet or mask must have an independent exhaust valve.	(a) A dry suit or other buoyancy-changing device not directly connected to the exhaust valve of the helmet or mask must have an independent exhaust valve.	

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(b) When used for SCUBA diving, a buoyancy-changing device must have an inflation source separate from the breathing gas supply.	(b) When used for SCUBA diving, a buoyancy-changing device must have an inllation source separate from the breathing gas supply.	
$197.344 Inflatable floatation devices.	$197.344 Inflatable floatation devices.	
An inflatable floatation device for SCUBA diving must-	An inflatable floatation device for SCUBA diving must-	
(a) Be capable of maintaining the diver at the surface in a face up position; (b) Have a manually activated inflation device; (c) Have an oral inflation device; (d) Have an over-pressure relief device; and (e) Have a manually operated exhaust valve.	(a) Be capable of maintaining the diver at the surface in a face up position; (b) Have a manually activated inflation device; (c) Have an oral inflation device; (d) Have an over-pressure relief device; and (e) Have a manually operated exhaust valve.	
$197.346 Diver's equipment	$197.346 Diver's equipment	
(a) Each diver using SCUBA must have-	(a) Each diver using SCUBA must have-	Serious consideration should be given to restricting the use of SCUBA equipment, except in the event of an emergency. It does not fulfill the need of the working diver, nor the requirements of this regulation (i.e. the need for two way communication with the working diver).
(1) Self-contained underwater breathing equipment including-	(1) Self-contained underwater breathing equipment including-	
(i) A primary breathing gas supply with a cylinder pressure gage readable by the diver during the dive; and (ii) A diver-carried reserve breathing gas supply provided by-	(i) A primary breathing gas supply with a cylinder pressure gage readable by the diver during the dive; and (ii) A diver-carried reserve breathing gas supply provided by-	
(A) A manual reserve (J valve); or	(A) A manual reserve (J valve); or	

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(B) An independent reserve cylinder connected and ready for use;	(B) An independent reserve cylinder connected and ready for use;	
(2) A face mask;	(2) A face mask;	
(3) An inflatable tloatation device;	(3) An inflatable fioatation device;	
(4) A weight belt capable of quick release;	(4) A weight belt capable of quick release;	Serious consideration should be given to restricting the use of SCUBA equipment, except in the event of an emergency. It does not fulfill the need of the working diver, nor the requirements of this regulation (i.e. the need for two way communication with the working diver).
(5) A knife;	(5) A knife;	
(6) Swim fins or shoes;	(6) Swim fins or shoes;	
(7) A diving wristwatch; and	(7) A diving wristwatch; and	
(8) A depth gage.	(8) A depth gage.	
(b) Each diver using a heavyweight diving outfit must-	(b) Each diver using a heavyweight diving outfit must-	
(1) Have a helmet group consisting of helmet, breastplate, and associated valves and connections	(1) Have a helmet group consisting of helmet, breastplate, and associated valves and connections;	
(2) Have a diving dress group consisting of a basic dress that encloses the body (except for head and hands) in a tough, waterproof cover, gloves, shoes, weight assembly, and knife;	(2) Have a diving dress group consisting of a basic dress that encloses the body (except for head and hands) in a tough, waterproof cover, gloves, shoes, weight assembly, and knife;	

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(3) Have a hose group consisting of the breathing gas hose and fittings , the control valve, the lifeline, communication cable, and a pneumofathometer; and

(3) Have a hose group consisting of the breathing gas hose and fittings , the control valve, the lifeline, communications cable, and a pneumofathometer; and

(4) Be provided with a helmet cushion and weighted shoes.

(4) Be provided with a helmet cushion and weighted shoes.

(c) Each surface-supplied dive operation using a heavyweight diving outfit must have an extra breathing gas hose with attaching tools available to the standby diver.

(c) Each surface-supplied dive operation using a heavyweight diving outfit must have an extra breathing gas hose with attaching tools available to the standby diver.

(d) Each diver using a lightweight diving outfit must have-

(d) Each diver using a lightweight diving outfit must have-

(1) A safety harness;

(1) A safety harness;

(2) A weight assembly capable of quick release;

(2) A weight assembly capable of quick release;

(3) A mask group consisting of a lightweight mask and associated valves and connections;

(3) A mask group consisting of a lightweight mask and associated valves and connections;

(4)A diving dress group consisting of wet or dry diving dress, gloves, shoes or fins, and knife; and

(4) A diving dress group consisting of a diving dress that <u>provides suitable protection for existing environmental conditions and maintains the divers thermal balance within normal limits: and</u>

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(5) A hose group shall consist of a breathing gas hose and fittings, the control valve, the lifeline, communications cable, and pneumofathometer (if the breaking strength of the communication cable is at least equal to that for the lifeline, the communication cable can serve as the life line.)	(5) A hose group shall consist of; (i) a breathing gas hose, (ii) communications cable, (111) a means of determining the divers depth and (iv) an included strength member and (v) Have the nominal breaking strength of the hose group assembly, including the terminating hardware shall be 1.000 lbs.	
(e) Each surface-supplied air dive operation within the no-decompression limits and to depths of 130 fsw or less must have a primary breathing gas supply at the dive location.	(e) Each surface-supplied dive operation ~~within the no-decompression limits and to depths of 130 fsw or less~~ must have at the dive location - (i) a primary breathing gas supply; and (ii) a secondary breathing gas supply.	
(f) Each surface supplied dive operation outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas must have at the dive location- (1) a primary breathing gas supply; and (2) a secondary breathing gas supply.	~~(g) Each diver diving outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas must have a diver-carried reserve breathing gas supply except when using a heavy-weight diving outfit, or when diving in a physically confining space.~~	

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(g) Each diver diving outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas must have a diver-carried reserve breathing gas supply except when using a heavy-weight diving outfit, or when diving in a physically confining space.	(f) ~~Each diver diving outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas must have a diver-carried reserve breathing gas supply, except when using a heavy-weight diving outfit.~~	
	(f) Each diver entering the water shall have a diver-carried reserve breathing gas **supply, except** when using a heavyweight diving outfit.	Numerous instances can be cited where divers have been trapped, and subsequently died, in shallow water, when they could have survived, or been saved, had they been wearing a bail-out bottle.

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
OPERATIONS	**OPERATIONS**	
§ 197.400 Applicability	§ 197.400 Applicability.	
Diving operations may only be conducted from a vessel or facility subject to the subpart if the regulations in this subpart are met.	Diving operations may only be conducted from a vessel or facility subject to the subpart if the regulations in this subpart are met.	The existing wording leaves open the possibility of diving "from a vessel or facility" NOT "subject to the subpart, and, thereby, NOT conforming to the requirements of "the regulations in this subpart. "
	[INSERT $197.401 DESIGNATION OF PERSON-IN-CHARGE]	
$197.402 Responsibilities of the person-in-charge.	$197.402 Responsibilities of the person-in-charge.	
(a) The person-in-charge shall-	(a) The person-in-charge shall-	This, again, is a problem that requires attention, as the person-in-charge, when he or she is the Master of a vessel, is commonly neither familiar with diving operations, nor with their responsibilities under this subpart. (e.g. The P.I.C. must be certain that the Diving Supervisor has fulfilled his or her responsibilities under this subpart.)
(1) Be fully cognizant of the provisions of this subpart;	(1) Be fully cognizant of the provisions of this subpart;	
		It must be a requirement that all such communication be IN WRITING.
(2) Prior to permitting any commercial diving operation to commence, have-	(2) Prior to permitting any commercial diving operation to commence, have, in writing -	
(i) The designation of the diving supervisor for each diving operation as required by § 197.2 10;	(i) The designation of the diving supervisor for each diving operation as required by § 197.2 10;	
(ii) A report on-	(ii)A report on -	

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(A) The nature and planned times of the planned diving operation; and

(B) The planned involvement of the vessel or facility, its equipment, and its personnel in the diving operation.

(A)The nature and planned times of the planned diving operation; and

(B) The planned involvement of the vessel or facility, its equipment, and its personnel in the diving operation.

(b) Prior to permitting any commercial diving operation involving liveboating to commence, the person-in-charge shall insure that -

(b) Prior to permitting any commercial diving operation involving liveboating to commence, the person-in-charge shall insure that -

(1) A means of rapid communications with the diving supervisor while the diver is entering, in, or leaving the water is established; and

(1) A means of rapid communications with the diving supervisor while the diver is entering, in, or leaving the water is established; and

(2) A boat and crew for diver pickup in the event of an emergency is provided.

(2) A boat and crew <u>are available</u> for diver pickup in the event of an emergency is provided.

(3) The person-in-charge shall insure that a boat and a crew for SCUBA diver pickup is provided when SCUBA divers are not line-tended from the dive location.

~~(3) The person-in-charge shall insure that a boat and a crew for SCUBA diver pickup is provided when SCUBA divers are not line-tended from the dive location.~~

197.402(b)(3)
This wording is redundant, since the previous paragraph requires “a boat and crew are available for diver pickup.”

(c) The person-in-charge shall coordinate the activities on and of the vessel or facility with the diving supervisor.

(c) The person-in-charge shall coordinate the activities on and of the vessel or facility with the diving supervisor.

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(c) The person-in-charge shall insure that the vessel or facility equipment and personnel are kept clear of the dive location except after coordinating with the diving supervisor.	(d) The person-in-charge shall insure that the vessel or facility equipment and personnel are kept clear of the dive location except after coordinating with the diving supervisor.	
	[INSERT § 197.403 DESIGNATION OF DIVING **SUPERVISOR]**	
§ 197.404 Responsibilities of the diving supervisor	§ 197.404 Responsibilities of the Diving Supervisor	
	(a) ~~The diving supervisor shall be qualified to supervise the tyoe of diving for which he will be responsible, and shall;~~	197.404(a) The proposed wording does not clearly define who, or what authority, "qualifies," or by what standard, the Supervisor is to "qualify"
(a) The diving supervisor shall-	(a) The Diving Supervisor shall -	The proposed wording of 197.404(a) requires a reference to qualification , training, certification and or licensing for the area of diving the supervisor is to be responsible for. One License can not possibly cover all job classifications in the commercial diving industry. For instance, in addition to the required knowledge, for a Diving Supervisor, of diving, and of their responsibilities as a Diving Supervisor under this subpart, there is a need for more advanced knowledge of hyperbaric medical first aid treatment.
(1) Be fully cognizant of the provisions of this subpart;	(1) Be trained and experienced in the responsibilities of the Diving Supervisor, as per a standard to be approved by the Commandant of the United States Coast Guard	

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	(2) Be trained and experienced in the type of diving for which he or she will be responsible as per § 197.406 of this subpart;	[Re-numbering, to adjust for insertions]
	(3) Be fully cognizant of the provisions of this subpart;	
(2) Be fully cognizant of the provisions of the operations manual required by 197.420;	(4) Be fully cognizant of the provisions of the operations manual required by 197.420;	
(3) Insure that diving operations conducted from a vessel or facility subject to this subpart meet the regulation in this subpart;	(5) Insure that diving operations conducted from a vessel or facility subject to this subpart meet the regulation in this subpart;	(6) ~~Prior to the commencement of any commercial diving operation, provide the report required by § 197.402 to the person-in-charge;~~
(4) Prior to the commencement of any commercial diving operation, provide the report required by § 197.402 to the person-in-charge;	(6) Prior to the commencement of any commercial diving operation, provide the report required by § 197.402 to the person-in-charge;	(7) ~~Coordinate with the person-in-charge any changes that are made to the report required by § 197.402; and~~
(5) Coordinate with the person-in-charge any changes that are made to the report required by § 197.402; and	(7) Coordinate with the person-in-charge any changes that are made to the report required by § 197.402; and	Paragraph (6) and (7) may be redundant, since paragraph (3) requires the Supervisor to "Be fully cognizant of the provisions of this subpart"
(6) Promptly notify the person-in-charge of any diving related casualty, accident, or injury.	(8) Promptly notify the person-in-charge of any diving related casualty, accident, or injury.	

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(b) The diving supervisor is in charge of the planning and execution of the diving operation including the responsibility for the safety and health of the dive team.	(b) The diving supervisor is in charge of the planning and execution of the diving operation including the responsibility for the safety and health of the dive team.	
	§ 197.405 Responsibilities of the Diving Superintendent	
	(a) Where the nature or size of a diving operation requires a Diving Superintendent, a person shall not be a Diving Superintendent unless that person ~~h~~as	197.405(a) Wording is borrowed from the Australian diving regulations.
	(b) Been appointed, in writing by the Diving Contractor;	
	(c) Is able to supervise diving operations competently, and	
	(d) Complies with the requirements of § 197.404 Responsibilities of the Diving Supervisor.	
	§ 197.406 Responsibilities of the Diver	
	(a) The diver shall -	
	(i) Be trained and experienced in the type of diving for which he or she will be involved as per an acceptable minimum standard to be approved by the Commandant of The United States Coast Guard	The ANSI standard as proposed by the Association of Diving Contractors, as a minimum standard should not be considered. Rather a committee designated by the Commandant should prepare and present an acceptable, comprehensive standard based upon the various needs of the industry.
	(ii) No person shall dive unless he or she, has undergone a	

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medical examination to determine fitness to dive during the 24-month period preceding the dive or during such shorter period preceding the dive as has been recommended by the person's examining physician; and

(iii) has obtained a written statement from the examining physician who performed the most recent examination under clause indicating whether the diver is fit to dive or fit to dive with limitations, and

(iv) An examination under this subsection shall be performed by a physician who is knowledgeable in diving and hyperbaric medicine, and

(v) has obtained a written statement from the examining physician that meets the requirements of this subsection including the examining physician's name and address and shall be signed by the physician.

(c) Be fully cognizant of the provisions of this subpart;

(d) Be fully cognizant of the provisions of the operations manual required by §197.420;

(e) Maintain the Diver's Logbook

(i) No person shall dive in a diving operation unless he or she has a diving log book that, is permanently bound;

(ii) has numbered pages; contains the diver's signature and photograph; and

(iii) has attached to it or entered into it a record of any qualifications obtained by the diver that relate to diving; and

(iv) has attached to it or entered into it a record of the certification

(v) Each person who dives in a diving operation shall make an entry in the diving logbook in respect of each dive, each medical recompression and each hyperbaric exposure carried out or undergone by the person in connection with the diving operation.

(vi) No person shall dive in a diving operation unless he or she has made an entry in the diving logbook.

Wording for § 197.407 is borrowed from the Australian diving regulations, and might be revised to include reference an acceptable – Minimum Standard. This, or similar, wording is inserted to define the responsibilities of the dive team members described.

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(vii) Entries shall be made within 48 hours of the dive, medical recompression or hyperbaric exposure and shall appear in the logbook in chronological order.

(viii) An entry in respect of a dive shall be signed bv the diving supervisor and or

(ix) in the event of a medical recompression or a hyperbaric exposure an entry shall be signed bv the diving supervisor or presiding physician.

(x) The type of diving equipment used;

(xi) the breathing mixture used;

(xii) the time the diver left the surface;the maximum depth attained;

(xiii) the time the diver left the bottom;

(xiv) the time the diver reached the surface;

(xv) the time of the surface interval, if a repetitive dive was undertaken;

(xvi) the decompression table used;

(xvii) the date;

Wording for § 197.408 is borrowed from the Australian diving regulations, and might be revised to include reference to Minimum Standards. This, or similar, wording is inserted to define the responsibilities of the dive team members described.

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(xviii) any unusual incidents; and
(xix) the environmental conditions.
(xx) in respect of a dive originating from a submersible compression chamber or other submerged base shall state,
(A) The depth at the base;
(B) the maximum and minimum depths attained; and
(C) the duration of the excursions from the base.
(f) A person who is required to have a diving log book shall retain the log book

1. Be certified in general and hyperbaric first aid and CPR.

§ 197.407 - Systems maintenance, life support and diver medical technicians
(a) Where required under the provisions of this subpart, there shall be provided an experienced maintenance technician who shall personally, under the supervision of a Diving Supervisor, undertake and be responsible for the repair, maintenance and safe functioning of equipment used in diving operations.
(1) A person shall not perform the functions referred to in sub-clause (a) unless that person has such knowledge and experience as approved necessary to perform those duties.

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(b) Where required under the provisions of this subpart, there shall be provided an experienced life support technician who shall, under the supervision of the Diving Supervisor, control and monitor all the systems functions which relate to the "life support", safety and health of any person inside a surface compression chamber.

(1) A person shall not perform the functions referred to in sub-clause (b) unless that person has such knowledge and experience as approved necessary to perform those duties.

(c) Where required under the provisions of this subpart, there shall be provided a diver medical technician who shall, where required, render advanced first-aid treatment.

(1) A person shall not perform the functions referred to in sub-clause (c) unless that person complies with the provisions of sub-clause 808(3).

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	§ 197.408 – Responsibilities of the Diver's Attendant (Tender) (a) A Tender shall have sufficient knowledge of – (1) Underwater work; (2) The signals and communication devices used in diving operations; (3) Decompression procedures; and (4) Be certified in medical first aid and CPR.	
	§ 197.409 – Responsibilities of the Diving Contractor (a) The Diving Contractor shall be fully cognizant of the requirements of this subpart.	Wording for § 197.409 is inserted to define the responsibilities of Diving Contractor.
§ 197.410 Dive procedures (a) The diving supervisor shall insure that- (1) Before commencing diving operations, dive team members are briefed on- (i) The tasks to be undertaken; (ii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and	§ 197.410 Dive procedures (a) The diving supervisor shall insure that- (1) Before commencing diving operations, dive team members are briefed on- (i) The tasks to be undertaken; (ii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and	

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(iii) Any modifications to the operation manual or procedures including safety procedures necessitated by the specific diving operation;

(iii) Any modifications to the operation manual or procedures including safety procedures necessitated by the specific diving operation;

(2) The breathing gas supply system, masks, helmets, thermal protection, when provided, and bell lifting equipment, when a bell is provided or required, are inspected prior to each diving operation;

(2) The breathing gas supply system, masks, helmets, thermal protection, when provided, and bell lifting equipment, when a bell is provided or required, are inspected prior to each diving operation;

(3) Each diver is instructed to report any physical problems or physiological effects including aches, pains, current illnesses, sickness prior to each dive;

(3) Each diver is instructed to report any physical problems or physiological effects including aches, pains, current illnesses, sickness prior to each dive;

(4) A depth, bottom time profile, including any breathing mixture changes, is maintained at the dive location for each diver during the dive, except that SCUBA divers shall maintain their own profiles.

(4) A depth, bottom time profile, including any breathing mixture changes, is maintained at the dive location for each diver during the dive, except that SCUBA divers shall maintain their own profiles.

(5) A two-way voice communication system is used between-

(i) Each surface-supplied diver and a dive team member at the dive location

(ii) The Bell (when provided) and the dive location:

(5) A two-way voice communication system is used between-

(i) Each surface-supplied diver and a dive team member at the dive location

(ii) The Bell (when provided) and the dive location:

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(6) A two-way communication system is available at the dive location to obtain emergency assistance;

6) A two-way communication system is available at the dive location to obtain emergency assistance;

(7) During the dive –

(i) The Diving Supervisor shall not undertake or be assigned any secondary duties, which might limit his or her ability to carry out the primary duties of supervising the dive.

(ii) Any dive team member shall not undertake or be assigned any secondary task that might interfere with those members' primary duties.

(7) After the completion of each dive-

(i) The physical condition of the diver is checked by-

(ii) Visual observation; and

(iii) Questioning the diver about his physical well-being;

(8) After the completion of each dive the supervisor shall insure that;

(i) The physical condition of the diver is checked by -

(A) Visual observation; and
(B) Questioning the diver about his wellbeing;

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(iv) The diver is instructed to report any physical problems or adverse physiological effects including aches, pains, current illnesses, or symptoms of decompression sickness or gas embolism;

(ii) The diver is instructed to report any physical problems or adverse physiological effects including aches, pains, current illnesses, or symptoms of decompression sickness or gas embolism;

(v) The diver is advised of the location of an operational decompression chamber; and

(iii) The diver is advised of the location of an operational decompression chamber; and

(vi) The diver is alerted the potential hazards of flying after diving;

(iv) The diver is alerted to the potential hazards of flying after diving;

(8) For any dive outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas as a breathing mixture-

(9) For any dive outside the no-decompression limits, deeper than 80 fsw, or using mixed-gas as a breathing mixture –

(i) A depth, time, decompression profile including breathing mixture changes is maintained for each diver at the dive location;

(i) A depth, time, decompression profile including breathing mixture changes is maintained for each diver at the dive location;

(ii) The diver is instructed to remain awake and in the vicinity of the dive location decompression chamber for at least one hour after the completion of a dive, decompression, or treatment; and

(ii) The diver is instructed to remain awake and in the vicinity of the dive location decompression chamber for at least one hour after the completion of a dive, decompression, or treatment; and

(iii) A dive team member, other than the diver, is trained and available to operate the decompression chamber; and

(iii) A dive team member, other than the diver, is trained and available to operate the decompression chamber; and

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(9) When decompression sickness or gas embolism is suspected or symptoms are evident, a report is completed containing-

(i) The investigation for each incident including-

(A) The dive and decompression profiles;
(B) The composition, depth, and time of breathing mixture changes;
(C)A description of the symptoms including depth and time of onset; and
(D)A description and results of the treatment;

(ii) The evaluation for each incident based on –

(A) The investigation;
(B) Consideration of the past performance of the decompression table used ; and
(C) Individual susceptibility; and

(iii)The corrective action taken, if necessary, to reduce the probability of recurrence.

(b) The diving supervisor shall ensure that the working interval of a dive is terminated when he so directs or when-

(10) When decompression sickness or gas embolism is suspected or symptoms arc evident, a report is completed containing-

(i) The investigation for each incident including-

(A) The dive and decompression profiles;
(B) The composition, depth, and time of breathing mixture changes;

(C) A description of the symptoms including depth and time of onset; and
(D)A description and results of the treatment;

(ii)The evaluation for each incident based on –

(A) The investigation;
(B) Consideration of the past performance of the decompression table used ; and
(C) Individual susceptibility; and

(iii)The corrective action taken, if necessary, to reduce the probability of recurrence.

(b) The diving supervisor shall ensure that the working interval of a dive is terminated when he so directs or when-

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(1) A diver requests termination;

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

(3) Communications are lost and can not be quickly reestablished between-

(i) The diver and a dive team member at the dive location; or

(ii) The person-in-charge and the diving supervisor during liveboating operations; or

(4) A diver begins to use his diver carried reserve breathing gas supply.

(1) A diver requests termination;

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

(3) Communications are lost and can not be quickly reestablished between-

(i) The diver and a dive team member at the dive location; or

(ii) The person-in-charge and the diving supervisor during liveboating operations; or

(4) A diver begins to use his diver carried reserve breathing gas supply.

(c) A Lock-Out/Tag-Out (LOTO) procedure is used on main propulsion and/or other machinery controls onboard vessels or stationary platforms engaged in diving operations to provide a warning to anyone attempting to engage or operate machinery which may be potentially hazardous to the diver(s) safety.

§ 197.420 Operations manual

(a) The diving supervisor shall –

(1) Provide an operations manual to the person-in-charge prior to commencement of any diving operation; and

§ 197.420 Operations manual

(a) The diving supervisor shall –

(1) Provide an operations manual to the person-in-charge prior to commencement of any diving operation; and

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(2) Make an operations manual available at the dive location to all members of the dive team.

(b) The operations manual must be modified in writing when adaptation is required because of-

(1) The configuration or operation of the vessel or facility; or

(2) The specific diving operation as planned.

(c) The operations manual must provide for the safety and health of the divers.

(d) The operations manual must contain the following:

(1) Safety procedures and checklist for each diving mode used.

(2) Assignments and responsibilities of each diving mode used.

(3) Equipment procedures and checklists for each diving mode used.

(4) Emergency procedures for-

(i) Fire;
(ii) Equipment failure;
(iii) Adverse environmental conditions including, but not

(2) Make an operations manual available at the dive location to all members of the dive team.

(b) The operations manual must be modified in writing when adaptation is required because of-

(1) The configuration or operation of the vessel or facility; or

(2) The specific diving operation as planned.

(c) The operations manual must provide for the safety and health of the divers.

(d) The operations manual must contain the following:

(1) Safety procedures and checklist for each diving mode used.

(2) Assignments and responsibilities of each diving mode used.

(3) Equipment procedures and checklists for each diving mode used.

