Trimix Diver Course (I and II)

OVERVIEW

- These courses are to provide the diver with the skills and knowledge needed to minimize the risks of utilizing helium- based trimix breathing gas mixes for dives to a maximum depth of 250 fsw (76 msw) requiring stage decompression and utilizing EANx mixtures and/or oxygen during decompression. There are two levels, called Trimix Diver Level I and Trimix Diver Level II.

QUALIFICATIONS OF GRADUATES

- Upon successful completion of the Level I course, graduates are considered competent to plan and execute technical dives that require stage decompression and utilize helium-based trimix breathing gas mixtures and EANx and/or oxygen for stage decompression without direct supervision to depths not to exceed 200 fsw (61 msw) provided the diving activities and the areas dived approximate those of training. Level II graduates are considered competent to plan and execute technical dives that require stage decompression and utilize helium-based trimix breathing gas mixtures and EANx or oxygen for stage decompression without direct supervision provided the diving activities and the areas dived approximate those of training.

PREREQUISITES FOR ENTERING THE COURSE

- Minimum age of 18
- Minimum certification as a NAUI Decompression Techniques and Technical Helitrox Diver or equivalent.
- Minimum of 100 logged dives, at least 20 of which have been decompression dives.

COURSE POLICIES

- Classroom hours- 18 are estimated.
- Open water dives- six for level I and eight for level II (No dives are to exceed 130 fsw (40 msw) until student satisfactorily demonstrated equipment configuration and management during open water assessment dive(s).
- For Level I at least two dives must be deeper than 180 fsw (55 msw) not to exceed 200 fsw (61 msw). For Level II the additional two dives must exceed 200 fsw (61 msw) not to exceed 250 fsw (76 msw).

EQUIPMENT

- NTEC Gear Configuration
- Redundant Depth and Timing Devices
- Dive computers may be used as depth and timing devices. Helium-based computers and EANx computers may be used for dive planning as the technology becomes available.
- Jon-lines and other rigging lines as dictated by conditions at the dive site.
- Ascent line reel and lift bag, with a minimum of 50 lb (23 kg) lift.
- Redundant underwater lights if needed because of site conditions.
- Suit inflation cylinder (required for dry suit divers in cold water only)
- Cylinder volume appropriate for planned dive and suit inflation needs. Required for dives utilizing helium in bottom mix.

SKILL REQUIREMENTS

- The students are to analyze their own breathing gas mixture and to plan and safely execute each dive. Dive planning shall include limits based on gas consumption, oxygen exposures and inert gas loading for each stage of the dive and breathing gas mixture. Each diver is to demonstrate switching and isolating a malfunctioning regulator, first in confined water, and following adequate practice, at a depth between 33 fsw (10 msw) and 66 fsw (20 msw) and underwater navigation appropriate to the dive plan. Students shall participate in a diver rescue simulation to include management of a diver experiencing oxygen toxicity underwater. On at least two of the required dives ascend with ascent reel and line bag and perform stage decompression.

ACADEMIC REQUIREMENTS

- **Applied Sciences**
  This area is a review and continuation of the material covered in the NAUI Master Scuba Diver, Technical EANx Diver and Decompression Procedures. Included are physics, physiology and medical aspects as applied to planned decompression diving, with special emphasis on mechanisms of bubble formation, advantages of oxygen enriched air mixes for decompression, oxygen toxicity (whole body and CNS toxicity, otu's/uptd's), hypoxia, nitrogen narcosis, tissue inert gas tension, inspired inert gas tension, "precautionary stops" compared to required stops, rates for ascent/descent, carbon dioxide toxicity, dysbaric counter-diffusion, helium-based DCI, high pressure nervous syndrome (HPNS), symptoms of vestibular DCI event, hyperthermia, hypothermia, heat loss dynamics regarding helium in a breathing mixture, advantages and disadvantages of heliox, hydrox, hydrolox, trimix, travel mix vs. bottom mix, psychological considerations: task loading, stress, perceptual narrowing, dive time management, panic (remediation of a specific subject knowledge as needed). Also to be covered are best mix and maximum operating depth mixture computations plus decompression options on air, EANx, oxygen and the need for five minute air breaks every 20 minutes during stage decompression and the off-phenomenon when using 100% oxygen.
- **Helium-Based Trimix Diving Equipment**
  This area provides the diver with the knowledge necessary for selecting and configuring diving equipment for helium-based diving. Included is information about single and twin cylinders, valves, regulators, harness/buoyancy compensator, dive computers/depth gauges/bottom timers, ascent and navigation line reels, lift bags for drifting or untethered decompression, preparing surface-supplied decompression equipment, Jon-line and clips, appropriate ballast and buoyancy control during dive and stage decompression stops, a comparison of dive tables and computers, introduction and review of different decompression table models (DCIEM, RGBM based tables, U.S. Navy, Buhlmann, etc.), correct use of electronic multilevel dive computers for dive planning and decompression.
- **Helium-Based Trimix Dive Planning**
  This area provides the diver with the knowledge necessary to plan and safely execute helium-based dives. Included is information regarding standard operations, i.e., gas needs and requirements, rule of thirds, oxygen toxicity limitations, nitrogen narcosis limitations, tissue helium tension and inspired helium tension; emergency planning including omitted decompression, oxygen toxicity, decompression sickness, and equipment failure. Also, the following

procedures shall be covered: utilitzing primary and decompression gas, normal operations, plan failure, emergency procedure for contingencies for failure or inadequacies of procedure, analyzing and logging all breathing gases, safe guards to prevent misuse of decompression supply regulators, preparation deployment of decompression gear; descent- various methods of entry, use of descent lines or other descent technique decisions, recognizing the signs and symptoms of inert gas narcosis, oxygen toxicity, recognizing breathing pattern fluctuations, options for configuring diver carried equipment; variable ascent-rate techniques and applying deep stop models and theory, diver trim, ballasting and buoyancy compensation; tethered or untethered decompression methods, use of up-lines, loop lines, Jon-lines, line reels and lift bags, decompression bars and platforms, free drifting stage decompression or boat-based decompression station, a comparison of diver carried decompression gases versus surface supplied or rendezvous gas cylinder; shore or boat based dive team support, plus contingency planning, chamber locations, evacuation procedures, communications and emergency breathing gases.