MULTILEVEL AND COMPUTER DIVING

Introduction

For its first 30 years or so, recreational dive time underwater was the no decompression limit of the deepest depth reached. Period. But no more. Today, multilevel diving – gaining more no decompression time by ascending to shallower depths where nitrogen absorption is slower – is more the rule than the exception. Thanks to multilevel diving, in most environments you can stay underwater as long as you have air and warmth; this breakthrough springs from modern dive computers, The Wheel version (replaced by the eRDPML in 2008) of the Recreational Dive Planner and other advances in decompression theory.

Whether you favor coral reefs or inland lakes, most dive sites have opportunities to multilevel dive. Any place you find a sloping reef, wall or other topography that allows you to start deep and move to shallower depths, you can plan a multilevel dive with your computer or the eRDPML.

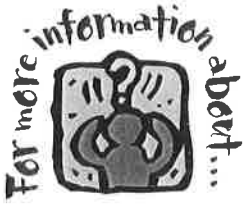
Even many wreck dives will allow multilevel dives in which you start on the deeper parts of the wreck, and gradually ascend to the wreck's upper structure. Multilevel diving is your ticket to more of what you got into diving for – time underwater. No wonder more and more divers consider their computers as essential as their masks and regulators.

The performance requirements for this section require you to use the eRDPML. Be sure you can use the eRDPML to calculate single, repetitive and multilevel dives before going any farther. To learn to use the eRDPML, or for a review, consult the Instructions for Use booklet packaged with the eRDPML, or see your dive center, resort or instructor.

MULTILEVEL DIVING THEORY

Underline/highlight the answers to these questions as you read:

1. What is multilevel diving?
2. What is the only way to determine no decompression limits?
3. What are the three types of diving that make a decompression theory mandatory?
4. How far can you rely on decompression theory to produce an acceptable probability of decompression sickness?
5. What are two reasons that you shouldn't attempt multilevel diving with conventional tables?
6. What dive planner can you use for multilevel diving?



Multilevel Diving Theory

See "The Diver Within" section of *The Encyclopedia of Recreational Diving* book or multimedia.

Multilevel diving is a technique for extending your bottom time beyond the no decompression limit (a.k.a. "no stop" limit) of the deepest depth you reach. You accomplish this by ascending to shallower levels during the dive; as you ascend, your body absorbs nitrogen more slowly than if you remained at the deepest depth for the entire dive. Because you absorb nitrogen more slowly, you have more time available within the no decompression limits.

Multilevel diving – whether you use a computer, the eRDPML or both – draws directly upon decompression theory, so a rudimentary understanding of this theory helps you understand some of the limitations of multilevel diving and other dive practices. You'll find that guidelines you use with dive computers and tables come from what we know – and don't know – about decompression.

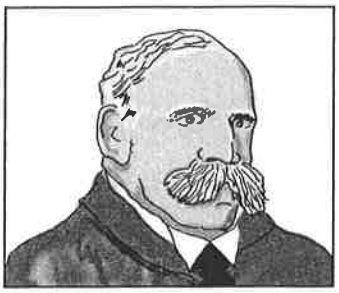
No Decompression Limits

Reviewing what you know from your PADI Open Water Diver course, your body absorbs nitrogen from the air you breathe during a dive. The deeper you dive, the faster you absorb nitrogen and the longer you dive, the more you absorb. Your body tolerates some amount of excess nitrogen when you surface without developing decompression sickness; dive tables and computers track theoretical nitrogen absorption to keep your body nitrogen within tolerable limits. (Note that in these discussions, we're concerned with decompression sickness, rather than the more broadly defined decompression illness. See the Deep Diving section if you're not familiar with the distinction.)

Interestingly, the "tolerable limits" – the no decompression limits for recreational divers – are the starting point for decompression theory. No theory of human physiology or decompression alone can predict the no decompression limits. They're determined only one way: through the actual results of human dives, preferably test dives.

The Decompression Model

Since no decompression limits are determined through the results of actual dives, if you limited your diving to one single-depth dive in a day, you wouldn't need a decompression theory. You would just memorize the limits established by successful dive results.