(4) Emergency procedures for-

(i) Fire;
(ii) Equipment failure;
(iii) Adverse environmental conditions including, but not

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limited to, weather and sea state; (iv) Medical illness; and treatment of injury.	limited to, weather and sea state; (iv) Medical illness; and treatment of injury.	
(5) Procedures dealing with the use of –	(5) Procedures dealing with the use of –	
(i) Hand-held power tools. (ii) Welding and burning equipment; and (iii) explosives.	(i) Hand-held power tools. (ii) Welding and burning equipment; and (iii) explosives.	
SPECIFIC DIVING MODE PROCEDURES	SPECIFIC DIVING MODE PROCEDURES	
§ 197.430 SCUBA diving.	§ 197.430 SCUBA diving.	Strong consideration should be given to restricting SCUBA diving to emergency operations only, which are exempt from this regulation. If SCUBA is eliminated from commercial diving operations, except during emergencies, this section can be deleted, as can any working reference to SCUBA.
The Diving supervisor shall insure that-	The Diving supervisor shall insure that-	
(a) SCUBA diving is not conducted-	(a) SCUBA diving is not conducted-	
(1) outside the no-decompression limits;	(1) outside the no-decompression limits;	
(2) at depths greater than 130 fsw;	(2) at depths greater than 130 fsw;	
(3) Against currents greater than one (1) knot unless line-tended; and	(3) Against currents greater than one (1) knot unless line-tended; and	
(4) If a diver cannot directly ascend to the surface unless line-tended;	(4) If a diver cannot directly ascend to the surface ~~unless line-tended~~.	
	~~(5) In a physically confining space~~	Strike “unless line tended.”
(b) The SCUBA diver has the equipment required by § 197.346(a);	(b) The SCUBA diver has the equipment required by § 197.346(a);	Proposed wording of 197.430(a)(5) is redundant, in consideration of (a)(4).

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(c) A standby diver is available while a diver is in the water;

(d) A diver is line-tended from the surface or accompanied by another diver in the water in continuous visual contact during the diving operation;

(e) When a diver is in a physically confining space, another diver is stationed at her underwater point of entry and is intending the diver; and

(f) A boat is available for diver pickup when the divers are not line tended from the dive location.

§ 197.432 Surfaced-supplied air diving.

The diving supervisor shall insure that-

(a) Surfaced-supplied air diving is conducted at depths less than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

(c) A standby diver is available while a diver is in the water;

(d) A diver is line-tended from the surface or accompanied by another diver in the water in continuous visual contact during the diving operation;

(e) When a diver is in a physically confining space, another diver is stationed at her underwater point of entry and is intending the diver; and

(f) A boat is available for diver pickup when the divers are not line tended from the dive location.

§ 197.432 Surfaced-supplied air diving.

~~The diving supervisor shall insure that -~~

Surface-supplied air diving operations shall-

(a) ~~Surfaced-supplied air diving is conducted at depths less than 190fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;~~

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	(a) Be conducted at depths less than 190 fsw, except that surface-supplied dives with bottom times of 30 minutes, or less, may be conducted to depths of220 fsw;	
(b) Each diving operation has primary breathing gas supply;	(b) Provide a primary breathing gas supply;	This proposed wording may be redundant due to the revised 197.346(e)(1)
		This proposed wording may be redundant due to the revised 197.346(e)(2)
(c) Each diver is continuously tended while in the water;	(c) Provide a secondary breathing gas supply;	
	(d) Ensure that each diver is continuously tended by a separate dive team member while in the water;	
(d) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;	(e) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;	197.432(f) & (g) are re-located to cover all surface-supplied diving operations.
	(f) A suitably dressed, and adequately briefed standby diver is at the dive station, and ready to assist the diver in the water;	
	(g) Each diver has a diver-carried reserve breathing gas supply, except when the diver is using a heavy-weight diving outfit;	
(e) For dives deeper than 130 fsw or outside the no-decompression limits-	(h) For dives deeper than 80 FSW or outside the no-decompression limits	

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(1) Each diving operation has a secondary breathing gas supply;	~~Each diving operation has a secondary breathing gas supply;~~	
(2) A decompression chamber is ready to use at the dive location.	(1) A decompression chamber is ready for use at the dive location;	
(3) A diving stage is used except when a bell is provided;	(2) A diving stage is available to enter or exit the water from the dive location and for in-water decompression if the diver is -	
	(i) wearing heavyweight diving outfit or	
	(ii) diving on a decompression table requiring in-water decompression, except when a bell is provided; or	
	... (iii) exposed to an air gap of greater than 15 feet; or	
	(iv) where conditions or crew size prohibits the recovery of the diver to the dive station and	
(4) A bell is used for dives with an in-water decompression time greater than 120 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;	(3) A bell is used for dives with an in-water decompression time greater than 100 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;	
(5) A separate dive team member tends each diver in the water;	(4) A separate dive team member tends each diver in the water;	

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(6) A standby diver is available while a diver is in the water; and	(5) ~~A standby diver is on station, suitably dressed and prepared to dive while a diver is in the water; and~~	
(7) Each diver has a diver-carried reserve breathing gas supply Except when diving in a physically confining space; and	~~(6) Each diver has a diver-carried reserve breathing gas supply except when using a heavy weight diving outfit; and~~	
The surface-supplied air diver has the equipment required by § 197.346 (b) or (d).	The surface-supplied air diver has the equipment required by 197.346 (b) or (d).	
§ 197.434 Surfaced-supplied Mixed-gas diving.	§ 197.434 **~~Surfaced-supplied~~** Mixed-gas diving.	At 197.434, reference to "Surface-Supplied" is omitted, because section refers to both surface-supplied and saturation diving modes.
The diving supervisor shall insure that-	~~The diving supervisor shall insure that —~~	
	(a) When mixed-gas diving is conducted,	
(a) When mixed-gas diving is conducted, a decompression chamber or a closed bell meeting the requirements of § 197.332 is ready for use at the dive location;	(1) A decompression chamber or a closed bell meeting the requirements of 197.332 is ready for use at the dive location;	Paragraphs are re-numbered, to separate surface-supplied from saturation diving.
(b) A diving stage is used except when a bell is provided;	(2) A diving stage is used except when a bell is provided;	
(c) A bell is used for dives deeper than 220 fsw or when the dive involves in-water decompression times greater than 120 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;	(3) An Open Bell is used for dives deeper than 220 fsw or when the dive involves in-water decompression times greater than 100 minutes ~~except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space~~;	Clarification between Open Bell and Closed Bell.

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(d) A closed bell is used for dives at depths greater than 300 fsw, except when diving is conducted in a physically confining space;	(4) A closed bell is used for dives at depths greater than 300 fsw, ~~except when diving is conducted in a physically confining space;~~	
(e) A separate dive team member tends each diver in the water;	(5) A separate dive team member <u>continuously</u> tends each diver in the water;	
(f) A standby diver is available during all nonsaturation dives;	(6) A standby diver <u>is on station, suitably dressed and prepared to dive while the diver is in the water</u>;	
	(7) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;	
	(8) Each diving operation has a primary and secondary breathing gas supply meeting the requirements of 197.340; and	
	(9) The surface-supplied mixed-gas diver has the equipment required by 197.346 (b) or (d).	
(g) When saturation diving is conducted-	(b) When saturation diving is conducted—	
(1) A standby diver is available when the closed bell leaves the dive location until the divers are in saturation ; and	(1) A standby diver is available when the closed bell leaves the dive location until the divers are in saturation; and	

Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(2) A member of the dive team at the dive location is a diver able to assist in the recovery of the closed bell or its occupants, if required.	(2) A member of the dive team at the dive location is a diver able to assist in the recovery of the closed bell or its occupants, if required;	
(h) When closed bell operations are conducted, a diver is available in the closed bell to assist a diver in the water;	(3) When closed bell operations are conducted, a diver is available in the closed bell to assist a diver in the water;	
(i) When a diver is in a physically confined space, another diver is stationed at the underwater point of entry and is line-tending the diver;		
(j) Each diving operation has a primary and secondary breathing gas meeting the requirements of § 197.340; and		
(k) The surface-supplied mixed-gas diver has the equipment required by $197.346 (b) or (d).		
	197.435 BELL BOUNCE AND SATURATION DIVING	This entire section needs review.
	(a) When closed bell diving operations are conducted.	
	(1) A member of the diver team at the dive location is a diver able to assist in the recovery of the closed bell or its occupants, if required.	
	(b) Bell bounce and saturation diving shall be conducted utilizing PVHO's fitted as per 197.328, 197.330, & 197.332.	

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(c) Each diving operation from a closed bell shall;

(1) have primary and secondary breathing gas' supply meeting the requirements of 197.340;

(2) Have a diver in the bell equipped to assist the diver in the water;

(3) Have mixed gas divers equipped as required by 197.346.

(d) All saturation operations must have a hyperbrac life boat and:
(i) capable of being deployed within 15 minutes and
(ii) able to decompress the total number of occupants
(iii) be rated for the deepest planed allowable working depth.

$197.436 Liveboating

(a) During liveboating operations, the person-in-charge shall insure that -

(1) Diving is not conducted in seas that

$197.436 Liveboating

(a) During liveboating operations, the person-in-charge shall insure that -

(1) Diving is not conducted in seas that

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impede station-keeping ability of the vessel;	impede station-keeping ability of the vessel;	
(2) Liveboating operations are not conducted-	(2) Liveboating operations are not conducted –	
(i) From 1 hour after sunset to 1 hour before sunrise; or	(i) From 1 hour after sunset to 1 hour before sunrise; or	
(ii) During periods of restricted visibility;	(ii) During periods of restricted visibility;	
(3) The propellers of the vessel are stopped before the diver enters or exits the water; and	(3) The propellers of the vessel are stopped before the diver enters or exits the water; and	
(4) A boat is ready to be launched with crew in the event of an emergency.	(4) A boat is ready to be launched with crew in the event of an emergency.	
(b) As used in paragraph (a)(2)(ii) of this section, *restricted visibility* means any condition in which vessel navigational visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.	~~As used in paragraph (a)(2)(ii) of this section, *restricted visibility* means any condition in which vessel navigational visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.~~	
(c) During liveboating operations, the diving supervisor shall insure that-	(b) During liveboating operations, the diving supervisor shall insure that –	
(1) Diving is not conducted at depths greater than 220 fsw;	(1) Diving is not conducted at depths greater than 220 fsw;	
(2) Diving is not conducted in seas that impede diver mobility or work function;	(2) Diving is not conducted in seas that impede diver mobility, ~~or~~ work function, or ability to decompress safely;	

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~~A means is used~~

(3) A means is used to prevent the diver's hose from entangling in the propellers of the vessel;

(3) Measures are taken to prevent the diver's hose from entangling in the propellers of the vessel;

(4) Each diver carries a reserve breathing gas supply;

(4) Each diver carries a reserve breathing gas supply;

(5) A standby diver is available while a diver is in the water;

(5) A standby diver is on station, suitably dressed and prepared to dive while a diver is in the water;

(6) Diving is not conducted with in water decompression times greater than 120 minutes; and

(6) Diving is not conducted with in-water decompression time greater than 100 minutes;

(7) The person-in-charge is notified before a diver enters or exits the water.

(7) The person in charge is notified before a diver enters or exits the water.

(8) A means of direct voice communication available between the dive station and the person in control of maneuvering the vessel,

(9) A kill switch is immediatelv available to the person in control of maneuvering the vessel, for immediate shutdown of the engines.

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(10) A decompression buoy may be used in place of a diving stage to support in-water decompression so long as a suitable means exists for the diver to enter or exit the water as required by 197.320.

197.438 - WORKING WITH REMOTE OPERATED VEHICLES **(ROV'S)**

a.) Before commencement of any joint ROV/Diving operations, a clear chain of command must be established;

(i) All ROV operations conducted concurrent with diving operations shall be coordinated through the Diving Supervisor;

b.) Two-way voice communications shall be available between the ROV pilot & the dive control station;

c.) All ROV movements are to be cleared through the Diving Supervisor while a diver is in the water; and

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d.) ROV thrusters are to be fitted with guards to prevent entanglement with the diver's umbilical.

~~e.) Reference to Chapter 3 Section VI ADC Consensus Standards for Commercial Dive Operations.~~

§ 197.440 DIVING FROM A DYNAMICALLY POSITIONED VESSEL

~~Diving from dynamically positioned vessel shall be conducted in accordance with the ADC Consensus Standards for commercial diving operations Section 6.0.~~

(a) All diving operations conducted from a Dynamically Positioned Vessel shall be conducted in accordance with guidelines approved by the Commandant.

A suitable example exists for such a document in the Australian "Guidelines for the Operation of Dynamically Positioned Diving Support Vessels."

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PERIODIC TESTS AND INSPECTIONS OF DIVING EQUIPMENT	PERIODIC TESTS AND INSPECTIONS OF DIVING EQUIPMENT	
§ 197.450 Breathing gas tests.	§ 197.450 Breathing gas tests.	
The diving supervisor shall insure that-	The diving supervisor shall insure that –	
(a) The output of each air compressor is tested and meets the requirements of § 197.340 for quality by means of samples taken at the connection point to the distribution system –	(a) The output of each air compressor has been tested, and meets the requirements of 197.340 for quality and quantity by means of samples taken at the connection point to the distribution system,	
(1) every 6 months; and	(1) Every 6 months; and	
(2) After every repair or modification.	(2) After every repair or modification.	
(b) Purchased supplies of breathing mixtures supplied to a diver are checked before being placed on line for –	(b) Purchased supplies of breathing mixtures supplied to a diver are checked before being placed on line for –	
(1) Certification that the supply meets the requirements of 197.340; and (2) Noxious or offensive odor and oxygen percentage;	(1) Certification that the supply meets the requirements of 197.340; (2) Noxious or offensive odor; and (3) Oxygen content;	
(c) Each breathing supply system is checked, prior to commencement of diving operation, at the umbilical or underwater breathing apparatus connection point for the diver, for noxious or offensive odor and presence of oil mist; and	(c) Each breathing supply system is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for noxious or offensive odor and presence of foreign material; and	

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(d) Each breathing supply system, supplying mixed-gas to a diver, is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for percentage of oxygen.	(d) Each breathing supply system, supplying mixed gas to a diver, is checked. Prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for percentage of oxygen.	
§ 197.452 Oxygen cleaning.	§ 197.452 Oxygen cleaning.	
The diving supervisor shall ensure that equipment used with oxygen or oxygen measures greater that 40 percent by volume is cleaned of flammable materials-	The diving supervisor shall ensure that equipment used with oxygen or oxygen measures greater that 40 percent by volume is cleaned of flammable materials-	
(a) Before being placed into service; and	(a) Before being placed into service; and	
(b) After any repair, alteration, modification, or suspected contamination.	(b) After any repair, alteration, modification, or suspected contamination.	
§ 197.454 First aid and treatment equipment.	§ 197.454 First aid and treatment equipment.	
The diving supervisor shall ensure that medical kits are checked monthly to insure that all required supplies are present.	The diving supervisor shall ensure that medical kits are checked <u>prior to commencing diving operations to ensure that all required supplies are present.</u>	

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§ 197.456 Breathing supply hoses.	§ 197.456 Breathing supply hoses.	
(a) The diving supervisor shall insure that-	(a) The diving supervisor shall insure that –	
(1) Each breathing supply hose is pressure tested prior to begin placed into initial service and every 24 months thereafter to 1.5 times its maximum working pressure;	(1) Each breathing supply hose is pressure tested prior to being placed into initial service and every 12 months thereafter hydrostatically to 1.5 times its maximum working pressure;	
(2) Each breathing supply hose assembly, prior to being placed into initial service and after any repair, modification, or alteration, is tensile tested by-	(2) Each breathing supply hose assembly, prior to being placed into initial service and after any repair, modification, or alteration, is tensile tested by –	
(i) Subjecting each hose-to-fitting connection to a 200 pound axial load; and	(i) Subjecting each hose-to-fitting connection to a 200 pound axial load; and	
(ii) Passing a visual examination for evidence of separation, slippage, or other damage to the assembly;	(ii) Passing a visual examination for evidence of separation, slippage, or other damage to the assembly;	
(3) Each breathing supply hose is periodically checked for-	(3) Each breathing supply hose is periodically checked for –	
(i) Damage which is likely to affect pressure integrity; and	(i) Damage which is likely to affect pressure integrity; and	
(ii) Contamination which is likely to affect the purity of the breathing mixture delivered to the diver ; and	(ii) Contamination which is likely to affect the purity of the breathing mixture delivered to the diver; and	
(4) The open ends of each breathing supply hose are taped, capped, or plugged when not in use.	(4) The open ends of each breathing supply hose are taped, capped, or plugged when not in use.	

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(b) To meet the requirements of paragraph (a)(3) of this section, each breathing supply hose must be -	(b) To meet the requirements of-paragraph (a)(3) of this section each breathing supply hose must be—	
(1) Carefully inspected before being shipped to the dive location;	(1) Pressure tested to its normal working pressure prior to commencing diving operations;	
(2) Visually checked during daily operation; and	(2) Visually checked during daily operation; and	
(3) Checked for noxious or offensive odor before each diving operation.	(3) Checked for noxious or offensive odor before each diving operation.	
§ 197.458 Gages and timekeeping devices.	§ 197.458 Gages and timekeeping devices.	
The diving supervisor shall insure that-	The diving supervisor shall insure that-	
(a) Each depth gage and timekeeping device is tested or calibrated against a master reference gage or time- keeping device every 6 months;	(a) Each depth gage and timekeeping device is tested or calibrated against a master reference gage or time- keeping device every 6 months;	
(b) A depth gage is tested when a discrepancy exists in a depth gage reading greater than 2 percent of full scale between any two gages of similar range and calibration;	(b) A depth gage is tested when a discrepancy exists in a depth gage reading greater than 2 percent of full scale between any two gages of similar range and calibration;	
(c) A timekeeping device is tested when a discrepancy exists in a timekeeping device reading greater than one-quarter of a minute in a 4-hour period between any two timekeeping devices; and	(c) A timekeeping device is tested when a discrepancy exists ~~in a timekeeping device reading~~ of greater than one-quarter of a minute in a 4-hour period between any two timekeeping devices; and	

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(d) Each depth gage and timekeeping device is inspected before diving operations are begun.	(d) Each depth gage and timekeeping device is inspected before diving operations are begun;	
	(i) All timekeeping devices on a diving location shall be synchronized, on a daily basis, against a referenced device.	197.458(c) [clarification]
$197.460 Diving equipment	197.460 Diving equipment	
The diving supervisor shall insure that the diving equipment designated for the use in a dive under § 197.346 is inspected before each dive.	The diving supervisor shall insure that the diving equipment designated for the use in a dive under § 197.346 is inspected before each dive.	
§ 197.462 Pressure vessels and pressure piping.	§ 197.462 Pressure vessels and pressure piping.	
(a) The diving supervisor shall insure that each volume tank, cylinder. PVHO, and pressure piping system has been examined and tested every 12 months and after any repair, modification, or alteration to the extent necessary to determine that they are in condition and fit for the service intended.	(a) The diving supervisor shall insure that each volume tank, cylinder. PVHO, and pressure piping system has been examined and tested every 12 months and after any repair, modification, or alteration to the extent necessary to determine that they are in condition and fit for the service intended.	
(b) The following tests must be made to meet the annual requirements of paragraph (a) of this section:	(b) The following tests must be made to meet the annual requirements of paragraph (a) of this section:	

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(1) An internal and external visual examination for mechanical damage or deterioration, If a defect is found that may impair the safety of the pressure vessel, a hydrostatic test must be performed.

(2) A leak test.

(3) A pneumatic test.

(4) A hydrostatic test every fifth year instead of the pneumatic test.

(c) The following tests must be made after any repair, modification, or alteration to meet the requirements of paragraph (a) of this section;

(1) An internal and external visual examination for correctness and adequacy of repair, modification, or alteration.

(2) A leak test.

(3) A hydrostatic test when the repair, modification, or alteration affects the pressure boundary.

(d) When the pneumatic test on pressure vessels is conducted-

(1) An internal and external visual examination for mechanical damage or deterioration. If a defect is found that may impair the safety of the pressure vessel, a hydrostatic test must be performed.

(2) A leak test.

(3) A Pneumatic test.

(4) ~~A hydrostatic test every fifth year instead of the pneumatic test~~.

(c) The following tests must be made after any repair, modification or alteration to meet the requirements of paragraph (a) of this section:

(1) An internal and external visual examination for correctness and adequacy of repair, modification, or alteration.

(2) A leak test

(3)A hydrostatic test when the repair, modification, or alteration affects the pressure boundary.

(d) When the pneumatic test on pressure vessels is conducted-

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(1) The test pressure must be the maximum allowable working pressure stamped on the pressure vessel; and

(2) The test may be conducted only after suitable precautions are taken to protect personnel and equipment.

(e) When the pneumatic test on pressure piping is conducted:

(1) The test pressure must be no less than 90 percent of the setting of the relief device; and

(2) The test may be conducted only after suitable precautions are taken to protect personnel and equipment.

(f) When a hydrostatic test on a pressure vessel is made, the test pressure must be:

(1) 1.25 times the pressure stamped on the pressure vessel built to division of the ASME Code;

(2) 1.5 times the pressure stamped on the pressure vessel built to division 1 of the ASME Code.

(1) The test pressure must be the maximum allowable working pressure stamped on the pressure vessel; and

(2) The test may be conducted only after suitable precautions are to protect personnel and equipment

(e) When the pneumatic test on pressure piping is conducted:

(1) The test pressure must be no less than 90 percent of the setting of the relief device; and

(2) The test may be conducted only after suitable precautions are taken to protect personnel and equipment.

(f) When a hydrostatic test on a pressure vessel is made, the test pressure must be:

(1) 1.25 times the pressure stamped on the pressure vessel built to division 2 of the ASME Code; and

(2)1.5 times the pressure stamped on pressure vessels built to division 1 of the ASME Code; or

(3)As required by the Code if construction.

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(g) When a hydrostatic test on pressure piping is conducted, the test must be conducted in accordance with the ANSI Code.	(g) When a hydrostatic test on pressure piping is conducted, the test must be conducted in accordance with the Code of Construction	
(h) When the leak test on pressure vessels or pressure piping is conducted:	(h) When the leak test on pressure vessels or pressure piping is conducted:	
(1) The test must be conducted with the breathing mixture normally used in service;	(1) The test must be conducted with the breathing mixture normally used in service;	
(2) The test must be conducted at the maximum allowable working pressure; and	(2) The test must be conducted at maximum allowable working pressure; and	
(3) The test pressure must be maintained for a minimum of 10 minutes to allow checking all joints, connections, and regions of high stress for leakage.	(3) The test pressure must be maintained for a minimum of 10 minutes to allow checking all joints, connection, and regions of high stress for leakage.	

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RECORDS	**RECORDS**	
§ 197.480 Logbooks.	§ 197.480 Logbooks.	
(a) The person-in-charge of a vessel or facility required by 46 U.S.C. 201 to have an official logbook shall maintain the logbook on form CG-706.	(a) The person-in-charge of a vessel or facility required by 46 U.S.C. 201 to have an official logbook shall maintain the logbook on form CG-706.	
(b) The person-in-charge of a vessel or facility not required by 46 U.S.C. 201 to have an official logbook shall maintain, on board, a logbook for making the entries required by this subpart.	(b) The person-in-charge of a vessel or facility not required by 46 U.S.C. 201 to have an official logbook shall maintain, on board, a logbook for making the entries required by this subpart.	
(c) The diving supervisor conducting commercial diving operations from a vessel or facility subject to this subpart shall maintain a logbook for making the entries required by this subpart.	(c) The diving supervisor conducting commercial diving operations ~~from a vessel or facility subject to this subpart~~ shall maintain a logbook for making the entries required by this subpart.	
	(d) The Diver Conducting a commercial diving operation shall maintain a log box as prescribed in § 197.406	

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Existing 46CFR Chapter 1	Proposed modifications and or additions	Comments
§ 197.482 Logbook entries.	§ 197.482 Logbook entries.	
(a) The person-in-charge shall insure that the following information is recorded in the logbook for each commercial diving operation:	(a) The person-in-charge shall insure that the following information is recorded in the logbook for each commercial diving operation:	
(1) Date, time, and location at the start and completion of dive operations.	(1) Date, time, and location at the start and completion of dive operations.	
(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).	(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).	
(3) Name of the diving supervisor.	(3) Name of the diving supervisor.	
(4) General nature of work perfonned.	(4) General nature of work performed. (5) The person in charge will see that a written emergency contingency plan has been posted complete with- (i) The dive site location (ii) The nearest emergency facility: (iii) Location. (iv) Radio channel and or (v) Phone number (vi) Name of the Person in Charge [vii) Name of the Dive Supervisor (viii) Owner (ix) Address (x) Phone (xi) Contractor (xii) Address (xiii) Phone (xiv) The United States Coast Guard **(local** district)	

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(A) Location.
(B) Radio channel and or
(C) Phone number

(xv) A description of the procedure to be implemented in the event of an emergency

(b) The diving supervisor shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time, and location at the start and completion of each dive operation.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Names of dive team members including diving supervisor.

(4) General nature of work performed.

(5) Repetitive dive designation or elapsed time since last hyperbaric exposure if less than 24 hours for each diver.

(6) Diving modes used.

(b) The diving supervisor shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time, and location at the start and completion of dive operations.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Names of dive team members, ~~including~~ diving supervisor (s) including diver certification numbers.

(4) General nature of work performed.

(5) Repetitive dive designation or elapsed time since last hyperbaric exposure if less than 24 hours for each diver.

(6) Diving modes used.

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(7) Maximum depth and bottom time for each diver.
(8) Name of person-in-charge.

(7) Maximum depth and bottom time for each diver.
(8) Name of person-in-charge.

(9) For each dive outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas, the breathing gases and decompression table designations used.

(9) <u>For each dive the breathing gases and decompression table designations used</u>.

