

injured diver as rapidly as possible, thereby improving the effectiveness of subsequent treatment regimens. Regarding the use of non-employees, the Agency notes that the main purpose of the proposed condition is to ensure that properly qualified personnel are available for initial treatment, regardless of their employment status. However, recognizing that the employer may not be familiar with the qualifications of the non-employee involved in this procedure, OSHA is proposing that employers verify their qualifications prior to using them for this purpose.

9. Diving Logs and Decompression Tables

(a) *Diving log.* This proposed condition requires employers, before beginning diving operations, to (i) designate an employee or non-employee to make entries in a diving log, and (ii) verify that this designee understands the diving and medical terminology, as well as the proper procedures, for making such entries. Recognizing that many employers of recreational divers and diving guides are small businesses that may have difficulty finding an employee to make entries in the diving log, OSHA is proposing to allow non-employees to make entries in the log. The Agency believes that any properly qualified individual can make such entries, provided the employer verifies their qualifications before using them for this purpose; these qualifications include an understanding of the diving and medical terminology and established procedures needed to enter the required information accurately in a diving log.

(b) *Diving log requirements.* Proposed Condition 9(b) specifies that employers must: (i) Ensure that diving logs meet the information requirements specified by § 1910.423(d), including the requirement for DCS information when appropriate; and (ii) maintain diving logs in accordance with the provisions of § 1910.440, including the requirements for record availability, access to records by employees and OSHA, and retention of records. Employers covered by this proposal already are required to comply with these provisions because their employees breathe a mixed gas (*i.e.*, nitrox) during diving operations; this proposed paragraph merely emphasizes this important obligation. In addition, during inspections, OSHA intends to review these records to determine whether the procedures proposed in this rulemaking are providing adequate protection to recreational diving instructors and diving guides.

(c) *Availability of decompression tables.* This proposed condition requires

employers to have a hard-copy of the no-decompression tables used for the dives (see proposed Condition 6(a) above) readily available at the dive site, whether or not the divers use dive-decompression computers. This condition would ensure that the parameters of the no-decompression limits are readily available and accessible as a reference source. In addition, a hard-copy of the decompression tables would serve both as a reference source should decompression become necessary, and as a back-up resource to divers with dive-decompression computers.

10. Diver Training

Under proposed Condition 10, employers must ensure that their divers receive training that enables them to perform their work safely and effectively while using open-circuit SCUBAs or rebreathers supplied with nitrox breathing-gas mixtures. Training would include the following areas: Recognizing the effects of breathing excessive CO₂ and O₂; taking appropriate action after detecting the effects of breathing excessive CO₂ and O₂; and properly evaluating, operating, and maintaining their diving equipment under the diving conditions they encounter. OSHA believes that such training would provide divers with the basic skills and knowledge necessary to ensure that diving is performed safely.

The proposed provision is performance-based, requiring employers to ensure that their employees are trained to perform safely and effectively while using open-circuit SCUBAs or rebreathers supplied with nitrox breathing-gas mixtures. In this regard, the Agency believes that employers are in the best position to determine when the training that their divers obtain is adequate to perform their jobs safely and effectively. However, the provision specifies several critical tasks that the recreational diving instructors and diving guides would have to perform safely and effectively, including detecting and managing excessive levels of CO₂ and O₂, and being able to evaluate, operate, and maintain their diving equipment. Such training would enable divers to take remedial action to prevent and escape the life-threatening effects of CO₂ and O₂ toxicity, including convulsions and loss of consciousness. In addition, OSHA believes that divers who know how to evaluate, operate, and maintain their open-circuit SCUBAs and rebreathers under the diving conditions they encounter will be less likely to require emergency egress because of equipment failure, thereby reducing the

incidence of AGE from rapid ascents to the surface.

11. Testing Protocol for Determining the CO₂ Limits of Rebreather Canisters

This proposed condition specifies the requirements employers must follow when they use a schedule to replace depleted CO₂-sorbent material instead of using CO₂ sensors to detect when the material is no longer absorbing CO₂ effectively (see proposed Condition 1(h) above). Employers may use a CO₂-sorbent replacement schedule developed by a rebreather manufacturer only when the manufacturer has tested the canisters according to the proposed canister-testing protocol in Appendix C. The Agency adapted this protocol from the canister-testing parameters and statistical procedures developed by the U.S. Navy Experimental Diving Unit ("NEDU") (see, respectively, Ex. 3-11 and Reference (4), Section III below); the NEDU is the only Federal agency involved in testing CO₂-sorbent replacement schedules. OSHA believes that the NEDU protocol provides valid and reliable data for determining CO₂-sorbent replacement schedules because they are carefully executed and control significant variables that deplete CO₂-sorbent materials, such as breathing rate (by using breathing machines) and ambient temperature.

(a) *Quality-control assessment of CO₂-sorbent material.* Under this proposed condition, employers must use CO₂-sorbent materials in rebreathers that have the necessary physical properties as determined by the following procedures: (i) The NATO CO₂ absorbent-activity test to assess the capacity of the material to absorb CO₂; (ii) the RoTap shaker and nested sieves to determine granule-size distribution; (iii) the NEDU-derived Schlegel test to assess the friability of the CO₂-sorbent material; and (iv) the NEDU's MeshFit software to evaluate mesh size conformance to specifications. These procedures would provide a quality-control assessment of CO₂-sorbent materials. By ensuring that these materials meet the physical criteria established by these procedures, employers would improve the reliability with which they estimate canister durations during diving operations; improved estimates would enable divers to replace CO₂-sorbent material before it fails (*i.e.*, before CO₂ increases to dangerous levels).

(b) *Testing canister function.* This proposed condition requires employers to provide divers with canisters for their rebreathers that have been tested using a protocol consisting of specified canister-testing methods, procedures,