Virtually all recreational dive computers and dive tables grew from various modifications of a decompression model published by physiologist John Scott Haldane in 1908.

But you don't want to make only one dive, you want to multilevel dive and you want to be ready for emergency decompression, just in case. Repetitive diving, multilevel diving and emergency decompression theory have too many variables to test all the possible combinations of dives, levels and surface intervals, so physiologists use mathematical decompression models to apply test results to this multitude of diving variables. Virtually all recreational dive computers and dive tables grew from various modifications of a decompression model published by physiologist John Scott Haldane in 1908.

Briefly, a decompression model works by mathematically predicting how much nitrogen the human body absorbs during a specific dive. As dynamic and useful as decompression models are, however, physiologists have learned that decompression theory is imperfect, and that decompression models can predict as "safe" dive profiles that may not be so safe. For that reason, you can only rely on decompression theory to produce an acceptable risk of decompression sickness as far as it has been successfully tested. Even then, because people vary in their physiology and susceptibility to decompression sickness, no dive table or computer can guarantee decompression sickness will never occur, even when diving within the table or computer limits. This is one reason why it's important to dive conservatively, well within table or computer no stop limits.

Mounting evidence suggests that repetitive deep dives produce an unacceptably high rate of decom-

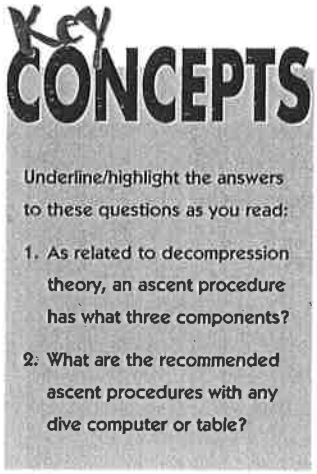
Repetitive Deep Dive Tests

A series of tests by the British Royal Navy demonstrates why it's important to test decompression model limits. In 1982, the Royal Navy tested the following profile: 46 metres/150 feet for 5 minutes, 60 minute surface interval, 46 metres/150 feet for 5 minutes, 60 minute surface interval, 46 metres/150 feet for 5 minutes.

Although it's not likely anyone would actually dive this way in normal circumstances, according to mathematics and decompression models, this series of dives should have produced no cases of decompression sickness (in fact, some dive computers will permit this profile). But, the test divers had multiple cases of decompression sickness.

ASCENT PROCEDURES

There are two potentially hazardous conditions related to a diver's ascent that you're already familiar with from your Open Water Diver course: lung overexpansion injuries and decompression sickness. Ascent recommendations help you avoid these. So far as decompression theory is concerned, an ascent procedure consists of three parts: 1) no decompression limit, 2) rate of ascent and 3) safety stop.



No Decompression Limit

From a theoretical point of view, the no decompression limit dictates when you'll start to ascend. This component of ascent has no bearing on lung overexpansion injuries.

Rate

The ascent rate for the eRDPML has been established at a maximum of 18 metres/60 feet per minute based on human tests, though some computers specify slower rates. Ascend no faster than 18 metres/60 feet per minute or at the rate prescribed by the table or computer you are using, whichever is slower. Using the eRDPML or RDP Table, you may ascend slower than 18 metres/60 feet per minute.

Safety stop

A safety stop is a three minute pause at the 5 metre/15 foot level. Safety stops have been tested to a limited degree, and show significant benefit in reducing the probability of decompression sickness. When analyzed mathematically with a decompression model, the safety stop theoretically also produces a significant reduction in absorbed nitrogen. A safety stop at 5 metres/15 feet also allows you a moment to double-check your depth and time information. In addition, the stop gives you a moment to readjust your buoyancy, so it may help prevent runaway ascents through the last few metres/several feet of water, and thereby minimize the possibility of lung overexpansion injuries. It's with these reasons in mind that you want to make safety stops on virtually all dives.

pression sickness, despite the predictions of mathematical models. For this reason, plan your repetitive dives no deeper than 30 metres/100 feet, regardless of what your dive table or computer might say it permits.