(10) When decompression sickness or gas embolism is suspected or symptoms are evident-
(i) The name of the diver; and
(ii) A description and results of treatment.

(10) When decompression sickness or gas embolism is suspected or symptoms are evident-
(i) The name of the diver; and
(ii) A description and results of treatment

(11) For each fatality or any diving related injury of illness that results in incapacitation of more than 72 hours or requires any dive team member to be hospitalized for more than 24 hours-
(i) The date;
(ii) Time;
(iii) Circumstances; and
(iv) Extent of any injury of illness.

(11) For each fatality or any diving related injury or illness that requires professional medical assistance
(i) The date;
(ii) Time
(iii) Circumstances; and
(iv) Extent of any injury of illness.

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Existing 46CFR Chapter I	Proposed modifications and or additions	Comments
(c) The diving supervisor shall insure that the following is recorded in the logbook for each diving operation deviating from the requirements of this subpart:	(c) The diving supervisor shall insure that the following is recorded in the logbook for each diving operation deviating from the requirements of this subpart;	
(1) A description of the circumstances leading to the situation.	(1) A description of the circumstances leading to the situation.	
(2) The deviations made.	(2) The deviations made.	
(3) The corrective action taken, if appropriate, to reduce the possibility of recurrence.	(3) The corrective action taken, if appropriate, to reduce the possibility of recurrence.	
(d) The diving supervisor shall insure that a record of the following is maintained:	(d) the diving supervisor shall insure that a record of the following is maintained	
(1) The date and results of each check of the medical kits.	(1) The date and results of each check of the medical kits.	
(2) The date and results of each test of the air compressor.	(2) The date and results of each test of the air compressor.	
(3) The date and results of each check of the breathing mixtures	(3) The date and results of each check of breathing mixtures.	
(4) The date and results of each check of each breathing supply system.	(4) The date and results of each check of each breathing supply system.	
(5) The date, equipment cleaned, general cleaning procedure, and names of persons cleaning the diving equipment for oxygen service.	(5) The date, equipment cleaned, general cleaning, procedure, and names of persons cleaning the diving equipment for oxygen service.	

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(6) The date and results of each test of the breathing supply hoses and system.

(6) The date and results of each test of the breathing supply hoses and system.

(7) The date and results of each inspection of the breathing gas supply system.

(7) The date and results of each inspection of the breathing gas supply system.

(8) The date and results of each test of depth gages and timekeeping devices.

(8) The date and results of each test of depth gages and timekeeping devices.

(9) The date and results of each test and inspection of each PVHO.

(9) The date and results of each test and inspection of each PVHO.

(10) The date and results of each inspection of the diving equipment.

(10) The date and results of each inspection of the diving equipment.

(11) The date and results of each test and inspection of pressure piping.

(11) The date and results of each test and inspection of pressure piping.

(12) The date and results of each test and inspection of volume tanks and cylinders.

(12) The date and results of each test and inspection of volume tanks and cylinders.

(e) The diving supervisor shall insure that a notation concerning the location of the information required under paragraph (d) is made in the logbook.

(e) The diving supervisor shall insure that a notation concerning the location of the information required under paragraph (d) is made in the logbook.

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NOTE: R.S. 4290 (46 U.S.C. 20 1) requires that certain entries be made in an official logbook in addition to the entries required By this section; and R.S. 4291 (46 U.S.C. 202) prescribes the manner of making those entries.

§ 197.484 Notice of casualty.

(a) In addition to the requirements of subpart 4.05 of this chapter and 33 CFR 146.0 I-20, the person-in-charge shall notify the Officer-in-Charge, Marine Inspection, as soon as possible after a diving casualty occurs, if the casualty involves any of the following:

(1) Loss of life.
(2) Diving -related injury to any person causing incapacitation for more than 72 hours.
(3) Diving-related injury to any person requiring hospitalization for more than 24 hours.
(b) The notice required by this section must contain the following:
(1) Name and official number (if applicable) of the vessel or facility.
(2) Name of the owner or agent of the vessel or facility.
(3) Name of the person-in-charge.
(4) Name of the diving supervisor.
(5) Description of the casualty including presumed cause.
(6) Nature and extent of the injury to

NOTE: R.S. 4290 (46 U. S.C. 201) requires that certain entries be made in an official logbook in addition to the entries required By this section; and R.S. 4291 (46 U.S.C. 202) prescribes the manner of making those entries.

§ 197.484 Notice of casualty.

(a) In addition to the requirements of subpart 4.05 of this chapter and 33 CFR 146.0 l-20, the person-in-charge shall notify the Officer-in-Charge, Marine Inspection, as soon as possible after a diving casualty occurs, if the casualty involves any of the following:

(1) Loss of life.
(2) Diving -related injury to any person causing incapacitation for more than 48 hours.
(3) Diving-related injury to any person requiring hospitalization for more than 24 hours.
(b) The notice required by this section must contain the following:
(1) Name and official number (if applicable) of the vessel or facility.
(2) Name of the owner or agent of the vessel or facility.
(3) Name of the person-in-charge.
(4) Name of the diving supervisor.
(5) Description of the casualty including presumed cause.
(6) Nature and extent of the injury to

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persons.

(c) The notice required by this section is not required if the written report required by § 197.484 is submitted within 5 days of the casualty.

§ 197.486 Written report of casualty.

The person-in-charge of a vessel or facility for which a notice of casualty was made under § 197.484 shall submit a report to the Officer-in-Charge, marine Inspection, as soon as possible after the casualty occurs, as follows:

(a) On Form CG-2692, when the diving installations on a vessel.

(b) Using a written report, in narrative form, when the diving installation is on a facility. The written report must contain the information required by § 197.484.

(c) The report required by this section must be accompanied by a copy of the report required by § 197.4 10 (a)(9) when decompression sickness is involved.

(d) The report required by this section must include information relating to alcohol or drug involvement as required by §4.05-12 of this chapter.

(The reporting requirement in paragraph (a) was approved by OMB under control number 2 115-0003)

[CGD 76-009,43 FR 53683, Nov. 16, 1978, as amended by CGD 82-023, 47 FR 35748, Aug. 16, 1982; 48 FR 43328, Sept. 23, 1983; CGD 84-099, 52 FR 47536, Dec. 14, 1987]

persons.

~~(c) The notice required by this section is not required if the written report required by § 197.484 is submitted within 5 days of the casualty.~~

§ 197.486 Written report of casualty.

The person-in-charge of a vessel or facility for which a notice of casualty was made under § 197.484 shall submit a report to the Officer-in-Charge, marine Inspection, as soon as possible after the casualty occurs, as follows:

(a) On Form CG-2692, when the diving installations on a vessel.

(b) Using a written report, in narrative form, when the diving installation is on a facility. The written report must contain the information required by § 197.484.

(c) The report required by this section must be accompanied by a copy of the report required by § 197.410 (a)(9) when decompression sickness is involved.

(d) The report required by this section must include information relating to alcohol or drug involvement as required by §4.05-12 of this chapter.

(The reporting requirement in paragraph (a) was approved by OMB under control number 2 115-0003)

[CGD 76-009,43 FR 53683, Nov. 16, 1978, as amended by CGD 82-023, 47 FR 35748, Aug. 16, 1982; 48 FR 43328, Sept. 23, 1983; CGD 84-099, 52 FR 47536, Dec. 14, 1987]

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$197.448 Retention of records after casualty

(a) The owner, agent, or person-in-charge of a vessel or facility for which a report of casualty is made under § 197.484 shall retain all records onboard that are maintained on the vessel or facility and those records required by this subpart for 6 months after the report of casualty is made or until advised by the Officer-in-Charge, Marine Inspection, that records need not be retained on board.

(b) The records required by paragraph (a) of this section to be retained on board include, but are not limited to the following:

(1) All logbooks required by § 197.480.

(2) All reports required by § 197.402(a)(2)(ii), § 197.404(a)(4), § 197.410(a)(9).

(c) The owner, agent, person-in-charge, or diving supervisor shall, upon request, make the records described in this section available for examination by any Coast Guard official authorized to investigate the casualty.

9197.448 Retention of records after casualty

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(b) The records required by paragraph (a) of this section to be retained on board include, but are not limited to the following:

(1) All logbooks required by § 197.480.

(2) All reports required by § 197.402(a)(2)(ii), § 197.404(a)(4), § 197.4 1 O(a)(9).

(c) The owner, agent, person-in-charge, or diving supervisor shall, upon request, make the records described in this section available for examination by any Coast Guard official authorized to investigate the casualty.

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Existing 46CFR Chapter I

Proposed modifications and or additions

Comments

APPENDIX A TO PART 197-AIR NO DECOMPRESSON LIMITS

The following table gives the depth versus bottom time limits for single, no-decompression, air dives made within any 12-hour period. The limit is the maximum bottom time in minutes that a diver can spend at that depth without requiring decompression beyond that provided by a normal ascent rate of 60 fsw per minute. (Although bottom time is concluded when ascent begins, a slower time thereby requiring decompression.) An amount of nitrogen remains in the tissues of a diver after any air dive. Whenever another dive is made within a 12-hour period, the nitrogen remaining in the blood and body tissues of the diver must be considered when calculating his decompression.

AIR NO-DECOMPRESSION LIMITS

Depth (feet):	No- Decompression Limits (minutes)
35	310
40	200
50	100
60	60
70	50
80	40
90	30
100	2.5
110	20

~~APPENDIX A TO PART 197-AIR NO DECOMPRESSON LIMITS~~

~~The following table gives the depth versus bottom time limits for single, no-decompression, air dives made within any 12-hour period. The limit is the maximum bottom time in minutes that a diver can spend at that depth without requiring decompression beyond that provided by a normal ascent rate of 60 fsw per minute. (Although bottom time is concluded when ascent begins, a slower time thereby requiring decompression.) An amount of nitrogen remains in the tissues of a diver after any air dive. Whenever another dive is made within a?2 hour period, the nitrogen remaining in the blood and body tissues of the diver must be considered when calculating his decompression.~~

~~AIR NO-DECOMPRESSION LIMITS~~

~~Depth (feet):~~	~~No- Decompression Limits (minutes)~~
~~35~~	~~31~~
~~40~~	~~200~~
~~50~~	~~100~~
~~0~~	~~60~~
~~Zn~~	~~50~~
~~80~~	~~40~~
~~90~~	~~30~~
~~inn~~	~~25~~
~~in~~	~~20~~

This regulation cannot quote specific decompression or treatment tables. It can only require that properly tested, proven tables be utilized in a commercial diving operation. The regulations should include the requirement for proper supporting documentation for any and all tables used by a commercial diver

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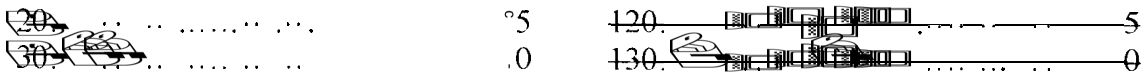

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Part 4

Canadian Commercial Diving Regulations

(For reference only)

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Fax 425 861 0525

24 HOUR HOT LINE 1 800 675 0740

DiveSafe@msn.com

(Canadian Diving Regulations for reference only)

Ontario (Canada) Ministry of Labour Diving Regulations

REGULATION MADE UNDER THE
OCCUPATIONAL HEALTH AND SAFETY ACT
DIVING OPERATIONS
PART I
INTERPRETATION

1. In this Regulation,

"adequate", in relation to a procedure, material, device, object or any other thing, means sufficient for its intended and actual use and sufficient to protect a worker from damage to the worker's body or health, and "adequately" has a corresponding meaning;

"atmospheric diving" means diving where the diver is always at one atmosphere;

"atmospheric diving system" means a diving system designed to withstand external pressures greater than one atmosphere while the internal pressure remains at one atmosphere, and includes a one-person submarine and the one-atmosphere chamber of a lock-out submersible;

"bail-out system" means an emergency breathing mixture supply worn by a diver;

"bottom time" means the total elapsed time measured in minutes, from the time a descending diver leaves the surface to the time the diver begins final ascent, rounded to the next whole minute;

"breathing mixture" means a mixture of gases for human respiration and includes pure oxygen;

"decompression" means the procedure that a diver follows during the ascent from depth in order to minimize the risk of decompression sickness;

"deep diving" means diving to depths greater than 165 feet;

"dive site" means a surface location at which diving personnel and equipment are located in support of the underwater work site;

"diver" means,

(a) an atmospheric diving system operator, and
(b) a worker who performs work underwater at any pressure greater than one atmosphere, and includes a standby diver who dives in the event of a health or safety emergency;

"diver's tender" means a person who assists a diver at the dive site by monitoring the diver's equipment, communicating with the diver and otherwise monitoring the diver's health and safety;

"diving operation" means work performed underwater by divers or work performed on the surface in support of divers, and includes underwater inspection, investigation, excavation, construction; alteration, repair or maintenance of equipment, machinery, structures or ships and the salvage of sunken property;

"employer associated with a diving operation" means an employer of,

(a) a diver who participates in the diving operation,

(b) a standby diver who participates in the diving operation,
(c) a diver's tender who participates in the diving operation,
(d) a diving supervisor for the diving operation,
(e) a hyperbaric chamber operator who participates in the diving operation,
(f) a life support technician who participates in the diving operation, or
(g) any other worker who participates in the diving operation at or near the dive site or underwater work site;

"hyperbaric chamber" means a pressure vessel and associated equipment designed for pressures greater than one atmosphere;

"lifeline" means a safety rope used to tether a diver;

"liveboating" means a diving operation conducted from a vessel the propeller of which is turning, whether the vessel is stationary or moving;

"locked-out" means made inoperable by means that are under the direct control of the diving supervisor or a person authorized by the diving supervisor;

"lock-out submersible" means a self-propelled submersible that is fitted with a submersible compression chamber from which a diving operation can be carried out and that has a separate one-atmosphere chamber from which the submersible is operated;

"mixed gas" means a breathing mixture other than air;

"non-saturation diving" means diving in which decompression occurs during ascent from the underwater work site;

"saturation diving" means diving in which the decompression procedure used allows a bottom time of unlimited duration;

"saturation chamber" means a hyperbaric chamber that is equipped to permit divers to remain under pressure for an unlimited period of time;

"stage" means a cage, basket, platform or other device in or on which a diver may be lowered to or raised from an underwater work site but does not include a submersible compression chamber, an atmospheric diving system or a lock-out submersible;

"standby diver" means a person who stands by at the dive site prepared to rescue a submerged diver should rescue become necessary;

"submersible compression chamber" means a hyperbaric chamber that has the capacity to transport divers at pressures greater than one atmosphere from the surface to an underwater work site and back and includes a submersible compression chamber that is part of a lock-out submersible;

"submersible compression chamber attendant" means a diver in a submersible compression chamber who,
(a) assists a diver who has exited from the chamber by monitoring the diver's equipment, monitoring the diver's health and safety and communicating with the diving supervisor, and
(b) stands by prepared to rescue a diver who has exited from the chamber should rescue become necessary;

"surface-supplied diving" means diving where the diver is supplied with a breathing mixture through an umbilical bundle, whether or not a submersible compression chamber is used;

"umbilical bundle" means a composite of hoses, wires and cables designed to supply services, such as breathing mixtures, power, heat and communications, from the surface to a diver or to a submersible compression chamber;

"underwater work site" means the underwater location where work is performed;

"water control structure" includes dams, head gates, stop logs, turbine intake gates and pump intake gates;

"wet bell" means a stage that is equipped with a dry upper compartment

PART II
GENERAL
Application

2. (1) This Regulation applies in relation to,
   (a) any diving operation; and
   (b) any function in support of a diving operation.
   (2) Despite subsection (I), this Regulation does not apply in relation to,
      (a) any diving operation the purpose of which is to train people for recreational diving;
      (b) any diving operation in which the only underwater breathing equipment used is snorkelling equipment;
      (c) a dive the sole purpose of which is to respond to an unforseen emergency situation involving imminent danger to the life, health or safety of any person, if the dive is undertaken voluntarily; or
      (d) any function in support of a diving operation described in clause (a) or(b) or any dive described in clause (c).
   (3) For the purposes of clause (2) ©, a dive is not undertaken voluntarily if it is related to a diving operation in relation to which the diver is paid.

Method of Giving Notice to Ministry

3. (1) A written notice that is required by this Regulation to be given to the Ministry shall be given by delivering it to the Diving Notice Address or by delivering it by facsimile transmission using the Diving Notice Facsimile Transmission Number.
   (2) An oral notice that is required by this Regulation to be given to the Ministry shall be given by telephoning the Diving Notice Telephone Number.
   (3) The Diving Notice Address, the Diving Notice Facsimile Transmission Number and the Diving Notice Telephone Number may be obtained from any Director.

Equivalency

4. (1) An employer, owner, constructor or diving supervisor may vary a procedure required by this Regulation or a composition, design, size or arrangement of a material, object or device or thing required by this Regulation if,
   (a) the varied procedure, composition, design, size, or arrangement affords protection for the health and safety of workers that is at least equal to the protection that would otherwise be afforded;
   (b) written notice of the variance has been given,
      (i) to the joint health and safety committee or the health and safety representative, if any, or
      (ii) to the Ministry, if there is no joint health and safety committee or health and safety representative; and
   (c) a copy of the notice is available for inspection by an inspector at the dive site whenever the variance is used in a diving operation.

(2) Subsection (1) does not apply in respect of any requirement in the *Act* or this Regulation to give notice.

Duties of Employers, Constructors and Owners

5. (1) Each constructor of a project where a diving operation is to take place, each employer associated with a diving operation and each owner associated with a diving operation shall ensure that the Ministry is given notice of the diving operation.

(2) Notice under subsection (1) shall be given,

(a) in writing before the diving operation begins; or

(b) orally before the diving operation begins and in writing within 30 days after the day on which the diving operation begins.

(3) Despite subsection (2), where a breathing mixture other than air is expected to be used in the diving operation, the notice shall be given in writing before the diving operation begins.

(4) Written notice under subsection (1) shall be given on a form obtained for the purpose from the Ministry and shall include the following:

1. Information sufficient to permit an inspector to locate the dive site.
2. The expected starting date and duration of the diving operation.
3. The dates when and times of day during which the diving operation is expected to be carried out.
4. The name, mailing address and telephone number of an owner, constructor or employer who is associated with the diving operation.
5. The name of the diving supervisor appointed under section 6.
6. The expected maximum depth of any dive in the diving operation.
7. A description of the tasks expected to be performed in the diving operation.
8. The breathing mixtures expected to be used in the diving operation.
9. A statement whether the diving operation is to be offshore or onshore.
10. A statement whether recirculating S.C.U.B.A. is to be used in the diving operation.
11. A statement whether the diving operation is one to which Part XI applies.

(5) Oral notice under subsection (1) shall include the following:

1. Information sufficient to permit an inspector to locate the dive site.
2. The expected starting date and duration of the diving operation.
3. The dates when and times of day during which the diving operation is expected to be carried out.
4. The name, mailing address and telephone number of an owner, constructor or employer who is associated with the diving operation.
5. A statement whether the diving operation is to be offshore or onshore.

(6) Each person responsible for ensuring that notice of a diving operation is given under subsection (1) shall also ensure that notice is given in writing to the Ministry of any departure from the plans described in the notice under subsection (I).

(7j Notice under subsection (6) shall be given before the departure where reasonably possible and, in any event, as soon as reasonably possible.

6. Each person responsible for ensuring that notice of a diving operation is given under subsection 5 (1) shall also ensure,

(a) that one or more competent persons are appointed as diving supervisors for the diving operation; and

(b) that one of the persons appointed under clause (a) is present at the dive site or, where required by clause 49 (3) (b), in the lock-out submersible, and is acting as diving supervisor whenever the diving operation is being carried out.

7. (1) Each person responsible for ensuring that notice of a diving operation is given under subsection 5 (1) shall also ensure that a written operational plan and a written contingency plan for the diving operation are prepared, with input from one or more of the diving supervisors appointed for the diving operation under section 6.

(2) An operational plan shall,

(a) describe the tasks to be performed in the diving operation;

(b) state how the tasks referred to in clause (a) are to be performed;

(c) state how the hazards that could be encountered in the diving operation are to be identified and handled; and

(d) state which agencies, plants and facilities will be given notice under section 9.

(3) A contingency plan shall,

(a) include instructions for communicating with medical assistance in the event of an emergency;

(b) outline emergency procedures for the evacuation of an injured diver from the dive site;

(c) outline emergency procedures for responding to any significant failure of a component of any diving equipment;

(d) outline emergency procedures for responding to a loss of communications with a diver;

(e) outline emergency procedures for responding to hazardous weather or ice conditions;

(f) outline emergency procedures for aborting a dive; and

(g) outline emergency procedures for responding to any inability of an offshore dive site to maintain station.

8. Each person responsible for ensuring that notice of a diving operation is given under subsection 5 (1) shall also ensure that each of the following is available for inspection by an inspector at the dive site whenever the diving operation is being carried out:

1. A copy of any written notice that has been given in respect of the diving operation under subsection 5 (1).
2. Where written notice has not yet been given in respect of the diving operation under subsection 5 (I), a written statement including the date of the oral notice given in respect of the diving operation and the name of the person to whom the oral notice was given.
3. A copy of the operational plan prepared for the diving operation under section 7.
4. A copy of the contingency plan prepared for the diving operation under section 7.
5. A copy of this Regulation.
6. A copy of any standard published by the Canadian Standards Association and referred to in this Regulation that may apply to the diving operation.

9. (1) Each person responsible for ensuring that notice of a diving operation is given under subsection 5 (1) shall also ensure that notice of the diving operation is given to,

(a) each law enforcement agency that,
(i) has responsibilities in relation to the area in which the dive site is located, and
(ii) would need to know about the diving operation in order to ensure that it is carried out safely and in a manner that takes into account other activities and events in the area;
(b) each industrial plant that is within two kilometres of the dive site and might discharge effluent that would be harmful to the health or safety of a worker associated with the diving operation; and
(c) each water control facility, such as a hydro-electric authority, or water intake plant that is within one kilometre of the dive site.

(2) For the purposes of clause (1) (a), examples of law enforcement agencies include harbour commissions, harbour masters, navigable water authorities and police departments.

(3) For the purposes of subsection (1), notice is given to an agency, plant or facility when it is given to a person with control over or responsibility for the agency, plant or facility.

(4) Notice under subsection (1) shall include the following:
1. Information sufficient to permit the person receiving the notice to locate the dive site.
2. The expected starting date and duration of the diving operation.
3. The dates when and times of day during which the diving operation is expected to be carried out.
4. The name, mailing address and telephone number of an owner, constructor or employer who is associated with the diving operation.

(5) Notice under subsection (1) shall be given before the diving operation begins and may be given orally or in writing.

10. (1) Each person responsible for ensuring that notice of a diving operation is given under subsection 5 (1) shall also ensure that the Ministry is given written notice if any of the following incidents occur in connection with the diving operation:
1. A diver becoming trapped underwater.
2. A diver failing to comply with the decompression requirements of this Regulation.
3. Failure of any diving equipment posing a risk to the health or safety of a diver.
4. Emergency rescue of a diver in a submersible compression chamber or atmospheric diving system.
5. Emergency use of a recompression chamber.
6. A person becoming unconscious.
7. A diver suffering from decompression sickness.

(2) A notice under subsection (1) shall be given within two days of the incident and shall include the following:

1. The name, mailing address and telephone number of an owner, constructor or employer associated with the diving operation.
2. The nature and circumstances of the incident and the injury or illness, if any, sustained by any person as a result of the incident.
3. The time and place of the incident.

4. The name and address of any person who sustained injury or illness as a result of the incident.
5. The steps taken to prevent a recurrence.

Notices and Reports

11. (1) A written report under subsection 5 1 (1) of the *Act* respecting an occurrence in which a person is killed or critically injured shall set out,
(a) the name and address of the person submitting the report;
(b) the nature and the circumstances of the occurrence and the bodily injury sustained by the person;
(c) a description of any machinery, equipment or procedure involved;
(d) the time and place of the occurrence;
(e) the name and address of the person who was killed or critically injured;
(f) the names and addresses of all witnesses to the occurrence;
(g) the name and address of the physician or surgeon, if any, by whom the person was or is being attended for the injury; and
(h) the steps taken to prevent a recurrence.

(2) A written notice under subsection 52 (1) of the *Act* respecting an occurrence shall set out,
(a) the name and address of the person submitting the notice;
(b) the nature and the circumstances of the occurrence and the injury or illness sustained by any person as a result of the occurrence;
(c) a description of any machinery, equipment or procedure involved;
(d) the time and place of the occurrence;
(e) the name and address of any person who sustained injury or illness as a result of the occurrence;
(f) the names and addresses of all witnesses to the occurrence;
(g) the name and address of the physician or surgeon, if any, by whom the person was or is being attended for the injury or illness; and
(h) the steps taken to prevent a recurrence.

(3) A written notice under subsection 52 (2) of the *Act* respecting an illness shall set out,
(a) the name and address of the person submitting the notice;
(b) the nature of the occupational illness;
(c) the name and address of the worker involved;
(d) the name and address of the physician or surgeon, if any, by whom the worker was or is being attended for the illness; and
(e) the steps taken to prevent a recurrence.

Duties of Diving Supervisors

12. (1) The diving supervisor for a diving operation shall have his or her diving log book or equivalent statement of diving experience at the dive site and available for inspection by an inspector.

(2) The diving supervisor for a diving operation shall be present at the dive site or, where required by clause 49 (3) (b), in the lock-out submersible and shall be in direct control of the diving operation whenever the diving operation is being carried out.

(3) The diving supervisor for a diving operation shall,

(a) ensure that the operational plan and the contingency plan for the diving operation are followed;

(b) brief the workers associated with the diving operation on the operational plan, the contingency plan and the procedures to be followed during the diving operation;

(c) ensure that each diver participating in the diving operation is competent and fit to perform the work;

(d) ensure that each diver has his or her diving log book at the dive site and available for inspection by an inspector;

(e) immediately before each dive, review the nature of the hazards that could be encountered in the underwater work site and brief divers on those hazards;

(f) ensure that any diving equipment to be used in the diving operation is examined by a competent person at least once on each day on which it is to be used, before the use, and is tested and repaired as appropriate;

(g) ensure that, whenever the diving operation is being carried out, adequate warning devices are displayed to indicate the area around the dive site that is to be kept clear of any equipment other than that associated with the diving operation;

(h) except in the case of a health or safety emergency, ensure that a diver is not permitted to remain at any depth longer than the maximum time planned for the depth of the dive;

(i) supervise all decompression and therapeutic recompression in strict accordance with adequate decompression procedures and tables;

(j) terminate or interrupt the diving operation if, in the diving supervisor's opinion, continuance of the operation is likely to endanger the health or safety of any worker.

(4) The diving supervisor for a diving operation shall supervise the standby divers associated with the diving operation and, in particular, shall,

(a) ensure that an adequate number of standby divers are present and properly positioned at the dive site so that each submerged diver can be reached as quickly as possible in the event that he or she needs to be rescued;

(b) ensure that no person is permitted to act as a standby diver unless he or she is adequately trained, having regard to the depths and circumstances in which the standby diver would have to operate should a rescue become necessary;

(c) ensure that each standby diver is adequately dressed and has adequate diving and communication equipment checked, ready and at hand, having regard to the depths and circumstances in which the standby diver would have to operate should a rescue become necessary;

(d) ensure that each standby diver who uses S.C.U.B.A. is equipped with a lifeline that is at least 10 feet longer than the lifeline of any submerged diver whom the standby diver might need to rescue;

(e) ensure that each standby diver who uses surface-supplied diving equipment is equipped with an umbilical bundle that is at least 10 feet longer than the

umbilical bundle of any submerged diver whom the standby diver might need to rescue;

(f) ensure that no standby diver is assigned to any duties other than,

(i) duties of standby diver,

(ii) where the standby diver is also acting as diving supervisor, duties of diving supervisor, and

(iii) duties of communicating with a submerged diver;

(g) ensure that no standby diver dives except in the event of a health or safety emergency;

(h) ensure that each standby diver has his or her diving log book at the dive site and available for inspection by an inspector; and

(i) ensure that no person is permitted to act as a standby diver unless he or she is knowledgeable about,

(i) the operational plan and the contingency plan for the diving operation,

(ii) the diving equipment to be used in the diving operation,

(iii) the diving signals to be used in the diving operation,

(iv) the in-water decompression procedures to be used in the diving operation, and

(v) any emergency procedures that might have to be used in the diving operation.

(5) The diving supervisor for a diving operation shall supervise the divers' tenders associated with the diving operation and, in particular, shall,

(a) ensure that a diver's tender is acceptable to each diver to be tended by him or her;

(b) ensure that no diver's tender is assigned to any duties other than,

(i) duties of diver's tender,

(ii) where the diver's tender is also acting as diving supervisor, duties of diving supervisor, and

(iii) duties permitted to be performed by a diver's tender under clause 30 (1) (d);

(c) ensure that no person is permitted to act as a diver's tender unless he or she is knowledgeable about the matters mentioned in clause (4) (i).

(6) The diving supervisor for a diving operation shall supervise the submersible compression chamber attendants associated with the diving operation and, in particular, shall,

(a) ensure that, whenever a submersible compression chamber is being used to carry out the diving operation, a submersible compression chamber attendant is present in the chamber;

(b) ensure that no person is permitted to act as a submersible compression chamber attendant unless he or she is adequately trained, having regard to the depths and circumstances in which the attendant would have to operate should a rescue become necessary;

(c) ensure that each submersible compression chamber attendant is adequately dressed and has adequate diving and communication equipment checked, ready and at hand, having regard to the depths and circumstances in which the attendant would have to operate should a rescue become necessary;

(d) ensure that each submersible compression chamber attendant is equipped with a lifeline that is at least 10 feet longer than the lifeline of any diver who has

exited the submersible compression chamber and whom the attendant might need to rescue;

(e) ensure that each submersible compression chamber attendant is equipped with an umbilical bundle that is at least ten feet longer than the umbilical bundle, if any, of any diver who has exited the submersible compression chamber and whom the attendant might need to rescue;

(f) ensure that no submersible compression chamber attendant is assigned to any duties other than those of submersible compression chamber attendant;

(g) ensure that no submersible compression chamber attendant exits the submersible compression chamber underwater except in the event of a health or safety emergency;

(h) ensure that each submersible compression chamber attendant has his or her diving log book at the dive site and available for inspection by an inspector;

(i) ensure that a submersible compression chamber attendant is acceptable to each diver to be attended by him or her;

(j) ensure that no person is permitted to act as a submersible compression chamber attendant unless he or she is knowledgeable about the matters mentioned in clause (4)(i).

(7) Except in the event of a health or safety emergency or where required by subsection (2), a person acting as a diving supervisor for a diving operation shall not dive.

Duties of Divers and Standby Divers

13. (1) Before participating in a diving operation, a diver or standby diver shall ensure that he or she,

(a) understands the operational plan and the contingency plan for the diving operation;

(b) is aware of the hazards that could be encountered in the underwater work site;

(c) has his or her diving log book at the dive site and available for inspection by an inspector;

(d) has undergone a medical examination in accordance with section 32;

(e) has a physician's statement, obtained in accordance with section 32, at the dive site and available for inspection by an inspector;

(f) is not fatigued;

(g) is not impaired in his or her diving ability because of consumption of alcohol or drugs; and

(h) is satisfied that all workers associated with the diving operation have an adequate understanding of the operational plan and the contingency plan.

(2) A diver or standby diver who is unfit to dive shall promptly inform the diving supervisor of that fact and shall refrain from diving or from acting as standby diver.

(3) Immediately before diving, while at the dive site, a diver or standby diver shall check that he or she has all the necessary personal diving equipment and that it is all functioning properly.

(4) At the onset of any sign of equipment malfunction or distress on the part of any submerged diver, a diver shall, if possible, notify the diver's tender, the diving supervisor and any diving partner and terminate the dive.
(5) On completion of any dive for which this Regulation does not require decompression, a diver, other than an atmospheric diving system operator, shall remain under observation in the presence of the diving supervisor for a period set by the diving supervisor.
(6) On completion of any dive for which this Regulation requires decompression, a diver, other than an atmospheric diving system operator, shall remain under observation at the dive site for at least one hour.
(7) Where the diving supervisor is of the opinion that, because of the nature of a dive to which subsection (6) applies, a diver should remain under observation for a period longer than one hour, the diver shall remain under observation at the dive site for such longer period as the diving supervisor sets.
(8) A diver, other than an atmospheric diving system operator, shall not fly at an altitude greater than 1000 feet above the dive site during,
(a) the 12-hour period following a no-decompression dive;
(b) the 24-hour period following an air dive requiring decompression;
(c) the 24-hour period following a mixed gas dive requiring decompression with a bottom time of less than two hours;
(d) the 48-hour period following a mixed gas dive requiring decompression with a bottom time of two hours or longer;
(e) the 72-hour period following a saturation dive; and
(f) any period set by an attending physician following treatment for decompression sickness.
(9) A standby diver shall ensure that he or she,
(a) does not dive except in the event of a health or safety emergency;
(b) does not perform any duties other than,
(i) duties of standby diver,
(ii) where he or she is also acting as diving supervisor, duties of diving supervisor, and
(iii) duties of communicating with a submerged diver; and
(c) is adequately dressed and has adequate diving and communication equipment checked, ready and at hand, having regard to the depths and circumstances in which the standby would have to operate should a rescue become necessary.
(10) A submersible compression chamber attendant shall ensure that he or she,
(a) does not exit the submersible compression chamber except in the event of a health or safety emergency;
(b) does not perform any duties other than those of a submersible compression chamber attendant; and
(c) is adequately dressed and has adequate diving and communication equipment checked, ready and at hand, having regard to the depths and circumstances in

Duties of Diver's Tenders

14. A diver's tender shall ensure that he or she does not perform any duties other than,
    (a) duties of diver's tender;
    (b) where he or she is also acting as diving supervisor, duties of diving supervisor; and
    (c) duties permitted to be performed by a diver's tender under clause 30 (1) (d).

PART III
EQUIPMENT

Diving Equipment - General

15. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that all diving equipment to be used in the diving operation is adequate.
    (2) Without limiting the generality of subsection (l), each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that all diving equipment to be used in the diving operation,
        (a) is of sound construction and adequate strength and is free from patent defects;
        (b) is adequately maintained;
        (c) is tested and repaired by a competent person in accordance with the manufacturer's recommended procedures; and
        (d) is constructed in a way that ensures against malfunctions caused by low air or water temperatures or by the expansion of air or gas.
    (3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that all written material necessary for adequate dive site maintenance and operation of all diving equipment to be used in the diving operation is available at the dive site.
    (4) For the purposes of subsection (3), examples of written material include operation manuals, field manuals, maintenance manuals, alerts and safety checklists.
    (5) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any compressed gas cylinder to be used in the diving operation is hydrostatically tested and visually inspected in accordance with the Canadian Standards Association Standard, Z275.2-92, "Occupational Safety Code for Diving Operations".

Personal Diving Equipment

16. (1) A diver participating in a diving operation and the diving supervisor for the diving operation shall ensure that the diver is adequately equipped.
    (2) A standby diver participating in a diving operation and the diving supervisor for the diving operation shall ensure that the standby diver is adequately equipped.
    (3) Without limiting the generality of subsection (1), a diver, other than an atmospheric diving system operator, participating in a diving operation and the diving supervisor for the diving operation shall ensure that the diver is equipped with,
        (a) a knife that is adequately strong and sharp;
        (b) adequate weights;

(c) an adequate diving suit or, where a diving suit is not necessary because of the circumstances of the dive, other adequate protective clothing;
(d) an adequate diving harness that,
(i) is strong enough to lift the diver and his or her personal equipment from the water in an emergency,
(ii) is equipped with a positive buckling device, and
(iii)where the diver wears an umbilical bundle, is equipped with an attachment point for the lifeline that adequately ensures against strain on the diver's hose, mask and helmet.

(4) Without limiting the generality of subsection (2), a standby diver participating in a diving operation and the diving supervisor for the diving operation shall ensure that the standby diver is equipped with the things mentioned in subsection (3).

Dive Site Equipment

17. (1) The diving supervisor for a diving operation shall ensure that, whenever diving is in progress, the dive site is adequately equipped.

(2) Without limiting the generality of subsection (1), the diving supervisor for a diving operation shall ensure, whenever diving is in progress, that the dive site is equipped with,
(a) an adequate quantity of oxygen for use for therapeutic purposes in the event of an emergency;
(b) a first-aid kit that is adequate having regard to the nature and circulnstances of the diving operation;
(c) a set of adequate decompression tables;
(d) where appropriate because of temperature conditions, an adequate climate-controlled facility for the use of workers that is located at or adequately near to the dive site;
(e) an adequate two-way communication system connecting the dive site with medical assistance;
(f) adequate means to facilitate the entry and exit of divers to and from the water;
(g) adequate means to facilitate the immediate exit from the water of an unconscious diver; and
(h) any other equipment that may be required to protect the health and safety of workers, having regard to the nature and circumstances of the diving operation.

(3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that the dive site is of sufficient size to accommodate all workers and equipment needed for the diving operation without overcrowding.

(4) Where a diving operation is to be conducted from an offshore dive site, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that, whenever there are workers present at the dive site,
(a) there are at least two adequate means of evacuating workers from the dive site; or

(b) a boat equipped with an adequate primary motor and an adequate back-up motor is available at the dive site as a means of evacuating workers from the dive site.

(5) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any vessel used in the diving operation is capable of maintaining station or of being anchored or moored without risk to any diver.

Lifelines

18. (1) The diving supervisor for a diving operation shall ensure that an adequate lifeline is attached to each diver, other than an atmospheric diving system operator, participating in the diving operation at all times when he or she is in the water.

(2) Without limiting the generality of subsection (1), the diving supervisor for a diving operation shall ensure that any lifeline used in the diving operation,

(a) is of sound construction and adequate strength and is free from patent defects;

(b) is adequately maintained;

(c) is free of knots, other than knots necessary to attach the lifeline to the diver and the dive site, is free of splices and has a breaking strength of not less than 2450 kilograms;

(d) is securely attached to the diver's harness;

(e) is no longer than is reasonably required to perform the work;

(f) where the diver is using surface-supplied diving techniques, is attached securely to the dive site;

(g) where the diver is using S.C.U.B.A., is attached securely to the dive site or to a float visible to the diver's tender;

(h) where the diver is operating from a submersible compression chamber or a lock-out submersible, is attached securely to the chamber or submersible;

(i) where the diver is using surface-supplied diving techniques, is tended at all times by a diver's tender by continuously holding the lifeline;

(j) where the diver is using S.C.U.B.A., is tended at all times by a diver's tender, by continuously holding the lifeline or, in the case of a lifeline attached to a float, by continuously observing the float;

(k) where the diver is operating from a submersible compression chamber, is attended at all times by a submersible compression chamber attendant by continuously holding the lifeline; and

(l) where the diver is using an umbilical bundle, is incorporated in the umbilical bundle.

(3) Despite subsection (1) and clauses (2) (g) and (j), where because of the nature of the work a diver using S.C.U.B.A. cannot operate safely while tethered by a lifeline to the dive site or a float, the diving supervisor may permit the diver to operate untethered, so long as the diver is accompanied by another diver who,

(a) is using a lifeline in accordance with clauses (2) (g) and (j); and

(b) is in continuous visual contact with the untethered diver.

Communications

19. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that each submerged diver is connected to the dive site or, where the diving supervisor is in the one atmosphere chamber of a lock-out submersible, to the diving supervisor, by a two-way communication system that is adequate and that meets the requirements of subsections (2) to (5).

(2) Subject to subsection (3), the two-way communication system may be by voice or by pre-arranged line signals.

(3) The two-way communication system must be by voice where,

(a) the depth of the dive exceeds 100 feet;

(b) a diver uses any power tool, explosive, burning equipment or welding equipment;

(c) a diver directs the use of any hoisting device to place any materials underwater while the diver is underwater;

(d) a diver works in or near a pipe, tunnel, duct, underwater intake or other confined space or in or near a water control structure;

(e) a diver places any materials underwater in a way that poses a risk to the health or safety of the diver;

(f) an atmospheric diving system is used;

(g) a wet bell is used;

(h) a submersible compression chamber is used; or

(i) the diving operation is one to which Part XI applies.

(4) For the purposes of clause (3) (d), a diver works near a thing where the proximity of the thing to the diver poses a health or safety risk to the diver.

(5) The two-way voice communication system must,

(a) afford sound reproduction that enables the diver's breathing to be heard clearly; and

(b) where a breathing mixture containing helium or any other gas that significantly distorts voice transmission is used, unscramble voices effectively.

(6) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that,

(a) all communication through a two-way voice communication system used for a dive to a depth greater than 165 feet or for a dive using an atmospheric diving system is continuously recorded; and

(b) the recordings referred to in clause (a) are saved for at least 48 hours after they are made.

(7) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that each submerged diver operating at a depth greater than 100 feet is connected to the dive site by an adequate back-up two-way communication system that is independent of the primary communication system required by subsection (1).

(8) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any atmospheric diving system or submersible

compression chamber used in a diving operation is provided with an adequate back-up two-way communications system that is independent of the primary communications system required by subsection (1).

Cranes and Hoisting Devices

20. (1) Where a crane or other hoisting device is used to lower a stage carrying a diver into the water, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that,

(a) the crane or other hoisting device remains available throughout the dive for the immediate recovery of the diver if required in the event of an emergency; and

(b) except in the event of an emergency, all directions to the operator of the crane or other hoisting device are given, throughout the dive, by the diver, the diver's tender or the diving supervisor.

(2) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that a diver who is being lowered in a stage into the water by means of a crane or other hoisting device is continuously able to communicate with the diving supervisor by using pre-arranged visual or line signals or a two-way voice communication system.

(3) Each employer associated with a diving operation shall ensure that any crane or other hoisting device used in a diving operation is adequate.

(4) Without limiting the generality of subsection (3), each employer associated with a diving operation shall ensure that any crane or other hoisting device used in a diving operation,

(a) is of sound construction and adequate strength and is free from patent defects;

(b) is equipped with a failsafe mechanism that will prevent the boom from descending or telescoping in the event of a power source failure or hoisting system failure;

(c) is equipped with a brake or mechanical locking device that is applied automatically when the control lever, handle or switch is not held in the operating position;

(d) is equipped with brakes that can stop and hold one hundred per cent of the maximum working load with the outermost layer of wire on the drum;

(e) is so constructed that any brakes that are power released will be applied automatically on loss of power;

(f) is so constructed that the lowering and raising of loads is controlled by power drives that are independent of the brake mechanism;

(g) is not fitted with a pawl-and-ratchet gear on which the pawl has to be disengaged before commencing the lowering or raising the load; and

(h) is constructed in a way that ensures against malfunctions at low temperatures.

(5) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any crane or other hoisting device to be

used in the diving operation is adequately maintained and is examined by a competent person at least once on each day on which it is to be used.

(6) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any cable used with a crane or other hoisting device in the diving operation is used in accordance with the Code for Cable, Slings and Rigging, dated July 4, 1994 and issued by the Ministry.

(7) Where a crane or other hoisting device is used to lower a submersible compression chamber or atmospheric diving system into the water, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that, except in the event of an emergency, all directions to the operator of the crane or other hoisting device are given, throughout the dive, by the diving supervisor.

(8) Where a crane or other hoisting device is used to lower a submersible compression chamber or atmospheric diving system into the water, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that the crane or other hoisting device is equipped with,

(a) a primary lifting cable that permits the chamber or system to be lowered safely to the maximum depth of the dive and to be returned safely to the surface, without undue lateral, vertical or rotational movement;

(b) a secondary lifting cable that is,

(i) readily available at the dive site, and

(ii) compatible with the secondary lifting eye or similar device.

(9) Where a crane or other hoisting device is used to lower a submersible compression chamber that is not part of a lock-out submersible into the water, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that, during any air-water interface transfer, the crane or other hoisting device is equipped with a safety rope that will, in the event of the primary cable breaking, cause the chamber to stop immediately below the turbulent wave zone.

Fall Arrest Systems

21. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that an adequate system to arrest the fall of a stage is used whenever a diver is being lowered into the water by a stage and there is a possibility that the stage might fall,

(a) a distance of more than 10 feet;

(b) into or onto operating machinery; or

(c) into or onto a hazardous substance or object.

(2) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that the fall arrest system,

(a) is adequately secured to a fixed support at the dive site or to a line that is securely fastened to a fixed support at the dive site;

(b) is so designed that if the stage falls, the stage will be suspended not more than five feet below the location it occupied before the fall; and

(c) is attached to a secondary lifting eye or similar device that is of at least the same strength as the primary lifting eye for the stage.

(3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that the fixed support referred to in clause (2) (a) is capable of resisting any arrest forces in the event of a fall and is free of sharp edges that might cut or chafe the connection between the fall arrest system and the fixed support.

Stages

22. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any stage used in the diving operation is adequate.

(2) Without limiting the generality of subsection (1), each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any stage used in the diving operation,

(a) is of sufficient size to accommodate all workers and equipment needed for the diving operation without overcrowding;

(b) is secure against tipping and spinning;

(c) does not contain any equipment that might interfere with an occupant's foothold or handhold;

(d) is so constructed or equipped that the occupants are secure against falling out of the stage;

(e) is equipped with hand and foot holds arranged so that crushed hand and foot injuries are avoided;

(f) is designed in accordance with good engineering practice; and

(g) is so constructed that it is adequate for the purpose for which it is to be used.

Hyperbaric Chambers

23. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that a hyperbaric chamber is at the dive site during any dive that exceeds,

(a) the no-decompression limit given by the decompression tables used for the dive; or

(b) a depth of 100 feet.

(2) Subsection (1) does not apply in relation to a dive where the diver is always at one atmosphere.

(3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that a hyperbaric chamber is at the dive site during any dive where that would be reasonable in the circumstances for the protection of the diver.

(4) Each employer associated with a diving operation shall ensure that any hyperbaric chamber used on land in the diving operation has been registered with the Ministry of Consumer and Commercial Relations, Technical Standards Division, for use in Ontario.

(5) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any hyperbaric chamber used in the diving operation, other than as a submersible compression chamber or saturation chamber, conforms to and is operated in accordance with the requirements specified in clauses 1 to 9 of the Canadian Standards Association Standard, Z275.1-93, "Hyperbaric Facilities".

(6) Each employer associated with a diving operation and the diving supervisor for a diving operation shall, in the case of a dive for which a hyperbaric chamber is used other than as a submersible compression chamber or saturation chamber, ensure that a quantity of air or adequate mixed gas is available with the hyperbaric chamber that is twice the quantity required,

(a) to pressurize the hyperbaric chamber to a pressure equivalent to the pressure at the greatest depth in respect of which the hyperbaric chamber is used in the dive or to the pressure at 165 feet, whichever is greater; and

(b) to ventilate the hyperbaric chamber at this pressure.

Gauges and Metering Equipment

24. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any gauge or metering equipment to be used in the diving operation is adequate and has been tested by a competent person within the 12-month period immediately preceding any use of it.

(2) Where it appears, whether from inconsistent readings or otherwise, that any gauge or metering equipment to be used in a diving operation may be malfunctioning, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that the gauge or metering equipment is examined and repaired by a competent person so that it operates adequately before its next use.

(3) Where the examination and repair required by subsection (2) do not occur immediately after it appears that a gauge or metering equipment may be malfunctioning, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that, until the examination and repair occur, the gauge or metering equipment is clearly labelled in a way that states that it is not to be used until repaired.

PART IV
BREATHING MIXTURES
General Requirements

25. (1) The diving supervisor for a diving operation shall ensure that no diver participating in the diving operation is permitted to dive without a breathing mixture and breathing mixture supply system that are adequate, having regard to the depths and circumstances in which the diver will be operating.

(2) The diving supervisor for a diving operation shall ensure that any breathing mixture used in the diving operation conforms to Canadian Standards Association Standard, Z275.2-92, "Occupational Safety Code for Diving Operations".

(3) Except for decompression or therapeutic purposes, the diving supervisor for a diving operation shall ensure that no diver participating in the diving operation is given pure oxygen as a breathing mixture unless notice is given under paragraph 10 of subsection 5 (4).

(4) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any breathing mixture supply system used in the diving operation is designed to ensure that,

(a) an interruption of the breathing mixture supply to one diver will not affect the supply of breathing mixture to any other diver; and

(b) an interruption of the primary breathing mixture supply to a diver will not affect the delivery of breathing mixture from,

(i) any emergency bail-out system worn by the diver,

(ii) any emergency reserve system worn by the diver, or

(iii)any secondary breathing mixture supply;

(c) an interruption of the primary breathing mixture supply to a submersible compression chamber will not affect the delivery of breathing mixture from any emergency reserve system attached to the chamber; and

(d) an interruption of the primary breathing mixture supply in an atmospheric diving system will not affect delivery of breathing mixture from any secondary breathing mixture supply in the atmospheric diving system.

Quantities of Primary and Secondary Breathing Mixture Supplies

26. (1) The diving supervisor for a diving operation shall ensure that the total supply of breathing mixture that is available at the dive site at any time during a dive consists of,

(a) an adequate primary supply to complete the dive as planned; and

(b) an adequate secondary supply.

(2) The secondary supply referred to in clause (1) (b) shall at the start of a dive consist of,

(a) in the case of a dive in which S.C.U.B.A. is used, one complete S.C.U.B.A. unit, including regulator and fully charged cylinder, in addition to the sets required for the divers and standby divers;

(b) in the case of a dive in which surface-supplied diving techniques are used, an adequate supply of breathing mixture to allow the diver to return to the surface and undergo any in-water decompression that might be required;

(c) in the case of a dive in which a submersible compression chamber or atmospheric diving system is used, an adequate supply of breathing mixture to enable the occupants of the chamber or system to return to the surface;

(d) in the case of a dive in which an on-line gas blender or diver's gas recovery system is used, an adequate supply of premixed breathing mixture to allow the divers to return to the surface and undergo any in-water decompression that might be required; and

(e) in the case of a dive in which a hyperbaric chamber is used, an adequate supply of breathing mixture to allow the diver to undergo any decompression that might be required and undergo any treatment that might be required for decompression sickness.