Tables and Multilevel Diving

Obviously, you can use dive computers for multilevel diving – that's perhaps their prime function. Computers calculate your exact dive profile and apply a decompression model to "write" a custom dive table for your dive.

On the other hand, you can't use conventional dive tables for multilevel diving, even by "interpolating" repetitive groups, because doing so can permit dives beyond what human dives show to work. A second concern is that attempting to calculate multilevel dives with conventional tables is at best tedious and at worst complex and error-prone. Not a good place to have an "oops."

The eRDPML differs, though, because it was designed and tested with multilevel diving in mind. It keeps your dive plan within accepted limits, and its electronic design simplifies planning.

Quick REVIEW

Multilevel 1

1. Multilevel diving is
   - ☐ a. a technique for safely making decompression dives.
   - ☐ b. a technique for safely extending no decompression dive time.

2. No decompression limits for recreational diving can only be established
   - ☐ a. through actual human dive results, preferably tests.
   - ☐ b. by extensive computer analysis.
   - ☐ c. through experiments with rats.

3. A decompression theory is made mandatory by (check all that apply):
   - ☐ a. multilevel diving.
   - ☐ b. single dive no decompression diving.
   - ☐ c. repetitive diving.
   - ☐ d. decompression diving.

4. You can rely on decompression theory to produce acceptably minimal risk of decompression sickness
   - ☐ a. as far as you wish to extend the mathematics.
   - ☐ b. only as far as it has been successfully tested.

5. You don't use conventional dive tables for multilevel diving because planning with them is complex and
   - ☐ a. doing so infringes on international patent laws.
   - ☐ b. they may permit profiles well beyond those that have been successfully tested.

6. The dive planner that has been designed and tested for multilevel diving is
   - ☐ a. the eRDPML.
   - ☐ b. the U.S. Navy Multidepth Tables.

How'd you do?

1. b; **2.** a; **3.** a, c, d; **4.** b; **5.** b; **6.** a.

Quick REVIEW

Multilevel 2

1. As related to decompression theory, the three parts of an ascent procedure are:
   - ☐ a. beginning, ascending, surfacing.
   - ☐ b. no decompression limit, rate of ascent, safety stop.
   - ☐ c. rate, safety stop, surfacing.

2. The recommended rate of ascent for any dive table or computer is
   - ☐ a. 18 metres/60 feet per minute.
   - ☐ b. no faster than 18 metres/60 feet per minute, or slower if so specified by the computer or table.

How'd you do?
1. b; **2.** b.

Key CONCEPT

Underline/highlight the answers to this question as you read:

1. Why should a dive requiring emergency decompression be the last, and preferably only dive of the day?

EMERGENCY DECOMPRESSION

Within the scope of recreational diving, decompression diving is exclusively an emergency procedure. However there's an important aspect to note about combining a dive that requires emergency decompression with a repetitive dive: It's a bad idea.

A 1986 U.S. Navy test revealed an unacceptable rate of decompression sickness resulting from repetitive decompression dives, despite table predictions. Furthermore, anecdotal reports from recompression chamber facilities indicate many cases of decompression sickness result from combining decompression diving with repetitive diving. Apparently, even if only one dive in the series is a decompression dive, the probability of decompression sickness increases.

It seems that in many cases, mathematical decompression models can't adequately predict the combination of a repetitive dive with a decompression dive. For this reason, avoid combining a dive that requires emergency decompression with a repetitive dive. If you make a dive and accidentally end

up at an emergency stop, after the stop make that the last dive of the day, even if your computer permits more dives. (the eRDPML requires *at least* a six hour surface interval.)

Note

Technical divers sometimes make repetitive decompression dives. However, they do this using pure oxygen for decompression – not air – which may mitigate the risk to some extent; nonetheless, the risk may be higher. This type of diving is well beyond the scope of this Adventure Dive.

Quick REVIEW

Multilevel 3

1. Tests and anecdotal reports indicate that combining decompression diving with repetitive (decompression or no decompression) diving produces an unacceptably high risk of decompression sickness.
   ☐ True ☐ False

How'd you do?
1. True.