Emergency Reserve and Bail-out Systems

27. A diver participating in a diving operation and the diving supervisor for the diving operation shall ensure that, when an emergency bail-out system or an emergency reserve system is used in the diving operation,

(a) an adequate breathing mixture is provided in the system; and

(b) the total quantity of the breathing mixture in the system is,

(i) when carried by the diver, sufficient to enable the diver to safely reach the surface, submersible compression chamber, lock-out submersible or wet bell, as the case may be,

(ii) when carried by a submersible compression chamber that is not part of a lock-out submersible, sufficient to meet the needs of the occupants of the chamber for a minimum of 24 hours, and

(iii)when carried by a lock-out submersible or atmospheric diving system, sufficient to meet the needs of the occupants of the submersible or system for a minimum of 48 hours.

Breathing Mixtures Containing Nitrogen

28. Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that, when nitrogen is a component of any breathing mixture used in the diving operation, the mixture is not used at depths where the nitrogen partial pressure in the breathing mixture exceeds 4.8 bars.

Purity of Breathing Mixtures

29. Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that the purity of any breathing mixture used in the diving operation conforms to the Canadian Standards Association Standard, Z275.2-92 "Occupational Safety Code for Diving Operations".

Compressor Requirements

30. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that,

(a) any compressor and associated equipment used in the diving operation to supply a breathing mixture conforms to the requirements of the Canadian Standards Association Standard Z275.1-93 "Hyperbaric Facilities" and the Canadian

Standards Association Standard B-5 1 “Code for the Construction and Inspection of Boilers and Pressure Vessels”;

(b) any compressor used in the diving operation to supply a breathing mixture directly to a diver,

(i) is capable of maintaining a supply of breathing mixture at least equal to double the volume of breathing mixture required by the diver, at a pressure at least 25 per cent greater than the maximum pressure required to supply the breathing mixture to the diver, and

(ii) operates automatically and without undue fluctuation of pressure in the receiver;

(c) any compressor used in the diving operation to supply a breathing mixture directly to a diver discharges the mixture through purification filters and into a receiver of adequate volume; and

(d) any compressor and associated equipment used in the diving operation is operated by a competent person, who may be the diver’s tender.

(2) The operator of a compressor shall ensure that the compressor and associated equipment, including valves, stop valves, drain-cocks, gauges and filters, are operating adequately throughout the dive.

Oxygen Supply Systems

31. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any oxygen supply system used in the diving operation,

(a) is designed specifically to supply oxygen;

(b) is adequate having regard to the circumstances of the diving operation;

(c) is designed so that the possibility of contamination of the oxygen by hazardous elements, including other gases, is minimized;

(d) is designed so that the possibility of contamination of other breathing mixtures being used in the diving operation by oxygen is minimized;

(e) does not include quick-opening valves, such as ball valves, except for emergency shut-off

(f) is adequately clean; and

(g) is designed so that it will not deliver oxygen at a pressure greater than 150 pounds per square inch above the pressure of the maximum diving depth.

(2) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any area where oxygen is stored is,

(a) adequately ventilated;

(b) adequately posted with warning signs;

(c) equipped with an adequate fire extinguishing apparatus;

(d) adequately maintained; and

(e) located as far as practicable from combustible materials.

PART V
MEDICAL PROCEDURES
Medical Examinations

32. (1) No person shall dive, other than as an atmospheric diving system operator, unless he or she,
    (a) has undergone a medical examination to determine fitness to dive during the 24-month period preceding the dive or during such shorter period preceding the dive as has been recommended by the person's examining physician; and
    (b) has obtained a written statement from the examining physician who performed the most recent examination under clause (a), indicating whether the diver is fit to dive or fit to dive with limitations.
    (2) An examination under subsection (1) shall be performed by a physician who is knowledgeable in diving and hyperbaric medicine and shall follow the Code for Medical Examination of Divers, dated July 4, 1994, and issued by the Ministry.
    (3) No person shall dive as an atmospheric diving system operator unless he or she,
    (a) has undergone a medical examination to determine fitness to operate an atmospheric diving system during the 24-month period preceding the dive or during such shorter period preceding the dive as has been recommended by the person's examining physician; and
    (b) has obtained a written statement from the examining physician that meets the requirements of subsection (4) and that indicates that the diver is fit to operate an atmospheric diving system or fit to operate an atmospheric diving system with limitations.
    (4) A written statement under clause (1) (b) or (3) (b) shall include the examining physician's name and address and shall be signed by the physician.

Emergency Training

33. (1) Each employer associated with a diving operation shall ensure that up-to-date certification in cardio-pulmonary resuscitation and basic first aid is held by,
    (a) each person appointed as diving supervisor for the diving operation;
    (b) each diver participating in the diving operation; and
    (c) whenever the diving operation is being carried out, at least one worker at the dive site in addition to the people mentioned in clauses (a) and (b).

(2) For the purposes of subsection (1), certification may be from

St. John Ambulance, Canadian Red Cross Society or an equivalent organization

Medical Assistance

34. Each employer associated with a diving operation shall ensure that arrangements are made with one or more physicians who are knowledgeable in diving and hyperbaric medicine so that any medical advice or support that may be required is available whenever,
    (a) a dive that involves decompression is carried out; or

(b) a dive to a depth greater than 100 feet is carried out using techniques other than those of atmospheric diving.

Decompression Procedures and Tables

35. The diving supervisor for a diving operation shall ensure that dives that involve decompression are carried out in accordance with adequate decompression procedures and tables.

PART VI
S.C.U.B.A. DIVING

Prohibitions on **S.C.U.B.A.** Use

36. (1) The diving supervisor for a diving operation shall ensure that S.C.U.B.A. is not used by,
    (a) a diver working near or in an operating underwater intake;
    (b) a diver working near or in a pipe, tunnel, duct or other confined space;
    (c) a diver working at a water control structure;
    (d) a diver using any power tool, hoisting device, explosive, burning equipment or welding equipment;
    (e) a diver placing any materials underwater in a way that poses a risk to the health or safety of the diver;
    (f) a diver operating at depths in excess of 100 feet; or
    (g) a diver working in a diving operation to which Part XI applies.

(2) For the purposes of clauses (1) (a) and (b), a diver works near a thing where the proximity of the thing to the diver poses a health or safety risk to the diver.

Minimum Crew

37. (1) Whenever S.C.U.B.A. is used, each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that,
    (a) an adequate number of diver's tenders, and in any event at least one diver's tender, is present at the dive site;
    (b) an adequate number of standby divers, and in any event at least one standby diver, is present at the dive site;
    (c) an adequate number of divers, and in any event at least one diver, is present at the dive site; and
    (d) one person does not act at the same time both as diver's tender and as standby diver for one or more divers.

(2) Whenever S.C.U.B.A. is used, the diving supervisor may also function either as a standby diver or as a diver's tender.

S.C.U.B.A. Diving Equipment

38. (1) A diver using open circuit S.C.U.B.A. in a diving operation and the diving supervisor for the diving operation shall ensure that the open circuit S.C.U.B.A. is equipped with,
    (a) a demand regulator;
    (b) a tank with a quick release harness; and
    (c) an emergency reserve system or emergency bail-out system.

(2) A diver using S.C.U.B.A. in a diving operation and the diving supervisor for the diving operation shall ensure that the diver is equipped with,

    (a) an adequate face mask;
    (b) an adequate pair of fins;
    (c) an adequate submersible pressure gauge; and
    (d) where the S.C.U.B.A. is to be used during hours of darkness, an adequate locater device, such as a rescue beacon or strobe.

PART VII
SIJRFACE-SUPPLIED DIVING

Minimum Crew

39. (1) Whenever surface-supplied diving is being carried out, each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that;
    (a) an adequate number of diver's tenders, and in any event at least one diver's tender, is present at the dive site;
    (b) an adequate number of standby divers, and in any event at least one standby diver, is present at the dive site;
    (c) an adequate number of divers, and in any event at least one diver, is present at the dive site;
    (d) except in a health or safety emergency, there is a separate diver's tender for each diver engaged in surface-supplied diving; and
    (e) one person does not act at the same time both as a diver's tender and as a standby diver for one or more divers engaged in surface-supplied diving.
    (2) For the purposes of subsection (1), the diving supervisor may also function either as a standby diver or as a diver's tender.
    (3) Whenever a hyperbaric chamber is required by subsection 23 (1) or (3) and surface-supplied diving is being carried out, each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that,
    (a) the requirements of subsection (1) are met; and
    (b) a competent worker who does not have any duties that would interfere with his or her adequate operation of the chamber is available to operate the chamber.
    (4) For the purposes of subsection (3), the diving supervisor may also function as one of the following:
    1. A standby diver.
    2. A diver's tender.
    3. A chamber operator.
    (5) Whenever surface supplied diving is carried out in a diving operation to which Part XI applies, each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that,
    (a) the requirements of subsection (1) or (3), as the case may be, are met; and
    (b) the diving supervisor does not have any duties other than the duties of a diving supervisor.

Breathing Mixture Supply Lines

40. (1) The diving supervisor for a diving operation shall ensure that any breathing mixture supply line used in surface-supplied diving,
    (a) is adequate;
    (b) has an internal diameter sufficient to permit adequate flow rates and pressures;
    (c) is protected in a way that ensures against damage at the dive site; and
    (d) is protected against kinking.

(2) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that each breathing mixture supply line used in surface-supplied diving is fitted with an adequate breathing mixture supply valve.

(3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that the breathing mixture supply valve of any diver engaged in surface-supplied diving is,

(a) readily accessible to dive site personnel;

(b) protected in a way that ensures against damage at the dive site;

(c) clearly marked to permit dive site personnel to identify the diver whose breathing mixture supply it controls; and

(d) under the care and control of a competent person.

(4) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that each breathing mixture supply line used in surface-supplied diving is fitted with an adequate pressure gauge installed,

(a) downstream of the diver's supply valve, except where the diver's supply valve is a position indicating valve; and

(b) in a way that permits dive site personnel a clear and unobstructed view of its dial and figures.

Helmets, Masks and **Hookah**

41. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any diver engaged in surface-supplied diving wears a diving helmet or full face mask or uses a hookah that meets the requirements of subsections (2) to (4).

(2) A helmet, face mask or hookah must be,

(a) adequate;

(b) fitted with an adequate non-return valve; and

(c) attached by a hose to an adequate emergency bail-out system that is,

(i) worn by the diver, and

(ii) not used for suit-inflation.

(3) A helmet or mask shall be fitted with an adequate locking or fastening device.

(4) A helmet shall be fitted with an adequate and compatible attachment system for securing and sealing the helmet in place.

PART VIII
DEEP DIVING
General Requirements

42. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any diver engaged in deep diving, other than atmospheric diving, is provided with an adequate breathing mixture that is mixed gas.

(2) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that deep diving is not carried out unless,

(a) an adequate stage, downline, structure or other means is available to enable the diver to maintain the decompression stop depths and times specified in the decompression tables used for the dive without undue exertion and movement; and

(b) the diving supervisor has a means of,

(i) monitoring the depth of each diver,

(ii) controlling the pressures at which breathing mixtures are being supplied to each diver; and

(iii) analysing the breathing mixtures being supplied to each diver;

(3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that a submersible compression chamber that meets the requirements of Part IX is used to transfer personnel under pressure greater than one atmosphere to and from the underwater work site during any dive where,

(a) bottom time exceeds 30 minutes and depth is greater than 165 feet;

(b) bottom time exceeds 25 minutes and depth is greater than 195 feet; or

(c) depth exceeds 230 feet.

Exposure Limits and Rest Periods

43. (1) The diving supervisor for a diving operation shall ensure that a diver who has engaged in deep diving using non-saturation diving techniques does not work at a pressure greater than one atmosphere during the 24-hour period immediately following completion of decompression.

(2) The diving supervisor for a diving operation shall ensure that a diver who has engaged in deep diving using saturation diving techniques does not work at a pressure greater than one atmosphere during the

14-day period immediately following completion of decompression, except as permitted by a physician who is knowledgeable in diving and hyperbaric medicine.

(3) The diving supervisor for a diving operation shall ensure that a diver who has engaged in deep diving using saturation diving techniques observes the following limits:

1. In the case of a dive to a depth of 500 feet or less using a submersible compression chamber, no diver shall spend, seal to seal,

i. more than four hours in the water, or

ii. more than 10 hours in the submersible compression chamber.

2. In the case of a dive to a depth greater than 500 feet using a submersible compression chamber, no diver shall spend, seal to seal,

i. more than three hours in the water, or

ii. more than eight hours in the chamber.

3. A diver shall not work for at least 12 continuous hours immediately after reaching a limit set out in subparagraph i of paragraph 1, subparagraph ii of paragraph 1, subparagraph i of paragraph 2 or subparagraph ii of paragraph 2 and, in any event, a diver shall not work for at least 12 continuous hours in any 24-hour period.

PART IX
SUBMERSIBLE COMPRESSION CHAMBERS, SATURATION CHAMBERS AND ATMOSPHERIC DIVING SYSTEMS

Submersible Compression Chamber Construction and Equipment

44. Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any submersible compression chamber used in the diving operation,

(a) conforms to and is operated in accordance with the requirements specified in clauses 1 to 9 and 13 of the Canadian Standards Association Standard, Z275.1-93, "Hyperbaric Facilities";

(b) is capable of mating to a hyperbaric chamber that conforms to the requirements specified in clauses 1 to 9 and, in the case of saturation diving, clause 12 of the Canadian Standards Association Standard, Z275.1-93, "Hyperbaric Facilities";

(c) is adequately equipped to permit the transfer of persons under pressure into and out of a hyperbaric chamber;

(d) is of adequate size and design to accommodate the number of occupants that it is to carry during the diving operation without overcrowding;

(e) is designed in a way that permits divers to enter and exit with ease;

(f) is designed to permit a diver to disconnect or shear the umbilical bundle of the chamber in the event of a health or safety emergency;

(g) is provided with an adequate mechanism for shedding ballast weights that,

(i) can be operated from within the chamber, and

(ii) is designed in a way that ensures against accidental shedding of the weights;

(h) is equipped with,

(i) adequate doors and hatches that act as pressure seals and that may be opened from either side,

(ii) adequate valves, gauges and other fittings to control pressure within the chamber and to clearly indicate internal and external pressures,

(iii) adequate pressurization valves and main exhaust valves that are spring-loaded so as to close when not held in the open position,

(iv) adequate primary lighting equipment and emergency back-up lighting equipment,

(v) adequate first aid equipment,

(vi) adequate hoisting equipment to recover an unconscious or injured diver into the chamber,

(vii) adequate heating equipment,

(viii) adequate emergency thermal protection for all occupants,

(ix) an adequate emergency stroboscope light,

(x) an adequate emergency locating device,

(xi) adequate instruments to monitor temperature, oxygen and carbon dioxide levels within the chamber,

(xii) adequate primary and emergency carbon dioxide scrubbers,

(xiii) adequate hull shut-off valves on all gas and water penetrations into the chamber,

(xiv) a secondary lifting eye or similar device that is at least as strong as the primary lifting eye,

(xv) a blind port, and

(xvi) an adequate tool kit;

(i) is designed in a way that ensures against inadvertent operation of the secondary breathing mixture supply system; and

(j) is designed in a way that permits the secondary breathing mixture supply to be brought on-line from within the chamber.

Saturation Chamber Construction and Equipment

45. Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any saturation chamber used in the diving operation conforms to and is operated in accordance with the requirements specified in clauses 1 to 9 and 12 of the Canadian Standards Association Standard, Z275.1-93, "Hyperbaric Facilities".

Atmospheric Diving System Construction and Equipment

46. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any atmospheric diving system used in the diving operation,

(a) is designed to permit a diver to disconnect or shear the umbilical bundle of the system in the event of a health or safety emergency;

(b) is provided with an adequate mechanism for shedding ballast weights that,

(i) can be operated from within the system, and

(ii) is designed in a way that ensures against accidental shedding of the weights;

(c) is designed in a way that ensures against inadvertent operation of the secondary breathing mixture supply system;

(d) is designed in a way that permits the secondary breathing mixture supply to be brought on-line from within the system;

(e) is equipped with the things mentioned in subclauses 44 (h) (i), (ii), (iv), (v) and (vii) to (xvi); and

(f) conforms to the requirements for registration set out in,

(i) Det Norske Veritas, "Rules For Certification of Diving Systems", 1988,

(ii) Lloyd's Register, "Rules and Regulations For the Construction and Classification of Submersibles and Underwater Systems", 1989, Notice No. 1, July 17, 1991, or

(iii) American Bureau of Shipping, "Rules For Building and Classing Underwater Vehicles, Systems and Hyperbaric Facilities", 1990.

(2) For the purposes of clause (1) (e), a reference in clause 44 (h) to "chamber" shall be deemed to be a reference to "system".

Lock-out Submersible Construction and Equipment

47. (1) The submersible compression chamber part of a lock-out submersible and the atmospheric diving system part of the lock-out submersible may have in common the weight-shedding mechanism required for submersible compression chambers by

clause 44 (g) and for atmospheric diving systems by clause 46 (1) (b), so long as the mechanism can be operated from within the atmospheric diving system.

(2) The submersible compression chamber part of a lock-out submersible and the atmospheric diving system part of the lock-out submersible may have in common,

(a) the stroboscope required for submersible compression chambers by subclause 44 (h) (ix) and for atmospheric diving systems by clause 46 (1) (e); and

(b) the locating device required for submersible compression chambers by subclause 44 (h) (x) and for atmospheric diving systems by clause 46 (1) (e).

(3) Where a submersible compress& chamber and atmospheric diving system together form a lock-out submersible, each employer associated with a diving operation and the diving supervisor for a diving operation need not comply with clause 44 (f) or 46 (1) (a), if the lock-out submersible as a whole is designed to permit a diver to disconnect or shear the umbilical bundle of the lock-out submersible in the event of a health or safety emergency.

(4) Where a submersible compression chamber and atmospheric diving system together form a lock-out submersible, each employer associated with a diving operation and the diving supervisor for a diving operation need not comply with subclause 44 (h) (xiv) or with the requirement in clause 46 (1) (e) relating to secondary lifting eyes or similar devices, if the lock-out submersible as a whole has a secondary lifting eye or similar device that is at least as strong as the primary lifting eye of the lock-out submersible.

When Submersible Compression Chamber Attendant Required

48. Except in the event of a health or safety emergency, the diving supervisor for a diving operation shall ensure that any diver who exits from a submersible compression chamber is attended continuously by a submersible compression chamber attendant until the diver re-enters the chamber.

Underwater Exit from Submersible Compression Chamber

49. (1) The diving supervisor for a diving operation shall ensure that any diver, other than a submersible compression chamber attendant, who exits underwater from a submersible compression chamber is equipped with an umbilical bundle that is no longer than 100 feet.

(2) The diving supervisor for a diving operation shall ensure that any submersible compression chamber attendant who exits underwater from a submersible compression chamber is equipped with an umbilical bundle that meets the requirements of clause 12 (6) (e).

(3) The diving supervisor for a diving operation shall ensure that no diver exits underwater from the submersible compression chamber of a lock-out submersible unless,

(a) the lock-out submersible is negatively buoyant on the bottom or adequately secured to the underwater work site; and

(b) the diving supervisor is in the one atmosphere chamber of the lock-out submersible.

Breathing Mixtures for Atmospheric Diving

SO. Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that any diver engaged in atmospheric diving is provided with an adequate breathing mixture that has the same proportions of gases as are found in air.

Back-up Atmospheric Diving System

51. Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that, whenever an atmospheric diving system is used to carry out the diving operation, a back-up atmospheric diving system with adequate depth capability is available and can be deployed quickly enough to effect a rescue within 48 hours of an emergency arising.

Minimum Crew

52. (1) Whenever a submersible compression chamber or an atmospheric diving system is used to carry out a diving operation, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that an adequate number of workers is present at the dive site and in the chamber or system.

(2) Whenever a submersible compression chamber is used to carry out non-saturation diving, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that there are at least two workers, not including the diving supervisor and any divers, available at the dive site to assist,

(a) in the launch and recovery of the submersible compression chamber; and

(b) in the operation of the hyperbaric chamber.

(3) Whenever a submersible compression chamber is used to carry out saturation diving, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that there are at least three workers, not including the diving supervisor and any divers, available at the dive site to assist,

(a) in the launch and recovery of the submersible compression chamber;

(b) in the operation of the hyperbaric chamber; and

(c) in the operation of the life-support systems.

(4) Whenever a submersible compression chamber or an atmospheric diving system is used to carry out a diving operation, each employer associated with the diving operation and the diving supervisor for the diving operation shall ensure that at least one of the workers at the dive site is available to render any in-water assistance in the launch or recovery of the chamber or system that may be needed in the event of a health or safety emergency.

PART X
SPECIAL HAZARDS

Liveboating

53. (1) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that liveboating is not conducted,

(a) after sunset and before sunrise;

(b) in sea-state that poses a risk to the health or safety of a diver; or

(c) from vessels with manoeuvrability that is not adequate.

(2) The diving supervisor for a diving operation shall not permit in-water decompression procedures to be used in conjunction with liveboating.

(3) Each employer associated with a diving operation and the diving supervisor for a diving operation shall ensure that, whenever a diver participates in liveboating, a procedure or device that ensures against the diver's umbilical bundle becoming entangled in the propellers is employed.

(4) The diving supervisor for a diving operation shall ensure that any diver's tender participating in liveboating has a continuous unobstructed view of the vessel's captain.

(5) Each employer associated with a diving operation shall ensure that any boat captain participating in liveboating is competent to perform the duties of boat captain during liveboating.

(6) The boat captain and the diving supervisor for a diving operation shall co-operate in carrying out their responsibilities as needed to protect the health and safety of the divers.

Water Flow Hazards

54. (1) The diving supervisor for a diving operation shall ensure that diving is not conducted in hazardous water flow conditions.

(2) Each employer and each owner associated with a diving operation and the diving supervisor for the diving operation shall ensure that, before any dive is begun, any water flow that is a potential hazard to a diver,

(a) is identified and described to the diver; and

(b) is locked-out or controlled in a manner that,

(i) is satisfactory to the diver and diving supervisor; and

(ii) ensures that the water flow poses no safety hazard to the diver.

(3) In complying with subsection (2), each employer and each owner associated with a diving operation and the diving supervisor for the diving operation shall take account of water flow hazards that tend to arise when a diver works,

(a) near or in an operating underwater intake;

(b) near or in a pipe, tunnel, duct or other confined space; or

(c) at a water control structure.

Underwater Mechanisms

55. Each employer and each owner associated with a diving operation and the diving supervisor for a diving operation shall ensure that, before any dive is begun, any mechanism that is a potential hazard to a diver,

(a) is identified and described to the diver; and
(b) is locked-out in a manner that is,
(i) satisfactory to the diver and diving supervisor, and
(ii) adequate to protect the health and safety of the diver.

Use of Explosives

56. Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that,
(a) any transportation, handling, storage or use of explosives is carried out in a manner that does not endanger any worker;
(b) any initiation of explosives is subject to the direct control of the diving supervisor;
(c) the blasting initiator and its operating key or operating mechanism are kept physically separated from each other until initiation of the explosive is to take place; and
(d) no diver is in the water when an underwater explosive is initiated.

PART XI
CONTAMINATED ENVIRONMENTS

Definition

57. In this Part, "contaminant" has the same meaning as in the *Environmental Protection Act.*

Application

58. This Part applies to,
    (a) any diving operation that poses a significant risk to the health or safety of a worker because it is carried out at or near the point of discharge of effluent from an industrial plant, sewage treatment plant or water treatment plant;
    (b) any diving operation that poses a significant risk to the health or safety of a worker because the purpose of the operation is to clean up or contain a contaminant; and
    (c) any diving operation that poses a significant risk to the health or safety of a worker because it is carried out at or near the site of a spill within the meaning of Part X of the *Environmental Protection Act.*

Identification and Precautions

59. (1) Each constructor of a project where a diving operation is to take place, each employer associated with a diving operation, each owner associated with a diving operation and the diving supervisor for a diving operation shall ensure that, before any dive is begun, a competent person identifies each contaminant that is or is likely to be present during the diving operation, at or near the dive site or underwater work site: at a concentration that would pose a significant risk to the health or safety of a worker.

(2) Each constructor of a project where a diving operation is to take place, each employer associated with a diving operation and each owner associated with a diving operation shall ensure that a written contaminant management plan is prepared, with input from one or more of the diving supervisors appointed for the diving operation under section 6.

(3) A contaminant management plan shall,
    (a) name the contaminants identified under subsection (1);
    (b) describe the potential known health or safety risks that the contaminants identified under subsection (1) pose to humans;
    (c) describe the equipment and apparel required to be used by section 60;
    (d) specify the location of the exclusion zone, contaminated reduction zone and support zone required by section 62;
    (e) outline the procedures to be followed by personnel in moving from one zone to another;
    (f) describe the special emergency measures associated with exposure to the contaminants identified under subsection (1), where appropriate; and
    (g) outline procedures for obtaining, within an adequately short time, information relating to,

(i) the handling of the contaminants identified under subsection (I), and
(ii) the administering of any emergency treatment that may become necessary as a result of exposure to a contaminant identified under subsection (1).

(4) The diving supervisor for the diving operation shall ensure that a copy of the plan is prominently posted at the dive site.

Equipment - General

60. (1) Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that,
(a) adequate precautions are taken to ensure that the breathing mixture supply used is not adversely affected by a contaminant identified under subsection 59 (1);
(b) adequate breathing equipment for surface support personnel is provided if there is a risk to their health or safety from inhaling a contaminant identified under subsection 59 (1) during the diving operation;
(c) adequate apparel and equipment is worn to prevent exposing surface support personnel to a contaminant identified under subsection 59 (1);
(d) an adequate means of decontaminating personnel exposed to a contaminant identified under subsection 59 (1) is provided at the dive site;
(e) diving equipment used in the diving operation is not used in any subsequent diving operation unless it is free of all contaminants identified under subsection 59 (1); and
(f) diving equipment that is not for re-use is adequately disposed of.

(2) The diving supervisor for the diving operation shall ensure that,
(a) diving equipment that has been or may have been exposed to a contaminant identified under subsection 59 (1) is examined before each dive to ensure that it has not deteriorated in a way that would result, if it were used in the dive, in a worker being exposed to a contaminant identified under subsection 59 (1); and
(b) diving equipment that has been or may have been exposed to a contaminant identified under subsection 59 (1) is not removed from the dive site except as authorized by a competent person.

Surface-Supplied Diving

61. Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that a diver engaged in surface-supplied diving wears, in addition to the equipment required by section 41,
(a) an adequate diving helmet designed to protect divers from exposure to contaminants; and
(b) an adequate, totally enclosed diving suit that mates to the helmet with a positive seal and locking device and that does not permit contact between the contaminated environment and the diver.

Work Zones

62. (1) Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that the dive site has a clearly marked contamination reduction zone that is adequately designed and equipped to permit,

(a) personnel who have been or may have been exposed to a contaminant identified under subsection 59 (1) to dress and undress; and

(b) equipment and personnel that have been or may have been exposed to a contaminant identified under subsection 59 (1) to be cleaned.

(2) Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that the dive site has a clearly marked support zone that is adequately designed and equipped to permit the further cleaning or the disposal of equipment that has been or may have been exposed to a contaminant identified under subsection 59 (1).

(3) Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that the dive site has a clearly marked exclusion zone that is adequately designed and equipped for the purpose set out in subsection (4).

(4) Each employer associated with a diving operation and the diving supervisor for the diving operation shall ensure that all handling of contaminants identified under subsection 59 (1) that occurs at the dive site and that is not of a sort described in subsection (2) or (3) shall occur in the exclusion zone.

(5) The diving supervisor for the diving operation shall ensure that,

(a) no person enters the exclusion zone unless he or she is wearing adequate personal protective equipment;

(b) personnel enter and leave the exclusion zone only through the contamination reduction zone or the support zone;

(c) no person cleans contaminated equipment in the contamination reduction zone or the support zone unless he or she is wearing adequate personal protective clothing;

(d) no food, drink or tobacco is taken into, left or consumed in the contamination reduction zone, the support zone or the exclusion zone; and

(e) no person enters the contamination reduction zone, the support zone or the exclusion zone without the authorization of the diving supervisor.

PART XII
DIVING RECORDS
Diver's Log Book

63. (1) No person shall dive in a diving operation unless he or she has a diving log book that,
(a) is permanently bound;
(b) has numbered pages;
(c) contains the diver's signature and photograph; and
(d) has attached to it or entered into it a record of any qualifications obtained by the diver that relate to diving; and
(e) has attached to it or entered into it a record of the certification referred to in section 33.

(2) Each person who dives in a diving operation shall make an entry, in accordance with subsections (4) to (7), in the diving log book in respect of each dive, each medical recompression and each hyperbaric exposure carried out or undergone by the person in connection with the diving operation.

(3) No person shall dive in a diving operation unless he or she has made an entry, in accordance with subsections (6) and (7), in the diving log book in respect of any dive of a type described in clause 2 (2) (a), (c) or (d) that the person carried out during the 48 hours preceding the dive that is part of a diving operation.

(4) Entries under subsection (2) shall be made within 48 hours of the dive, medical recompression or hyperbaric exposure and shall appear in the log book in chronological order.

(5) An entry under subsection (2) in respect of a dive shall be signed by the diving supervisor and an entry under subsection (2) in respect of a medical recompression or a hyperbaric exposure shall be signed by the diving supervisor or presiding physician.

(6) An entry under subsection (2) or (3) in respect of a dive shall state,
(a) the type of diving equipment used;
(b) the breathing mixture used;
(c) the time the diver left the surface;
(d) the maximum depth attained;
(e) the time the diver left the bottom;
(f) the time the diver reached the surface;
(g) the time of the surface interval, if a repetitive dive was undertaken;
(h) the decompression table used;
(i) the date;
(j) any unusual incidents; and
(k) the environmental conditions.

(7) In addition, an entry under subsection (2) or (3) in respect of a dive originating from a submersible compression chamber or other submerged base shall state,

(a) the depth at the base;
(b) the maximum and minimum depths attained; and
(c) the duration of the excursions from the base.
(8) A person who is required to have a diving log book shall retain the log book for five years after the date of the last entry in it.

Daily Record

64. (1) The diving supervisor for a diving operation shall make a record in accordance with subsections (2) to (4) in respect of each day of the diving operation.
(2) A daily record shall include an entry in respect of each dive undertaken during the day, stating,
(a) the type of diving equipment used;
(b) whether a hyperbaric chamber was used;
(c) the breathing mixture used;
(d) the time the diver left the surface;
(e) the maximum depth attained;
(f) the time the diver left the bottom;
(g) the time the diver reached the surface;
(h) the time of the surface interval, if a repetitive dive was undertaken;
(i) the decompression table used;
(j) the name of the diver;
(k) the name of the tenders;
(l) the name of the standby diver;
(m)any unusual incidents;
(n) the location of the dive site;
(o) the environmental conditions;
(q) the purpose of the dive; and
(r) any underwater work site hazards.
(3) A daily record shall also include,
(a) a record of equipment examinations, tests and repairs performed during the day under clause 12 (3) (f);
(b) a record of hoisting device maintenance and examinations performed during the day under subsection 20 (5);
(c) a record of oxygen supply system cleaning performed during the day under clause 3 1 (1) (f);
(d) any arrangements for medical advice or support made under section 34 in respect of the day;
(e) a description of any diving vessel used during the day;
(f) a record of any disposal of equipment undertaken during the day under clause 60 (1) (f);
(g) the name of any client on whose behalf the diving operation is being carried out on the day; and
(h) a general description of the purpose of the diving operation on the day.
(4) A daily record shall state the date in respect of which it is made and shall include the name and signature of the diving supervisor.

(5) A diving supervisor who makes a daily record under this section shall file the record with his or her employer within a reasonable time.

(6) An employer with whom a daily record is filed shall retain the record for a period of five years from the day in respect of which it is made, together with the attachments described in subsection (7).

(7) An employer shall attach to the daily record a copy of any notice relating to the day that was given under section 10 or 11.

PART XIII
REVOCATION AND COMMENCEMENT

Revocation

65. Regulation 848 of the Revised Regulations of Ontario, 1990 and Ontario Regulation 514/92 are revoked.

Commencement

66. This Regulation comes into force on December 19, 1994.

Commercial Dive Safety Organization

Dedicated to a safe work place through education

Part 5

Australian Diving Regulations

(For reference only)

Phone4258833500 2795 152nd Ave N.E. Redmond, Washington 98052 Fax4258610525

24HOUR HOT LINE 1 800 675 0740

DiveSafe@msn.com

(Australian Diving Regulations included as reference only)

PART VIII -DIVING

Division 1 - General Requirements

General

Qualifications and Experience

Documentation Requirements

Operating Requirements

Clause 801 - Tests

Clause 802 - Exemption certificates

(1) Subject to sub-clause (2), the Director may, by a certificate in writing, exempt any person or class of persons, any diving operation or class of diving operations, and any plant and equipment, or class of plant and equipment, from any requirement or prohibition imposed by any provision of this Part and any such exemption may be granted subject to conditions and to a limit of time, and may be revoked at any time.

(2) The Director shall not grant any such exemption unless, having regard to

(a) the conditions which the Director proposes to attach to the exemption; and
(b) any other requirements imposed by or under any enactment which apply to the case -

it is established that the health and safety of persons who are likely to be affected by the exemption will not be prejudiced in consequence of it.

Clause 803 - Diver and diver's attendant

(1) A person shall not be a diver unless that person -

(a) has been accredited as having met the terminal objectives outlined in the relevant parts of Australian Standard AS281 5, consistent with the work which that person is called upon to perform during a diving operation; and
(b) has been certified as medically fit to dive in compliance with Clause 816; and
(c) is at least 18 years of age.

(2) A person shall not be a diver's attendant unless that person has sufficient knowledge of –
(a) underwater work;
(b) the signals and communication devices used in diving operations;
(c) decompression procedures;
(d) first-aid; and
(e) equipment used in diving operations

Clause 804 - Systems maintenance, life support and diver medical technicians

(1) Where required under the provisions of Clause 813, there shall be provided an experienced maintenance technician who shall personally, under the supervision of a diving supervisor, undertake and be responsible for the repair, maintenance and safe functioning of equipment used in diving operations.

(2) A person shall not perform the functions referred to in sub-clause (1) unless that person has such knowledge and experience as approved necessary to perform those duties.

(3) Where required under the provisions of Clause 813, there shall be provided an experienced life support technician who shall, under the supervision of the diving supervisor, control and monitor all the systems functions which relate to the "life support", safety and health of any person inside a surface compression chamber.

(4) A person shall not perform the functions referred to in sub-clause (3) unless that person has such knowledge and experience as approved necessary to perform those duties.

(5) Where required under the provisions of Clause 813, there shall be provided a diver medical technician who shall, where required, render advanced first-aid treatment.

(6) A person shall not perform the functions referred to in sub-clause (5) unless that person complies with the provisions of sub-clause 808(3).

Clause 805 - Diving supervisor

(1) A person shall not be a diving supervisor unless that person -

(a) has been trained and experienced in diving, as outlined in Clause 803(l)(a) and (c);

(i) is or has been a competent diver with adequate knowledge and experience of the diving techniques to be used; and
(ii) has been appointed in writing by that person's employer to supervise diving operations; and

(b) during that persons dive, another person satisfying the requirements of Clause 805 has been appointed in writing by their employer to supervise in the Supervisor's absence.

Clause 806 - Diving superintendent

Where the nature or size of a diving operation requires a diving superintendent, a person shall not be a diving superintendent in a diving operation unless that person has been appointed in writing is able to supervise diving operations competently and complies with the requirements of Clause 805.

Clause 807 - Medical practitioner

A medical practitioner referred to in this Part is a medical practitioner who is qualified under the requirements of the United Kingdom Health and Safety Executive or an approved similar body, and whose experience in underwater medicine is acceptable to the Director.

Clause 808 - First aid qualifications

(1) A person shall not commence employment as a diver, diver's attendant or life support technician unless that person can demonstrate competence in general and hyperbaric first-aid treatment as is acceptable to the Director.

(2) A person shall not be a diving supervisor unless -

(a) that person has an approved level of competence in general and hyperbaric medical first-aid treatment; and

(b) that person holds a current hyperbaric first aid, and St. John Ambulance Occupational First Aid Certificate or approved equivalent from an approved training establishment.

(3) A person shall not carry out the duties of a diver medical technician unless that person -

(a) has an approved level of advanced training in underwater medicine and first-aid procedures;

(b) has gained an approved level of competence in the field of that person's expected duties and responsibilities;

(c) is able competently to assess and evaluate the medical condition of a diving casualty, and to attempt to stabilize that casualty's condition;

(d) has such knowledge or experience as will enable that person, under the supervision of a diving supervisor and in consultation with a medical practitioner referred to in Clause 807 by remote radio-voice communication, to carry out specific medical tasks, including -

(i) the accurate reporting of the medical condition of a diving casualty, and the stabilising of that casualty's condition;

(ii) the maintaining of the airway of a casualty; and

(iii) venepuncture, pleurocentesis, catheterisation, sub-cutaneous and intramuscular injections, simple suture techniques and the use of specific anti-venenes for injuries caused by marine animals and the treatment of those injuries; and

(e) has been certified medically fit for exposure to pressures greater than atmospheric pressure.

Clause 809 - Diving manual and maintenance schedule

(1) Prior to the initial commencement of diving operations a manual of safety requirements and procedures ("diving manual") and a schedule of preventative maintenance requirements for diving operations and equipment shall be submitted to the Director for approval.

(2) The diving manual shall include provisions for securing the health and safety of persons engaged in diving operations and in particular provisions covering matters specified in Appendix 7.

Clause 8 10 - Diving operations record

(1) A record of diving operations shall be maintained at the site of all diving operations. Such records shall be an accurate record of all matters relevant to the diving operations as specified in Appendix 8 and shall be signed daily by the diving supervisor.

(3) The records of diving operations referred to in sub-clause (1) shall be retained for at least five years.

Clause 81 1 - Diver's log book

(1) Each diver shall have and maintain a personal log book to be known as the "diver's log book".

(2) The diver's log book shall have affixed in it a clear "head and shoulders" photograph of the diver with that diver's name and signature on it.

(3) Each diver shall record and maintain in the diver's log book -

(a) a report containing, so far as practicable, the details specified in Appendix 9, signed by the diver and by the diving supervisor of the diving operation to which that report relates;

(b) the results of each medical examination of the diver; and

(c) any other matters relating to the diver's suitability to dive that are referred to in Appendix 9.

Clause 8 12 - Emergency drill reports

A record shall be kept of each emergency drill carried out in compliance with Clause 817, including the type of emergency simulated, the results and conclusions drawn and any changes to operation procedures made as a consequence of these results and conclusions.

Clause 8 13 - Manning levels

(1) At all times when any diving operation is or is about to be carried out there shall be present a sufficient number of divers and other competent persons ('the diving team') to ensure so far as is reasonably practicable that the operation can be undertaken safely, and to operate plant, equipment and other facilities necessary for the safe conduct of the operation.

(2) Subject to this Clause and unless otherwise approved, a surface-oriented diving operation shall not be carried out unless, during the period when a diver is in the water, there are present and engaged in that operation a minimum of five persons - one diving supervisor, one diver in the water, one diver's attendant, one standby diver, one standby diver's attendant, or, one diving supervisor with four divers. At all other times during that operation these persons shall be readily available to assist in that operation.

(3) Subject to this Clause and unless otherwise approved, a diving operation involving the use of a diving bell shall not be carried out unless, during the period when a diver is either in a diving bell or in the water, there are present and engaged in that operation,a minimum of six persons - one bell diving supervisor, one diver outside the bell, one standby diver/attendant in the bell, one diver on the surface, two divers attending on the surface, or, a diving supervisor with three bell divers and two diver's attendants. At all other times during that operation these persons shall be readily available to assist in that operation.

(4) Subject to this Clause and unless otherwise approved, a diving operation involving the use of saturation diving techniques shall not be carried out unless, during the period when a diver is either in a diving bell or in the water, there are present and engaged in that operation a minimum of the following - one bell diving supervisor, one life support technician, three bell divers, one system maintenance technician and a sufficient number of diver's attendants to ensure the safety of the operation.

At all other times during that operation these persons shall be readily available to assist in that operation; and

(a) there shall be available on the diving platform or vessel a person other than the diving supervisor who shall have supplementary qualifications to enable that person to carry out the duties of a medical technician outlined in Clause 808(3). (5) (a) Subject to this Clause -

(i) in every diving operation one member of the diving team who is a diver, other than the diving supervisor of that operation, shall be the stand-by diver;

(ii) unless otherwise approved, the stand-by diver shall be at all times in the immediate vicinity of the dive control station and be ready to dive immediately as required but may perform duties which do not prejudice the safety of any diver in the water; and

(iii) where a diving bell is being used, a stand-by diver shall remain in the bell to monitor the diver or divers who leave it and be in immediate readiness to assist them in an emergency.

(b) During surface orientated diving operations, where two divers are in the water at the same time, one may act as stand-by diver for the other provided that both divers have -

(i) visual contact with each other;

(ii) means to communicate with the surface; and

(iii) independent breathing medium supplies.

(6) Nothing in sub-clause (5) shall prevent the stand-by diver or any diver, if instructed to do so by the diving supervisor, from going to the assistance of any other diver in an emergency.

Clause 8 14 - Place from which diving is allowed

Diving operations shall be conducted only from -

(a) a base established on land, a jetty, a platform or a vessel that is at anchor or aground or made fast to the seabed or a fixed structure -

(i) that is safe and suitable for the purpose;

(ii) on which the equipment necessary for the diving operations is kept; and

(iii) that has suitable and safe means of access to and egress from the water for both working divers and any rescue or stand-by diver in an emergency; or

(b) a dynamically positioned vessel -

(i) that is safe and suitable for the purpose;

(ii) that is maintained in position with adequate precautions taken to secure the safety of the divers from any dangers associated with the dynamic positioning system and the flow of water created;

(iii) that is approved for use in diving operations; and

(iv) that complies with the Guidelines for the Operation of Dynamically Positioned Diving Support Vessels.

Clause 8 15 - Place from which diving is allowed

Diving operations at any one location shall not commence unless -

(a) The specifications of the diving plant and equipment have been submitted and approved;

(b) The diving plant and equipment have been inspected by an inspector at that location and have been approved prior to their initial use; and

(c) Pre-dive function tests have been carried out on the diving plant and equipment prior to diving.

Clause 8 16 - Medical examination of divers

Diving operations shall not be carried out unless each diver who dives in those operations –

(a) has, within the period of 12 months before the commencement of those operations, undergone a medical examination by a medical practitioner referred to in Clause 807 in accordance with the Schedule of minimum examination requirements specified in Australian Standard AS 2299;

(b) has, after that medical examination, been declared in a certificate by endorsement in the divers log book given by that medical practitioner to be medically fit to dive; and

(c) has not, since that declaration was made, knowingly ceased to be medically fit to dive.

Clause 8 17 - Emergency drills

At least once during each calendar month, emergency drills shall be carried out from each site of diving operations, and the results recorded on the diving operations record.

Clause 8 18 - Decompression schedules

(1) With the exception of saturation diving operations, diving operations shall not be carried out unless there is used in those operations a decompression schedule that contains an inert gas exposure limiting line, is recognised and approved by the Director, and used in accordance with sub-clause (2).

(2) Where a diver is in a compression chamber and is subjected to pressure above normal atmospheric pressure -

(a) procedures for, or in relation to, decompression or the operation of a surface compression chamber shall be carried out by at least two of the following people - a diving superintendent, diving supervisor, life support technician or diver, one of whom shall be in charge of the operation and one of whom shall be in the immediate vicinity to assist.

For the purpose of this sub-clause, during saturation diving operations the person in charge shall comply with sub-clauses 804(3) and (4).

(c) unless the diving supervisor is one of the persons carrying out the decompression procedures, one of the two persons required by sub-clause (2)(a) shall report immediately to the supervisor the occurrence of any abnormal event during the procedures.

(3) Where a diver has carried out a dive using air as breathing medium and is required to carry out a subsequent dive (or dives) within a period of 12 hours after the commencement of the first dive, the bottom time for each subsequent dive shall be determined by adding, to its bottom time, the bottom times of all previous dives, and the depth to be entered into the decompression schedule in conjunction with that bottom time shall be the maximum of any dive so far carried out within that 12 hour period.

(4) Where a diver has carried out a dive in which the limiting line (as determined by the decompression schedule used for that dive) was reached or exceeded, that person shall not commence another dive for a period of at least 24 hours after completion on the first mentioned dive.which a mixed gas breathing medium was used, that person shall not commence another dive within a period of 24 hours after completion of the first mentioned dive.

(5) Where a diver has undergone saturation diving that person may not commence either surface oriented or bell-bounce diving within a period of 48 hours after the completion of decompression from saturation diving. The initial 24 hour period following that decompression shall be used to monitor the diver for any symptoms of decompression sickness and during this period that person shall remain within the vicinity of the compression chamber and not be subjected to more than light levels of exertion.

(6) No diver shall undergo saturation diving for a period exceeding 28 days from the commencement of compression to the completion of decompression.

Clause 8 19 - Hours of duty

(1) Subject to sub-clause (2), a person engaged in diving operations who is the diving supervisor, diver, diver's attendant, life support technician or systems maintenance technician shall not be on duty for more than 12 hours, either consecutively or in total during any period of 24 hours, not taking into account "handover" briefing periods required for safety reasons.

Clause 820 - Diving depths

(1) Except in an emergency, surface-oriented diving operations involving the use of either air or mixed gas as breathing medium shall not be carried out at a depth exceeding 50 metres.

(2) Except in an emergency, diving operations shall not be carried out at a depth exceeding 50 metres unless those operations involve the use of a diving bell and a suitable mixed gas breathing medium.

(3) Diving operations shall not be carried out at a depth exceeding 300 metres without approval.

Clause 821 - Application for diving beyond 300 metres

An application made to the Director for consent to the carrying out of diving operations at a depth exceeding 300 metres shall include details of -

(a) the equipment proposed to be used;

(b) the decompression schedules proposed to be used;

(c) the therapeutic recompression treatment for decompression sickness proposed to be used; and

(d) other procedures including emergency procedures proposed to be used.

Clause 822 - Decompression - general

A diver who has undergone decompression following a dive shall remain in the vicinity of the surface compression chamber for four hours after the completion of decompression.

Clause 823 - Therapeutic recompression procedures

Where, in diving operations, therapeutic recompression procedures are followed, such procedures shall not be used unless they are procedures, recognised by the diving industry and approved by the Director, or are authorised by a medical practitioner referred to in Clause 807.

Clause 824 - Decompression sickness

(1) Where a diver suffers decompression sickness as a result of carrying out a dive, that diver shall not commence another dive within 24 hours of completing the first-mentioned dive or therapeutic recompression, or such period as a medical practitioner referred to in Clause 807 determines.

(2)(a) Where a person has serious symptoms of decompression sickness, or has suffered a recurrence or relapse of musculo-skeletal decompression sickness, that required further recompression, a medical practitioner referred to in Clause 807 shall be consulted as soon as possible and treatment of the person shall be continued under the supervision of the diving supervisor in consultation with that medical practitioner.

(b) The person referred to in 2(a) above shall not carry out any further diving until that person has been examined and passed as fit to dive by a medical practitioner qualified in underwater medicine as referred to in Clause 807.

Clause 825 - Flying after diving

Precautions shall be taken as far as practicable to ensure that the restrictions on elapsed time between completion of dives and commencement of flying are as given in Australian Standard AS 2299.

Clause 825 - Flying after diving

Precautions shall be taken as far as practicable to ensure that the restrictions on elapsed time between completion of dives and commencement of flying are as given in Australian Standard AS 2299.

Clause 826 - Diving in current

Diving operations shall not be carried out where the velocity of the water current or weather conditions are considered by the diving supervisor to be such that a diver is unable to carry out work safely.

Clause 827 - Diving with self-contained breathing equipment

(1) Diving operations using self-contained breathing equipment shall not be carried out without approval.

(2) Closed circuit self-contained pure oxygen rebreathing apparatus shall not be used in diving operations.

Clause 828 - Diving with closed or semi-closed circuit rebreathing equipment

Diving operations using self-contained, closed circuit or semi-closed circuit rebreathing equipment shall not be carried out without approval.

Clause 829 - Manned submersible craft

Manned submersible craft shall not be used without approval and shall be used in accordance with the Guidelines for the Operation of Manned Submersible Craft.

Clause 830 - Diving from platforms

Where diving operations are being carried out from a platform, a person shall not -

(1) where the dive being carried out involves decompression of the diver, dive from a platform on which drilling operations are in progress or from another platform within 500 metres of that platform if -

(a) the depth of the well is within 30 metres of the predicted top of a hydrocarbon bearing zone; or

(b) after penetration of that zone the well has been found unstable following one complete circulation from bottom to surface; or

(c) the well is being perforated; and

(2) where the dive being carried out involves decompression of the diver, unless otherwise approved, weld within 5 metres of any processing equipment that contains hydrocarbons, except that such welding operations are permitted where they are carried out in a pressurised enclosure or where the welding site and nearest processing equipment containing hydrocarbons are clearly separated by a solid plate deck or a continuous firewall;

(3) carry out any activity at a place from which sparks or slag could fall upon any item of diving equipment being used for diving operations;

(4) operate a crane or other equipment not associated with diving operations or carry out any activity if diving personnel or diving equipment engaged in or being used for the diving operations could be struck by any material moving or falling as a result of the use of the crane or other equipment or the carrying out of the activity;

(5) transfer methanol, diesel fuel or other flammable or combustible substances between supply vessels and the platform;

(6) where the dive being carried out involves decompression of the diver, carry out any wireline operations on the platform;

(7) carry out operations associated with depressurising vessels or pipelines as a result of which hydrocarbons could be released on or near the platform;

(8) detonate a charge underwater within -

(a) 2 km of the platform; and

(b) 8 km of the platform unless adequate notification to the person in charge of the diving operations has been given of -

(i) the type of energy source to be used, its frequency and intensity;

(ii) the times at which the energy source is to be used;

(iii) in the case of explosive charges any misfires; and

(iv) any other pertinent information; or

(9) cause a vessel to approach or depart from that platform, or cause its propellers or thrusters to be engaged, without notifying the person in charge of diving operations

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Clause 83 1 - Cathodic protection

Where diving operations are being carried out from a platform or within 20 metres of a platform, the person in charge of the platform is responsible for ensuring that the power supply to all impressed current cathodic protection equipment is supplied in accordance with the Guidelines for the Safe Use of Electricity Underwater.