USING YOUR COMPUTER

It's your dive computer that really makes multilevel diving practical. While the eRDPML makes it possible without a computer, the primary advantage of using a computer for multilevel diving is that it computes your *exact* dive profile for maximum allowable no stop time. The eRDPML helps you understand how a computer calculates, and it's your best option for resuming diving if your computer crashes (it happens), but 99 percent of the time, you'll probably want to use your computer for the convenience and the precision it offers.

Key CONCEPTS

Underline/highlight the answers to these questions as you read:

1. What's the primary advantage of using your computer for multilevel diving?
2. What are eight safety rules that apply to diving with your computer?

However, as wondrous as your computer is, it's imperative that you make computer-*assisted,* not computer-*controlled* dives. Computers appear almost magical to some people; but they're just highly sophisticated calculators that read the depth and time and then apply the same type decompression model your dive tables use. They're no more or less valid than dive tables, and the same guidelines apply to computer diving as to table diving.

Eight rules for computer diving (some of these apply to tables, too) help you stay within the limits of what has been proven to produce an acceptably minimal probability of decompression sickness.

It's imperative that you make computer-assisted, not computer-controlled dives. Computers are just highly sophisticated calculators that read the depth and time and then apply the same type decompression model dive tables use. They're no more or less valid than dive tables.

1. Don't dive to the no decompression limits and avoid mandatory emergency decompression. Stay well within the computer's (or a table's) limits. You should have ample time before reaching a no stop limit at *all* times during your dive.

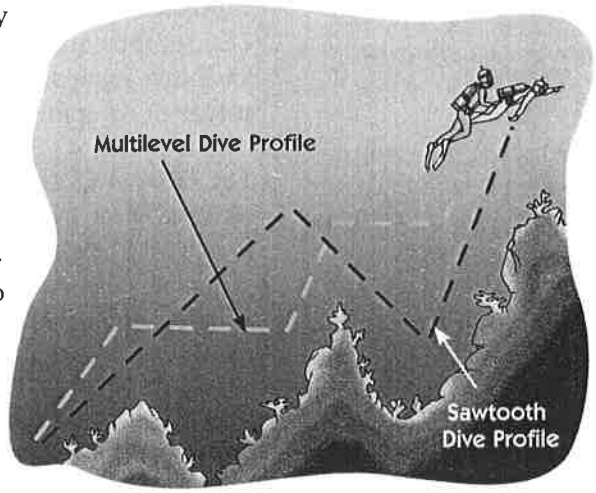
2. **Topography permitting,** make multilevel dives that start deep and work shallower. Avoid "sawtooth" (a.k.a. "reverse") dive profiles with repeated significant shallow and deep depth changes, such as starting a dive at 30 metres/100 feet, then ascending to 18 metres/60 feet and after a while, descending to 28 metres/90 feet. While it's unclear what added risk there may be for this kind of diving, if any, within the realm of no stop diving the vast majority of test data is based on "forward" profiles that start deep and work progressively upward. To stay within the envelope of proved test data, start at the deepest point and progress shallower (minor variations aren't a problem). Your computer may "permit" sawtooth profiles by calculating them, not to encourage this kind of profile, but so you have information if you accidentally do one.

3. Control your rate of ascent to 18 metres/60 feet per minute or slower. Virtually all computers have rate indicators that alert you if you start to go too fast.

4. Take a safety stop at the end of all dives at 5 metres/15 feet for at least 3 minutes.

5. Allow a surface interval of at least 60 minutes with a computer, even if it permits the dive time you want in less time.

6. Limit repetitive dives to 30 metres/100 feet or less. Make your deepest dive first, with subsequent dives progressively shallower.



7. Don't get so caught up in your extended bottom time limit that you neglect your air supply. (Sounds obvious, but on a multilevel dive, you'll usually be limited by air, not by no stop time.)

8. Be aware that no computer or table can account for physiological variations caused by factors such as age, dehydration, alcohol consumption, strenuous exercise, excessive fat tissue, injury or other factors that predispose you toward decompression sickness. The more of these factors that apply, the more conservatively you should use your computer or table. Surprisingly, being conservative doesn't always mean you have to cut your dive short – usually, you can simply move shallower sooner so you always have lots of time before reaching a no decompression limit.