Clause 832 - Breathing medium quality

(1) Diving operations shall not be carried out unless the breathing medium and unmixed pure components of breathing medium used in those operations are suitable for use at the depths and for the periods required in those operations and conform to the requirements of purity and composition as specified in Part A of Appendix 1.

(2) Compressed air for breathing supplied by an air compressor shall not be used in diving operations unless, within the period of three months preceding the operations, the compressed air delivered by the compressor has undergone a test carried out in accordance with Clause 801 that has shown that the compressed air satisfied the standard referred to in sub-clause (1).

Clause 833 - Suitability of plant and equipment

All diving plant and equipment shall -

(a) be adequate for the safe conduct of diving operations;

(b) be properly designed in accordance with recognised codes of construction, of adequate strength and of good construction in accordance with sound engineering practice and from sound and suitable material;

(c) be suitable for the conditions in which it is intended to be used, be properly maintained and comply with the requirements of Clauses 840 - 845; and

(d) where its safe use depends on the depth or pressure at which it is used, be marked with its safe working pressure or the maximum depth at which it may be used.

Clause 834 - Additional requirements for plant and equipment

(1) Without limiting the generality of the requirements of Clause 833, the diving plant and equipment shall -

(a) include a means of supplying a breathing mixture (including a reserve supply for immediate use in the event of an emergency and for therapeutic recompression or decompression) -

(i) which is suitable in composition and temperature and of adequate pressure; and

(ii) (ii) at an adequate rate - to sustain a prolonged vigorous exertion;

(b)include a lifeline for each diver except where the nature of the diving operations renders a lifeline unsuitable, in which case an approved alternative system for ensuring the diver's safety is to be used;

(c) subject to sub-clause (2), unless a diving bell is used in diving operations or the diver is lowered by a diver's stage or cage, include a shot-line of adequate strength and made of a suitable material of which, during ascent and descent, one end is attached to a fixed object at the surface and the other end to an object at the diver's work-site;

(d) include a system enabling oral communication to be carried out between each diver and diving supervisor;

(e) where it is lifting and handling equipment used in or in connection with diving operations, comply with the requirements of Appendix 2;

(f) where diving operations are carried out at a depth exceeding 20 metres or where decompression of the diver is required the equipment provided for that diving operation shall include a surface compression chamber with all necessary ancillary equipment, and the chamber and equipment shall comply with the requirements of Appendix 3 and Appendix 5 - Paragraphs 1 and 3.

(g) where diving operations are carried out at a depth exceeding 50 metres, include a diving bell as required under sub-clause 820(2) which shall have all necessary ancillary equipment and shall comply with the requirements of Appendix 4;

(h) where environmental conditions dictate, include an adequate means by which a diver can be maintained at a safe temperature;

(i) include a dive control station which shall have all necessary ancillary equipment and shall comply with the requirements of Appendix 5 - Paragraphs 1 and 2.

(j) where a surface compression chamber is used, include a decompression control station which shall have all necessary ancillary equipment and shall comply with the requirements of Appendix 5 - Paragraphs 1 and 3.

(k) where saturation diving operations are being carried out, include a life support control station which shall have all necessary ancillary equipment and shall comply with the requirements of Appendix 5 - Paragraphs 1, 3 and 4.

(l) include minimum first-aid equipment as detailed in Appendix 6; and

(m)include for use by a diver during diving operations -

(i) a sharp knife to be carried in an accessible position at all times whilst diving;
(ii) a weight belt which shall not be of the quick-release type;
(iii) a bail-out cylinder to be worn by the diver wherever practicable, the capacity of which cylinder shall be such as to allow the diver to swim in an emergency the maximum possible excursion length to the nearest independent breathing medium source;
(iv) a lifting harness to be worn by the diver which operates on a pelvic rather than head-and-shoulders type lifting principle; and
(v) approved head protection so as to prevent any injury caused by falling objects or other serious impacts.

(2) Where the nature of the diving operation renders a shot-line unsuitable an alternative system for ensuring that the diver can safely reach and return from the work site shall be used.

Clause 835 - Emergency plant and equipment

Without limiting the generality of the requirements of Clause 833, the diving plant and other available on site equipment shall include equipment to be available for use in an emergency and in particular shall include -

(1) such equipment as is necessary to provide an alternative and safe back-up means of recovering a diving bell from the seabed or underwater work-site to a mating position with a surface compression chamber;

(2) (a) for saturation diving operations, such equipment and back-up support as is necessary to allow all divers under hyperbaric pressure at any time to be evacuated under hyperbaric pressure from the location of the diving operations to a safe place where life support can be maintained and all divers safely decompressed to atmospheric pressure;

(b) for other than saturation diving operations, such approved equipment and back-up support as is necessary to allow all divers under hyperbaric pressure to be safely evacuated: and

(3) such equipment in diving bells as is necessary as far as practicable to allow the lives of divers trapped in a stricken bell to be sustained for not less than 24 hours - and emergency procedures relating to the use of such emergency plant and equipment shall be included in the diving manual required under Clause 809

Clause 836 - Breathing medium equipment- general

(1) Compressed air for breathing supplied by an air compressor shall not be used in diving operations unless -

(a) there is connected to the system supplying air from the compressor to the diver a pressure volume tank, a water and oil filter and where practicable a carbon monoxide filter; and

(b) the air intake from the compressor is located in a position in which it will not be affected by exhaust gases, sources of hydrocarbon or acetylene and in which it will take in only uncontaminated fresh air.

(2) A cylinder filled with breathing medium shall not be used in diving operations unless -

(a) it has been filled with and contains after filling only breathing medium satisfying the requirements of Clause 832;

(b) approved procedures which comply with the requirements of Part B of Appendix 1 were used for the filling, gas testing and supply of the cylinder; and

(c) where the cylinder was filled on a platform, the filling was done under the supervision of a diving supervisor.

(3) Pure oxygen shall not be used in diving operations unless -

(a) in all pure oxygen supply lines only rising-stem-type valves, which have either metal-to-metal seats or seats of another material suitable for pure oxygen service, are used;

(b) stored pure oxygen is located as far as practicable away from equipment in which people may be subjected to hyperbaric pressure, from hydraulic equipment and any other flammable substance;

(c) where practicable, fixed rigid piping is used for oxygen supply;

(d) the oxygen supply pressure is reduced to a maximum of 4.1 MPa (600 psi) gauge pressure at the supply cylinder; and

(e) care is taken to avoid sharp bends in all oxygen supply lines.

(4) All breathing medium supply lines shall be arranged so as to ensure adequate protection against their accidental damage and to ensure adequate protection for personnel.

(5) Any enclosed compartment in which large quantities of oxygen, inert gas or gas mixtures other than air are stored, shall be fitted with a visual and audible low and high oxygen content alarm device to provide warning that the atmosphere in the compartment is unsafe.

Clause 837 - Breathing medium hoses

(1) A hose shall not be used in diving operations for the conveyance of breathing medium unless -

(a) it has been tested not more than 12 months prior to those operations at a pressure equal to 1.5 times its maximum expected operating pressure;

(b) it is kink resistant;

(c) it is capable of carrying the breathing medium at a flow rate required in the operations;

(d) the hose and its couplings are in alignment;

(e) the couplings are not scoured or substantially corroded;

(f) the couplings contain no damaged threads;

(g) the hose fittings are made of brass, stainless steel, monel metal or other non-corrosive material;

(h) the fittings connecting the hose with other hoses are incapable of accidental disengagement or loosening; and

(i) it is, where practicable, of such diameter and has such type of connection as will minimise the possibility of wrongly connecting hoses and fittings.

Clause 838 - Breathing medium **supply**

(1) Diving operations shall not be carried out unless there is provided -

(a) a pressure reducing regulator to control the pressure at which breathing medium is supplied to a diver from a cylinder; and

(b) a means to allow ready changeover to an alternative pressure reducing regulator or an alternative breathing medium supply in case of failure of the primary pressure reducing regulator or the primary breathing medium supply.

(2) The oxygen content of mixed gas breathing medium supplied to a diver shall be continuously monitored using an oxygen content analyser in conjunction with an audible and visible high and low oxygen content alarm.

(3) Discrete inert gases or oxygen shall not be connected to a dive control panel nor supplied to any diver in the water.

(4) With the exception of breathing medium supplied to a diver by the use of a gas recirculating unit involving gas reclaim, carbon dioxide removal and oxygen enrichment, breathing medium produced on-site by either a gas mixing apparatus or by a gas reclaim unit shall not be delivered to a diver without first being stored for at least 24 hours and then re-analysed.

Clause 839 - Maintenance certification and documentation

Plant and equipment shall not be used in any diving operation unless -

(a) it is regularly maintained in a condition which ensures that it is safe while being used;

(b) in the case of a surface compression chamber, diving bell, associated trunking and other pressure vessels which form part of a diving system, it is certified in writing by a classifying authority or other verifying body in accordance with the rules of that authority pertaining to that equipment;

(c) in the case of lifting or handling equipment used to raise or lower persons in the course of diving operations, it is certified in writing by a classifying authority or other verifying body in accordance with the rules of that authority pertaining to that equipment;

(d) there is maintained a register containing -

(i) in the case of a surface compression chamber, other pressure vessels and lifting and handling equipment, the certificates referred to in paragraphs (b) and (c);

(ii) in the case of a surface compression chamber or a diving bell, sufficient information, including information relating to the materials used in its construction, to enable it to be safely used, repaired and altered;

(iii)in the case of all plant and equipment used in diving operations, a full schedule of all routine preventative maintenance to be carried out, which schedule has been signed or initialled as a mark of acceptance by the diving supervisor upon successful completion of any such maintenance; and

(iv)in the case of all plant and equipment used in diving operations, a record of non-routine equipment maintenance or equipment replacement, which record has been signed as a mark of acceptance by the diving supervisor upon successful completion of any such work;

(e) it has been examined and tested as necessary in accordance with a defined schedule of pre-dive checks within the six hours immediately prior to the commencement of operations.

Clause 840 - Maintenance certification and documentation

Plant and equipment shall not be used in any diving operation unless -

(a) it is regularly maintained in a condition which ensures that it is safe while being used;

(b) in the case of a surface compression chamber, diving bell, associated trunking and other pressure vessels which form part of a diving system, it is certified in writing by a classifying authority or other verifying body in accordance with the rules of that authority pertaining to that equipment;

(c) in the case of lifting or handling equipment used to raise or lower persons in the course of diving operations, it is certified in writing by a classifying authority or other verifying body in accordance with the rules of that authority pertaining to that equipment;

(d) there is maintained a register containing -

(i) in the case of a surface compression chamber, other pressure vessels and lifting and handling equipment, the certificates referred to in paragraphs (b) and (c);

(ii) in the case of a surface compression chamber or a diving bell, sufficient information, including information relating to the materials used in its construction, to enable it to bc safely used, repaired and altered;

(iii)in the case of all plant and equipment used in diving operations, a full schedule of all routine preventative maintenance to be carried out, which schedule has been signed or initialled as a mark of acceptance by the diving supervisor upon successful completion of any such maintenance; and

(iv) in the case of all plant and equipment used in diving operations, a record of non-routine equipment maintenance or equipment replacement, which record has been signed as a mark of acceptance by the diving supervisor upon successful completion of any such work;

(e) it has been examined and tested as necessary in accordance with a defined schedule of pre-dive checks within the six hours immediately prior to the commencement of operations.

Clause 841 - Certificates of examination and testing

(1) The certificates referred to in paragraph 840(d) shall state -

(a) the plant and equipment to which it relates;
(b) that the classifying authority or other verifying body or diving supervisor has examined it;
(c) that it has been tested by or under the close supervision of the authority, verifying body or supervisor issuing the certificate;
(d) the conditions under which it can be safely used; and
(e) the period during which it can be safely used.

(2) The certificates referred to in paragraph 840(d) shall cease to be valid -

(a) when any repair or alteration has been made to the plant or equipment which affects its safe working; and
(b) on expiration of the period in accordance with sub-clause (l)(e).

Clause 842 - Periodic testing

(1) Subject to sub-clause 841 (2), the following testing requirements for equipment used in diving operations, including test frequency and minimum test certificate signatory requirements, shall apply -

(a) for complete lifting and handling equipment upon installation and thereafter at least every 5 years a static overload test of 1.25 times and a dynamic overload test of 1.1 times the full weight of the equipment to be lifted including the expected weight of personnel during launch and recovery. The test certificates shall carry an approved classifying authority or other verifying body's signatures;

(b) for main lifting wires of diving bells, diving stages and wet bells upon initial installation and thereafter at least every 6 months a destructive overload test on a section of the wire to determine that the breaking strength is at least 8 times the full weight of the equipment to be lifted including the expected weight of personnel during launch and recovery. The

test certificates shall carry an approved classifying authority or other verifying body's signatures;

(c) for swivels used on main lifting wires, including diving bell, diving stage and wet bell swivels -

(i) a visual examination for abnormalities at least every month, the records of which to carry the signatures of the diving supervisor;

(ii) a non-destructive test to detect any cracks or other abnormalities at least every year, the records of which to carry signatures of the diving supervisor; and

(iii)a non-destructive test to detect any cracks or other abnormalities at least every 5 years, the certificates of which to carry NATA signatures;

(d) for all sheaves and lead-blocks -

(i) a visual inspection and lubrication as required at least every month, the records of which to carry the signatures of the diving supervisor;

(ii) a non-destructive test to detect any cracks or other abnormalities at least every year, the records of which to carry signatures of the diving supervisor; and

(iii)for primary load bearing sheaves, a non-destructive test to detect any cracks or other abnormalities at least every 5 years, the certificates of which to carry NATA signatures;

(e) for pressure vessels used as diving plant and equipment other than compressed air and hydraulically operated tools or fire extinguishers at least every 2 years a pneumatic pressure test at a pressure equal to 1.25 times or at least every 5 years a hydrostatic pressure test at a pressure equal to 1.5 times the working pressure, the certificates of which to carry the signatures of the classifying authority or other verifying body - pneumatic pressure testing shall not be carried out without approval;

(f) for seamless gas cylinders an inspection and test in accordance with SAA AS 2030 Gas Cylinder Code, the certificates of which to carry NATA signatures -

(i) taken underwater at least every 2 years; and

(ii) not taken underwater at least every 5 years;

(g) for air compressors for the supply of low or high pressure air breathing medium, at least every 3 months an analysis of the air from the compressor to detennine compliance with Clause 832 as to purity requirements specified in Appendix 1, Part A. The test certificates shall carry NATA signatures;

(h) for breathing medium hoses at least every year, the records of which to carry the signatures of the diving supervisor - a pressure test on the hose at a pressure equal I .5 times the maximum expected operating pressure as required by sub-clause 837(l)(a);

(i) for pressure measuring equipment -

(i) for working depth/pressure gauge at least every 3 months a calibration using a master gauge or dead-weight tester as required by sub-clause 839 (2)(b), the records of which to carry the signatures of the diving supervisor; and

(ii) for master depth/pressure gauge at least every year a calibration by a NATA approved testing laboratory as required by sub-clause 839 (2)(c); and

(j) for complete diving bell ballast release systems a visual inspection at least every 3 months and a complete disassembly at least every year of all lifting links in the drop-weight attachment rigging including lifting slings, chains, shackels, pins, rings etc., the records of which to carry the signatures of the diving supervisor.

(2) A reference in sub-clause (1) to a test is a reference to a test the procedures for which have been approved and which is carried out in accordance with those approved procedures.

Clause 843 - Retaining registers

The register referred to in paragraph 840(d) shall be retained -

(a) in the case of a register containing certificates relating to any surface compression chamber, diving bell or seamless gas cylinder not taken under water, for at least 5 years from the date of the last such certificate it contains; or

(b) in any other case, for at least 2 years from the date of the last certificate it contains

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Clause 844 - Alterations to equipment

A person shall not carry out any repairs, additions or alterations to diving plant or equipment other than of a routine nature which could affect its safe working without prior approval, and any repairs, additions or alterations are only to be carried out under the supervision of a classifying authority or other verifying body.

Clause 845 - Unattended equipment

(1) A surface compression chamber or diving bell may be used for diving operations only if -

(a) during the whole of the preceding 14 days it has been under the surveillance of divers or other persons competent to maintain the equipment properly; or

(b) in the event that it has been unattended for any part of the preceding 14 days, it has passed an internal leak test and pre-dive function tests prior to the initial recommencement of diving operations.

(2) In sub-clause (1) an internal leak test means an internal leak test held for at least 30 minutes in which the test pressure is not less than the maximum pressure (gauge) equivalent to the maximum depth of dive in which the chamber or bell is or is about to be used.

Clause 847 - Reporting of death, serious injury and decompression sickness of divers

(1) In this Clause and Clause 848 a reference to a serious injury is a reference to an injury to a person as a result of which the person requires immediate attention by a medical practitioner.

(3) Where a person dies or suffers a serious injury while engaged in diving operations in the adjacent area -

(a) a report of the death or serious injury shall forthwith be made to an inspector;

(b) a report in writing giving full particulars of the death or serious injury shall be transmitted to the Director as soon as practicable after the occurrence of the death or serious injury; and

(c) (c) a person shall not interfere with the place of such death or serious injury without the approval of an inspector except only insofar as it is necessary for the purposes of providing for the immediate protection or saving of health or life.

(3) Where a diver suffers from decompression sickness or any other adverse physiological condition as a result of exposure to higher than atmospheric pressure in the course of diving operations -

(a) a report of the sickness or condition shall forthwith be made to an inspector; and

(b) a report in writing giving full particulars of the sickness or condition shall be transmitted to the Director as soon as practicable after the occurrence of the sickness or condition, or the completion of treatment.

Clause 848 - Written records of diver death, injury or decompression sickness

(1) Where a diver during a diving operation dies or suffers any injury or decompression sickness, a written record of that death, injury or decompression sickness shall be kept and specify -

(a) particulars of death, injury or decompression sickness;

(b) the names of the supervisor, the divers and the divers' attendants and of any other person involved in activities directly relevant to the death, injury or decompression sickness;

(c) in respect of the dive, the times when the diver became exposed to pressure exceeding atmospheric pressure, when that diver commenced decompression, and when decompression was completed;

(d) the equipment used;

(e) the decompression schedule used;

(f) the breathing medium used by the divers;

(g) the work performed by the divers;

(h) details of unusual conditions (if any);

(i) the nature of the injury;

(j) the circumstances leading to the injury;

(k) the medical treatment given; and

(l) the names of medical practitioners consulted and who attended the injured diver.

(2) Subject to the reporting requirements of Clause 847, and not later than the 15th day of each calendar month, a copy of the records kept under sub-clause (1) of injuries which occurred during the preceding calendar month which have not been reported shall be transmitted to the Director.

(3) A report in writing required under sub-clause (2) shall as far as practicable be made in accordance with the form specified in SAA AS 1885 Code of Practice for Recording and Measuring Work Injury Experience.

Clause 849 - Reporting of potentially hazardous events

(1) Where an event occurs during a diving operation which is not in the normal or ordinary course of such an operation and which is professionally considered to be likely to cause injury to a person or serious damage to property, but such event does not cause injury or serious damage -

(a) a report of the event shall forthwith be made by the titleholder to an inspector; and

(b) a report in writing of the event shall be sent to the Director as soon as practicable specifying measures taken or to be taken to prevent such events.

Clause 832

APPENDIX 1 - PART A

Requirements as to purity and composition of breathing medium
and unmixed pure components of breathing medium used in diving operations

(1) Compressed natural air supplied by a low pressure air compressor used by divers for breathing in diving operations shall not –

(a) contain more than 3 parts per million by volume of halogenated hydrocarbons;

(b) contain more than 5 parts per million by volume of -

(i) carbon monoxide; or

(ii) acetylene;

(c) contain more than 25 parts per million by volume of methane;

(d) contain more than 500 parts per million by volume of carbon dioxide;

(e) contain more than 20 milligrams of oil per cubic metre at 100 kPa; and

(f) have an objectionable or nauseous odour.

(2) Compressed natural air supplied from a cylinder other than that supplied by a a low pressure air compressor used by divers for breathing in diving operations shall not have contamination levels higher than those specified in Table 1.

(3) Compressed natural air used by divers for breathing in diving operations shall not contain less than 19.5% or more than 22% by volume of oxygen.

(4) Pure unmixed components to be used for breathing medium in diving operations shall not have contamination levels higher than those specified in Table 1, and where these pure components are mixed to form breathing medium, then the maximum allowable contamination level in the mixture, where different levels are specified for a given contaminant, shall be the larger of the two levels listed in either pure component specification.

(5) Allowable percentage composition tolerances for the mixture minor components are as follows:- For the minor component content, + 5% of nominal content of the minor component is allowed eg. for 10% oxygen in helium + 0.5% oxygen is allowed.

Clause 836(2)

APPENDIX 1 - PART B

Requirements as to the filling, gas testing and supply
of cylinders for the supply of breathing medium used in diving operations

General

(1) Under sub-clause 836(2)(a), a cylinder filled with breathing medium shall not be used in diving operations unless it is filled with and contains after filling breathing medium satisfying the requirements of clause 832 and as detailed in Appendix 1, Part A.

Testing of cylinders and gas in cylinders shall be carried out in accordance with the requirements of clause 80 1.

Design and Handling of Cylinders

(2) All cylinders are to be manufactured in accordance with SAA AS 2030, Gas Cylinders Code and are to be subjected to periodic testing in accordance with sub- clause 842(l)(f).

(3) All cylinders are to be colour coded and labelled in accordance with the requirements of SAA Rules for Gas Cylinders Identification and in particular Identification of Medical Gas Cylinders (AS1944). This applies to individual cylinders as well as to cylinders supplied as part of a multi-cylinder pack or unit whether individually or commonly manifolded.

(4) In addition to the colour coding referred to above, and in accordance with SAA AS 2030, Gas Cylinders Code, Section 1.15 'Identification', each cylinder is to carry prominently a printed label, tag or other approved means of identification.

(5 j Each individually supplied cylinder or group of cylinders supplied as a unit is to be identifiable by a clearly visible and prominent mark or serial number.

(6) Supplies of oxygen-medical and air-medical are to remain captive in diving and/or medical traffic only.

Supplies of all remaining gases not normally part of medical traffic are to be dedicated exclusively to diving traffic and are to be so marked in bold letters such as "DIVING ONLY"

Filling and Testing

(7) All cylinders returned for tilling (or re-filling) are to be vented to atmospheric pressure and evacuated to a pressure not exceeding 20 kPa absolute.

(8) Analysis is to be carried out on the gas actually contained in a cylinder (or group of cylinders) and not on the gas upstream of the cylinder being filled, that is, before it reaches the cylinder.

(9) Analysis is to be carried out as follows –

(i) Every cylinder (including every individual cylinder within a multi-cylinder pack) is to be tested for carbon monoxide and odour contamination. These tests are 'on-site' tests and do not require NATA certificates;

(ii) Every cylinder of a gas or gas mixture containing oxygen (other than air) is to be analysed for oxygen content. These tests are 'on-site' tests and do not require NATA certificates;

(iii) In the case of 'G' size or equivalent cylinders supplied individually (and not commonly manifolded) one cylinder out of each batch of not more than sixteen is to be analysed comprehensively for impurities as required under clause 832 (and specified in Appendix 1, Part A) and the results are to be reported on a NATA endorsed test certificate (see point No 1) which specifies the serial numbers of the batch of cylinders concerned and the serial numbers of the cylinder from which the analysis was taken;

(iv) In the case of larger than 'G' size or equivalent cylinders supplied individually (and not commonly manifolded) and unless special dispensation to the contrary is applied for and given by the Director, each cylinder is to be analysed comprehensively for impurities as required under clause 832, (and specified in Appendix 1, Part A) and the results are to be reported on a NATA endorsed test certificate (see point No 1) which specifies the serial number of the cylinder from which the analysis sample was taken; and

(v) In the case of commonly manifolded 'G' size or equivalent or larger cylinders supplied as a composite unit, a composite representative sample of no more than 16 commonly manifolded cylinders is to be taken and analysed comprehensively for all impurities as required under clause 832, (and specified in Appendix 1, Part A) and the results are to be reported on a NATA endorsed test certificate (see point No 1) which specifies the serial numbers of all cylinders tested by the composite sample or the serial number of the framed bottle pack as appropriate (provided all cylinders within the pack contributed to the composite sample).

(10) Any NATA endorsed composition analysis certificate applicable to a cylinder (or group of cylinders) is to accompany that cylinder to its user destination and is to be available to the user and to an inspector on demand for verification of the acceptability of the gas for use as diving breathing medium.

(11) Attached to every individually supplied cylinder or to every commonly manifolded group of cylinders is to be a tag contained within a waterproof envelope which gives details of the mixture (or the pure component) supplied.