Quick REVIEW

Multilevel 4

1. The primary advantage of using a computer is
   - ☐ a. the ability to make virtually any dive the computer can calculate.
   - ☐ b. that the computer computes your exact profile for maximum allowable no stop time.

2. There's nothing wrong with a multilevel computer dive profile that ascends and descends repeatedly, provided that you don't exceed the no decompression limit.
   - ☐ True ☐ False

How'd you do?

1. b; **2.** False. "Sawtooth" profiles are problems. Avoid them by starting deep and working shallower on a multilevel dive.

MULTILEVEL DIVE EQUIPMENT

Equipment for All Multilevel Dives

Besides the equipment you normally wear in your local dive environment, you want to have three pieces of equipment along for multilevel dives.

KEY CONCEPTS

Underline/highlight the answers to these questions as you read:

1. What equipment, besides the standard equipment required in the local environment, do you need for multilevel diving, and what is its purpose?
2. What piece of equipment should each diver have when making computer-assisted multilevel dives?

The eRDPML. Planning multilevel dives with the eRDPML is recommended for two reasons. First, to plan a multilevel dive with or without your computer. The eRDPML will give you a rough idea of what your computer will allow as you ascend during the course of a dive. Second, if your computer goes south on you, use the eRDPML as a back up that permits multilevel diving – something you'll want especially if all your buddies' computers are still humming along fine. If you're on an exotic dive holiday and your computer quits, you'll kick yourself up and down the dock for leaving your eRDPML at home.

Depth gauge and timer. These two pieces of equipment are necessary to back up a dive computer. You'll also need these to multilevel dive with the eRDPML without your computer.

Equipment for Computer-assisted Multilevel Dives

When making computer-assisted multilevel dives, you and your buddy should each have your own computers. Multiple divers shouldn't share one computer. Once a diver begins diving with a computer, that diver uses that computer for the entire diving day, or longer if specified by the manufacturer.

Use the eRDPML as a back up that permits multilevel diving – something you'll want especially if all your buddies' computers are still humming along fine. If you're on an exotic dive holiday and your computer quits, you'll kick yourself up and down the dock for leaving your eRDPML at home.

The reason for this is that dive computers track your dive profile so closely that even minor variations between you and your buddy affect your allowable dive time. Likewise, the computer tracks nitrogen release between dives, so it's inappropriate to let someone borrow your computer between

dives. Never turn off a computer between dives, and always follow the manufacturer's instructions. (You did read them, right?)

When making computer-assisted multilevel dives, you and your buddy should each have your own computers. Multiple divers shouldn't share one computer.

QUICK REVIEW

Multilevel 5

1. On any multilevel dive, it is recommended that you have (check all that apply):
   - ☐ a. dive computer
   - ☐ b. the eRDPML
   - ☐ c. descent line
   - ☐ d. timer
   - ☐ e. depth gauge

2. When making computer-assisted multilevel dives,
   - ☐ a. each buddy team must have one computer.
   - ☐ b. each diver must have a computer.

How'd you do?
1. b, d, e; **2.** b.

KEY CONCEPTS

Underline/highlight the answers to these questions as you read:

1. **What are three potential hazards of multilevel diving, and how do you avoid them?**
2. **What are two common mistakes to avoid when multilevel diving with or without a computer in any environment?**

MULTILEVEL DIVE HAZARDS

There are a few potential hazards and mistakes in multilevel diving that you'll need to avoid. No worries – none of these are particularly mysterious or difficult to evade. Just things to watch out for.