Clause 834(e)

APPENDIX 2

Requirements for lifting and handling equipment used in the course of diving operations

Equipment used for raising and lowering persons in diving operations

(1) Lifting and handling equipment shall not be used in diving operations for the raising and lowering of persons unless –

(a) if it is a winch –

(i) it is so constructed that the brake is automatically applied except when the controls are in the operating position; and

(ii) the winch, winch drum and wire on the winch drum are clearly visible to the winch operator when operating the winch;

(b) if it is a diving bell lifting winch, the lowering of the diving bell is controlled by its drive system and not by its brakes;

(c) if it is a diver's stage –

(i) it is sufficiently large to carry at least two divers and their associated tools in uncramped conditions and contains no equipment other than for diving;

(ii) it is suitably enclosed to prevent its occupants from falling out;

(iii) it is fitted with appropriate inboard handholds and is secured against tipping or spinning in a manner dangerous to its occupants;

(iv) it is fitted with an adequate reserve supply of breathing mixture to allow for the safe return of the diver; and

(v) where the distance between the diving platform and the water surface is greater than 3 metres, there is provided a diver's stage and stage handling system for the diver and the stand-by diver.

(d) if it is a lead-block or sheave –

(i) it has an internal diameter of at least 24 times that of the lifting wire passing through it; and

(ii) it is equipped with a sheave restraint which is designed such that in the event of failure of the sheave, its lifting wire cannot move by more than one and a half times the internal diameter of the sheave;

(e) if it is a shackle, it is properly wired in the closed position when closed;

(f) in the case of a diving bell, a swivel is installed between its hull lifting point and main lifting wire;

(g) in the case of terminal wire rope connections, bull-dog grips are not used on any such connections where the wire is subject to other than purely static loads;

(h) where split pins are used as retainers on clevis pin or other similar connections, they are used in conjunction with castellated nuts; and

(i) suitable safety restraining harnesses are provided for and worn by all persons engaged in potentially hazardous rigging activities associated with diving bell launch and recovery such as –

(i) fitting and removal of chain-stops; and

(ii) attachment and removal of diving bell guide or cross haul wire end connections at the diving bell either before or after its deployment. Equipment used for raising and lowering loads in diving operations

(2) Lifting and handling equipment shall not be used in diving operations for the raising and lowering of loads unless –

(a) there is a continuous means of communication between the winch or crane operator and the diving supervisor;

(b) if it is a winch, the winch drum and wire on the winch drum are clearly visible to the winch operator; and

(c) if it is a crane, there is provided an audible and visible alarm system to indicate to the crane operator when the wire on the winch drum is near to being fully unspooled.

Clause 834(f)

APPENDIX 3

Requirements for surface compression chambers

A surface compression chamber shall –

(1) comply with clause 833 and be certified by a classifying authority or other verifying body to be in accordance with the rules of that authority;

(2) contain the first-aid equipment required under paragraph 834(l) (see Appendix 6);

(3) have at least two compartments with doors each of which acts as a pressure seal and can be unlatched from either side ('a two- compartment chamber');

(4) be equipped with suitable view-ports to enable a person outside the chamber to observe all occupants of each chamber lock as well as all measurement devices; and all ports are to be suitably located so as to –

(a) avoid physical damage caused by falling objects; and

(b) prevent damage caused by heat from any external light source shining through a port;

(5) have sufficient space to allow all occupants expected to occupy it at any one time to move about and lie down comfortably as required; and if the chamber is to be used in circumstances in which a person is intended to remain inside under pressure for a continuous period of 12 hours or more, excluding therapeutic decompression it shall have a minimum internal diameter of 2 metres; and in all other cases it shall have a minimum internal diameter of 1.75 metres unless a smaller diameter is approved by the Director.

(6) provide a suitable environment and suitable facilities for those who are to use it, having regard to the kind of operation in connection with which it is used and the period during which the pressure is raised; and in particular –

(a) overboard-dump mask breathing systems shall be provided for all occupants requiring oxygen-rich decompression or therapeutic treatment breathing mixtures;

(b) facilities shall be provided where necessary to minimise the noise inside the chamber during rapid pressurisation;

(c) adequate facilities shall be provided for heating, lighting and cooling; and

(d) adequate sanitary facilities shall be provided, with particular care being taken in the design of any toilet system so as to prevent the possibility of a pressure seal being fonned between the chamber interior and toilet bowl interior areas by any person using the toilet;

(7) be so designed as to minimise the risk of fire; and in particular –

(a) no chamber shall be fitted with electrical service connections that are physically capable of being wrongly connected;

(b) all motors installed inside a chamber shall be designed and operate so as to be safe and suitable for use in a hyperbaric environment;

(c) all electrical wiring and electric lighting installed inside a chamber shall be designed and operate so as to be safe and suitable for use in a hyperbaric environment;

(d) extreme care shall be exercised in the handling and piping of oxygen to and from a chamber; and particular care shall be taken to ensure –

(i) that oxygen delivery pressures to a chamber are suitably low and compatible with the design of the piping system in which the oxygen is transmitted;

(ii) that the valving and fittings used on oxygen lines are suitable and safe for the purpose;

(iii) that oxygen lines and fittings are kept clean and free from oil, dirt or other particulate matter; and

(iv) that only lubricants compatible with oxygen are used in oxygen service; and

(e) a means which is acceptable to the Director shall be provided in the chamber for extinguishing fires;

(8) where through-hull penetrating connections are fitted

(a) have fitted manually operable override valves immediately on either side of fixed-rigid-piping hull penetrators;

(b) have electrical and communication wiring type hull penetrators of a design acceptable to the Director; and

(c) have clear identification labelling on both internal and external hull sides of all hull penetrators;

(9) be equipped in an inner lock with such suitable medical support facilities as –

(a) a device from which an intravenous drip can be suspended; and

(b) a suitable plug connection allowing an electrocardio-graph situated outside the chamber lock to be used on a person in the chamber lock;

(10) be fitted with such valves, gauges and other fittings as are necessary to control and indicate the internal pressures of each chamber lock or trunking from outside the chamber; and in particular –

(a) pressure gauges shall be calibrated uniformly throughout in either metres head of sea-water or feet head of sea-water;

(b) there shall be an alternative means to measure the pressure in each chamber lock or trunking in the event of malfunctioning of a primary gauge; and

(c) a suitable caisson pressure gauge, which can be read by a person inside the chamber lock and a person outside the chamber lock, shall be fitted internally in each chamber lock:

(11) be equipped with –

(a) a facility to enable a gas sample to be taken outside the chamber from each internal chamber lock; and

(b) such instruments or equipment fitted either internally or externally as will allow the measurement by a person outside the chamber of the content of oxygen and carbon dioxide in the internal chamber atmosphere;

(12) be fitted with adequate equipment, including reserve facilities, for supplying and maintaining the appropriate breathing mixture at an adequate rate of supply to persons inside it;

(13) be equipped with an effective means which includes a helium voice unscrambler as required, to enable communication between persons inside and outside the chamber;

(14) be equipped with a suitable lock of diameter not less than 300 millimetres through which food and medical supplies can be passed into the chamber while its occupants remain under hyperbaric pressure;

(15 j if it is equipped for saturation diving –

(a) have adequate environmental monitoring and control facilities including a back-up system to maintain adequate and safe environmental conditions if the primary control system malfunctions; and in particular environmental monitoring shall include the following-

(i) the continuous monitoring by a person outside the chamber of the temperature, humidity and oxygen content of the internal chamber atmosphere. The equipment for monitoring the oxygen content shall bc fitted with an audible and visible high and low oxygen content alarm system;

(ii) the provision inside the chamber of environmental monitoring equipment or instruments to enable occupants of the chamber to monitor continuously its internal temperature, humidity and oxygen content; and

(iii) the provision, either at the chamber, at the life support control station or decompression control station, of environmental monitoring equipment to allow a person outside the chamber to monitor continuously its internal temperature, humidity and oxygen content and to measure its carbon dioxide content as required; and

(b) have a suitable system for guarding against rapid depressurisation of a chamber should a rupture occur in a large diameter pipe connected to the chamber such as a pipe forming part of the reticulated environmental control piping.

Clause 834(g)

APPENDIX 4

Requirements for diving bells

A diving bell shall –

(1) comply with clause 833 and be certified by a classifying authority or other verifying body to be in accordance with the rules of that authority;

(3) contain the first-aid equipment required under paragraph 834(l) (see Appendix 6);

(3) be equipped with doors which act as pressure **seals** and which may **be** unlatched from either side;

(4) have view-ports sited so as to avoid as far as possible physical damage and prevent **heat** damage from any external light source;

(5) provide a suitable and safe environment for those who are to use it; and in particular shall provide –

(a) mask systems for all occupants through which either surface-supplied or on-board gas can be breathed;

(b) facilities where necessary to minimise the noise inside the bell during rapid pressurisation; and

(c))adequate facilities for heating and lighting;

(6) be so designed as to minimise the risk of fire; and in particular –

(a) no electrical connections shall be physically capable of being wrongly connected;

(b) all motors installed inside a bell shall be designed and operate so as to be safe and suitable for use in a hyperbaric environment; and

(c) all electrical wiring and electric lighting installed inside a bell shall be designed and operate so as to be safe and suitable for use in a hyperbaric environment;

(7) where through-hull penetrating connections are fitted –

(a) have fitted manually operable override valves immediately on either side of fixed-rigid-piping hull penetrators;

(b) have electrical and communication wiring-type hull penetrators of a design acceptable to the Director; and

(c) have clear identification labelling on both internal and external hull sides of all such connections;

(8) be fitted with adequate equipment including reserve facilities for supplying the appropriate breathing mixture without interruption to persons occupying or working from the bell; and in particular –

(a) as required under sub-clause 838(l)(b) the breathing medium distribution panel in the diving bell shall be designed so as to allow a change-over to an alternative breathing medium supply source;

(b) as required under paragraph 833(b), all piping systems, pressure regulators and other fittings associated with the supply and delivery of breathing medium shall be properly designed in accordance with recognised codes of construction, of adequate strength and of good construction in accordance with sound engineering practice and from sound and suitable materials and shall in addition be capable of delivery of breathing medium at adequate flow rates and pressures at all depths for which the diving bell is designed to be used;

(c) shall be equipped with such breathing supply manifolds and piping as will enable –

(i) the diver (or divers) and stand-by diver to breathe either surface-supplied or on-board cylinder supplied breathing medium; and

(ii) the stand-by diver to breathe from an independent supply source other than surface supply when the diver (or divers) is breathing either surface-supplied or on-board cylinder- supplied breathing medium;

(d) it shall be equipped with a suitable means for removal of carbon dioxide from its atmosphere; and

(e) it shall be equipped with adequate portable carbon dioxide and oxygen analysers for analysis of its internal atmosphere; and the oxygen analyser shall be calibrated in atmospheres partial pressure with a maximum scale reading not exceeding two atmospheres partial pressure;

(9) be provided with a suitable sonar beacon and stroboscopic light or other acceptable system by which in the event of an emergency it can be rapidly located by rescue personnel;

(10) be provided with a suitable means by which in the event of an emergency the lives of trapped persons can be sustained for at least 24 hours;

(11) be provided with a through-water communication facility or other acceptable emergency means of conversation between occupants of a stricken bell and surface personnel;

(12) be fitted with lap-type seat belts for all occupants;

(13) be so designed that –

(a) its main lifting wire is of adequate strength to withstand all static and dynamic loads likely to be encountered during diving operations and it shall have a maximum fully equipped weight including the expected weight of its occupants of not more than one eighth;

(b) if the main lifting wire parts causing the bell to come to rest on the sea floor or other obstruction, diver access to and from the bell through the bottom door is still reasonably available;

(14) where drop-weights are fitted, have incorporated in their design –

(a) a suitable means for prevention of their accidental disengagement; and

(b) adequate strength in the release mechanism and fittings for attachment of the drop-weight to the bell, such that the weight of the drop-weight shall be less than one tenth of the tensile breaking strength of the release mechanism and fittings for its attachment;

(15) be equipped with emergency tools as required to enable –

(a) deliberate severance of the main lifting wire; and

(b) emergency repairs inside the bell to be carried out;

(16) be used in association with lifting gear which in an approved manner enables the bell to be safely lowered to working depth, maintained at that depth and returned to the surface without excessive lateral, vertical or rotational movement;

(17) be provided with a means by which, in the event of failure of the main lifting gear, the diving bell can be returned to a mating position with a surface compression chamber;

(18 **j** have pipe systems, fittings or tubings carrying pure oxygen which arc suitable for oxygen service and which have been thoroughly cleaned by an acceptable method to enable them to be safely used for oxygen service;

(19) be fitted with lifting equipment sufficient to enable an unconscious or injured diver to be hoisted into the bell by a person inside it;

(20) in the case of umbilicals and umbilical connections to the bell-

(a) subject to (e), not have diver umbilicals longer than 40 metres fitted without approval;

(b) have adequate, waterproof labelling or tagging fitted to divers' umbilicals which specifies their age and date of their last pneumatic pressure or other test;

(c) be equipped with a suitable means for preventing undue weight being placed on the umbilical connections at the bell hull;

(d) be equipped with suitable screwed or other acceptable external hull connection fittings, such that umbilical lines can be readily re-connected or disconnected underwater in an emergency; and

(e) have a stand-by bell diver's umbilical at least 2 metres longer than that of the working diver;

(2 1) be equipped with such valves, gauges and other fittings (which are to be made of suitable materials) as are necessary to control and to indicate to the diving supervisor and bell occupants the pressure within the bell; and in addition, there shall be means provided for

(a) a person on the surface to ascertain the pressure at which the breathing medium is being supplied to the bell and the external pressure acting on the bell; and

(b) a person inside the bell to ascertain the pressure at which breathing medium is supplied to the bell, the pressure at which on-board gas is supplied to the bell and the external pressure acting on the bell;

(22) be equipped with –

(a) an internal valve of a type that will enable a person inside the bell to de-pressurise the bell in an emergency, that is, a valve fitted with a spring or other fail-safe device which requires it to be continuously held in the open position in order to prevent its otherwise automatic closure; and

(b) an external valve of a type that will enable a person outside the bell to pressurise or de-pressurise the bell in an emergency, and a corresponding valve on the inside of the bell hull fitted in such a way as to prevent its inadvertent or accidental closure;

(23) be equipped for attachment between the bell and surface compression chamber a mating mechanism which is designed to ensure it cannot be mistakenly disengaged where this could cause rapid, uncontrolled depressurisation of the bell or any surface compression chamber forming part of the chamber complex to which the bell is attached;

(24) be equipped with an effective means which includes a helium voice unscrambler as required, to enable as far as practicable clear and interference-free oral communication between the diving supervisor and divers engaged in bell diving operations; and

(25) be clearly visible to the lifting winch operator during the above-water phases of bell launch and recovery.

Clause 834(i), (j) and (k)

APPENDIX 5

Requirements for dive, decompression and life-support control stations in diving operations

(1) Where a dive, decompression or life support control station is situated in an enclosed area, the enclosure shall be equipped with –

(a) an audible and visible high and low oxygen content alarm system;

(b) a suitable and effective air conditioning or ventilation system; and

(c) a self-contained or other cylinder-supplied, full-face-mask breathing system to allow a person or persons in charge of a dive, decompression or life support control station to maintain their position in the event of smoke or toxic gases making the station otherwise not habitable.

Clause 834(i) Requirements for a dive control station operations

(2) The Dive Control Station shall be set aside as a single, designated location which shall be as far as practicable adjacent to where a diver enters the water and from which the diving supervisor can continuously supervise, monitor and direct the control of all systems and functions which relate to the life support and safety of a diver in the water. In particular, the equipment forming part of a dive control station shall include instruments which readily allow the diving supervisor to monitor, direct and control on a continuous basis the following:-

(a) in relation to a diver's breathing medium –

(i) its supply to the Dive Control Station;

(ii) its oxygen content and wherever a reclaim recirculation unit is involved, its carbon dioxide content; and

(iii)its delivery to the diver;

(b) the pressurisation of –

(i j a diving bell;

(ii) umbilicals hoses to a diver engaged in surface-oriented diving operations or to a diving bell; and

(iii)any transfer-under-pressure locks and trunkings;

(c) a diver's depth and the internal and external pressures acting on a diving bell and its occupants;

(d) any heating, cooling or other environmental control systems as required; and

(e) all radio, telephone or other verbal communications associated with the diving operation being supervised. 834(j) Requirements for decompression control stations

(3) Where a dive, decompression or life support control station is situated in an enclosed area, the enclosure shall be equipped with –

(a) A decompression control station shall be set aside as a single, designated location which shall be either attached or adjacent to a surface compression chamber and from which a diving supervisor, life support technician, or diver can supervise, monitor and control all systems and functions which relate to the life support of a person undergoing decompression.

(b) Equipment forming part of a decompression control station shall include instruments, controls and fittings which allow for the control and monitoring of –

(i) Gas used for pressurization and breathing medium for each lock or trunking;

(ii) Pressure gauges fitted to each individual lock or trunking;

(iii)Oxygen and carbon dioxide content of each lock;

(iv)Temperature and humidity of each lock; and

(v) Radio and telephone communication with each lock.

834(k) Requirements for life support control stations

(4) (a) A life support control station shall be set aside as a designated location either attached or adjacent to a surface compression chamber, and from which a diving supervisor or life support technician can supervise, monitor and control all systems and functions which relate to the life support and safety of persons maintained under pressure.

(b) A life support control station shall be installed where saturation diving operations are being carried out and shall be combined with the decompression control station in the same location.

Clause 834(1)

APPENDIX 6

Minimum first aid equipment required at place at which diving operations are carried out

In some cases, brand names available in Australia are given as a guide only where the particular type of item quoted has been found to be available and suitable for the purpose intended.

(1) Within Diving Bell	No Required:
Tourniquet (e.g. 'Velcro' large or 'Esmarch')	1
Mouth-to-Mouth Resuscitation Tubes (eg 'Brook' or 'Portex')	2
Scissors (e.g. 'Lister' Bandage Type 27.5 cm)	2
Wound Dressing (Shell or Field) large	2
Hand-Operated Resuscitator	1

(2) Outside Surface Compression Chamber	No Required:
Anaroid Blood Pressure Sphygmomanometer	1
Stethoscope	1
Pen-light and batteries	1
Rubber hammer	1
Tuning fork	1
Otoscope - Aphphalho Scope	1
Dressing (Shell or Field large)	2
Torniquet (e.g 'Velcro' large or 'Esmarch')	2
Mouth-to-Mouth Resuscitation Tubes (e.g 'Brook', 'Portex' or 'Guedel')	2
Pharyngeal Airways large Adult Size(e.g 'Guedel' No 3 Airway)	2
Suction apparatus non-electric hand/foot operated (e.g. 'Medishield' TM.53)	1
Suction catheter with side arm relief	2
Mouth Gag (e.g. 'Ackland' or 'Mason')	1
Scissors (e.g. 'Lister' Bandage Type 5 in)	1
Artery. Forceps (e.g. 'Spencer Wells' 5 in)	4
Artery Forceps (e.g. 'Spencer Wells' 8 in)	2
'Haemaccel' 500 ml	4
500 ml 4% glucose in 1/5 normal Saline (plastic pack)	5
Cannula (e.g. 'Medicut', 16 gauge x 2 in Adult size)	5
Large Intra-Cath (Yellow Label) (e.g. 'Bardex' 30.48 x 14 gauge)	1
Giving Sets (e.g. 'Tuta')	5
Syringes 20 ml	4
Syringes 10 ml	4
Syringes 2 ml	4
Needles 0.50 mm x 25 mm	1 box
Needles 0.80 mm x 38 mm	1 box
Storets injection swabs Non-alcoholic (Packet of 100) (e.g. 'Mediprep' swabs)	1
Self-Retaining Catheter	5

(e.g. 'Foley' 16 gauge with 30-50 cm3 ballon)	
Catheter bag (2L)	5
Dexamethasone, 8 mg	1 box
Valium injection 10 mg	6
'Elastoplast' 7.5 cm (Code 1003)	2 rolls
'Zylocaine' 2 ml ampoules of 2%	10
Scissors (e.g. 'Lister' Bandage Type) 16.5 cm (large size)	1
Tape Non-Allergenic 3 cm (e.g. 'Micropore' or 'Leucopore')	10 rolls
Air splints Adult size Full Arms	3
Half Arms	2
Full Legs	2
10 cm sterile gauze squares	6
20 cm x 10 cm sterile combine dressings	5
15cm sterile crepe bandages	5

Clause 809

APPENDIX 7

Matters in respect of which provision is to be made in the Diving Manual

(1) Planning which includes the following –

(a) foreseeable meteorological and oceanological conditions;

(b) sea-bed conditions;

(c) depth and type of operation;

(d) suitability of plant and equipment;

(e) availability, qualifications and experience of personnel;

(f) underwater hazards of the diving site; and

(g) proposed shipping movements.

(2) Preparation which includes the following –

(a) consultation with persons having any control over or information related to the safety of any diving operations to be carried out, in particular the control of lifting operations and shipping movements;

(b) selection of breathing medium and equipment;

(c) check of plant and equipment (pre-dive function testing);

(d) allocation of personnel;

(e) fitness of divers for underwater operations;

(f) precautions against cold in and out of the water;

(g) communication procedures; and

(h) precautions against underwater hazards of the diving site.

(3) Procedures during diving operations which include the following –

(a) responsibilities of each position in the diving team;

(b) use of all types of diving equipment;

(c) supply of gases and gas mixtures, including maximum and minimum partial pressures of gases;

(d) operation and use of equipment under water;

(e) limits on depth and time under water;

(f) descent, ascent and recovery of divers;

(g) descent, ascent and recovery of diving bell;

(h) diving tables for use in decompression procedures for both single and repetitive diving and in therapeutic decompression procedures;

(i) control in changing meteorological and oceanological conditions;

(j) time for which divers are to remain in the vicinity of the surface compression chamber; and

(k) maintenance of log books

(4) Emergency Procedures which include the following

(a) emergency communications;

(b) (b)emergency assistance under water and on the surface;

(c) recompression and decompression;

(d) first aid;

(e) medical assistance;

(f) calling assistance from emergency services including advance liaison with those services where appropriate;

(g) precautions in the event of evacuation of the platform or vessel which include a comprehensive evacuation plan for any divers under hyperbaric pressure from initial alert stage through to completion of decompression;

(h) procedures for the emergency secondary recovery of a stricken diving bell from the sea-floor or other obstruction; and

(i) provision of emergency electrical supplies.

Clause 810(1)

APPENDIX 8

Matters to be included in the Diving Operations Record

The following matters shall be included in the Diving Operations Record in respect of each diving operation –

(a) the name of the diving contractor;

(b) the dates on which and the period during which the diving operation is carried out;

(c) the name or other designation of the platform or vessel in connection with which the diving operation is carried out and the location of that platform or vessel;

(d) the name of the diving supervisor and the period for which that supervisor is acting in that capacity in respect of the diving operation;

(e) the names of the other persons engaged in the diving operation including those operating any diving plant or equipment and their respective duties;

(f) the procedures followed in the course of the diving operation including details of the decompression schedule used;

(g) the date and time of authority being given to the diving supervisor to commence or recommence diving operations;

(h) the maximum depth reached in the course of the operation for each diver;

(i) for each diver in respect of each dive that diver makes, the time that diver leaves the surface, that diver's bottom time, and the time that diver reaches the surface;

(j) the type of breathing apparatus and gas mixture used;

(k) the nature of the diving operation;

(1) any decompression sickness, other illness, discomfort or injury suffered by any of the divers;

(m) particulars of any emergency which occurred during the diving operation and any action taken;

(n) any defects that are discovered in any plant or equipment used in the diving operations;

(o) particulars of any environmental factors affecting the diving operation;

(p) the date and time when any machincty or electrical system is isolated and rendered unserviceable because of its malfunction or other unsuitability for use in diving operations; and

(q) any other factors relevant to the safety or health of the persons engaged in the operations.

Clause 811 APPENDIX 9

Matters to be entered in the diver's log book

APPENDIX 9

The following matters shall be entered in the diver's log book

(1) in respect to the diver's suitability to dive –

(a) a record and the results of any medical examination carried out in compliance with clause 8 16; and

(b) a record of any medical abnormalities restricting the diver's ability to dive

(2) in respect of each diving operation in which the diver takes part

(a) the date;
(b) the name of vessel or platform, geographic location and client company;
(c) the current, visibility and water temperature;
(d) the maximum depth reached on each dive;
(e) the time the diver left the surface, left the bottom and the diver's bottom time;
(f) the diver's breathing medium (air or mixed gas);
(g) the mode of dive (surface supplied, bell, SCUBA, saturation or others);
(h) decompression procedure followed and the decompression table used;
(i) a description of the work carried out by the diver;
(j) remarks including any unusual aspects of dive, incidents of decompression sickness, area affected, and treatment table used; and
(k) the diver's signature, supervisor's signature and endorsement of the diving company.

(3) in respect to saturation diving –

(a) the date and time of the start and finish of each saturation dive;
(b) the breathing medium, rate of compression and total exposure to date for this saturation;
(c) the storage depth, excursion depth and duration of excursion; and
(d) the compression and decompression Schedule or Table used.