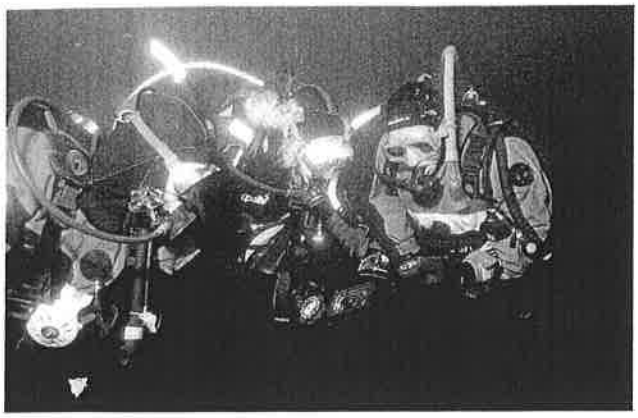
Potential Hazards

The three main potential hazards of multilevel diving are not unique to multilevel diving. You can encounter these in almost any diving situation, but we give them special attention here because multilevel dives mean extended bottom times, which means more potential to run into them.

Hypothermia. Extended bottom times increase your exposure to cool water. Your exposure suit that's adequate for a short dive may not be enough for a longer one. Be sure to wear adequate thermal protection. If you begin shivering, end the dive im-

mediately. For more information on hypothermia, see the Dry Suit Diving section.

Running out of air. We touched on this earlier. Your available no stop time on a multilevel dive can easily exceed your air supply. Pay close attention to your air supply and allow plenty for a safe return to boat or shore. A good habit is that when you check your computer, you check your SPG, too.



Pay close attention to your air supply and allow plenty for a safe return to boat or shore. A good habit is that when you check your computer, you check your SPG, too.

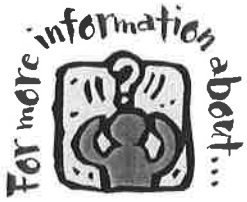
Disorientation. A long period underwater means you can go farther, which means more opportunity to get turned around. Use a compass and your other navigational skills so you know where you are and where to exit the water at all times. Take your time and go slower. Just because you can go farther doesn't mean you have to. See the Underwater Navigation section for more information about staying oriented.

Common Mistakes

There are two common mistakes to avoid, both of which we've touched on already:

Sharing a computer. Don't. Computers follow dive profiles too closely to make sharing feasible. The diver not wearing the computer can't be confident in the dive profile, and it would be especially cumbersome if that diver wants to dive with someone else after a surface interval. If you have two divers and one computer, have the computerless diver calculate a multilevel profile with the eRDPML. This should provide ample no stop time for both divers to fully enjoy the dive without unnecessary risk or complications.

Sawtooth diving. Because computers and tables are mathematical devices, they calculate any vari-



Hypothermia
See "The Diver Within" section of *The Encyclopedia of Recreational Diving,* book or Multimedia

Disorientation
See the *Underwater Navigator Manual* and *Underwater Navigation* video

ety of dives, even deep dives following shallow dives or, on multilevel dives, deep levels following shallow levels. These kinds of sawtooth profiles, however, take you outside the body of known test data for reliable diving. It seems that decompression models aren't as reliable in this kind of diving, and in any case, there's been virtually no testing of sawtooth diving.

As stated earlier, avoid this. Make your deepest dive first, with repetitive dives progressively shallower. Multilevel dives should begin at the deepest point and work to progressively shallower levels. Once you've ascended to a shallower depth, don't drop back down. Computers or tables let you calculate it not because it's recommended, but so you've got information if it happens accidentally.

Multilevel 6

1. Three potential hazards of multilevel diving are (check all that apply):
   - ☐ a. hypothermia
   - ☐ b. vertigo
   - ☐ c. oxygen poisoning
   - ☐ d. disorientation
   - ☐ e. running out of air

2. Sawtooth diving, in which the diver moves up and down from shallow levels to deep,
   - ☐ a. is made possible with computers.
   - ☐ b. should be avoided, regardless of the table or computer used.

How'd you do?
1. a, d, e; **2.** b.

MULTILEVEL DIVE PLANNING

You're going to find that planning a multilevel dive differs little from planning a single depth dive, making it easy to benefit from extended no stop time at shallower depths.

Underline/highlight the answers to these questions as you read:

1. What three considerations should you account for when planning a multilevel dive?
2. How do most computers display their no decompression limits for first and repetitive dives?
3. How do you use the eRDPML to estimate the time a computer will allow on a multilevel dive?
4. What is the minimum surface interval before resuming diving after a computer fails?
5. What should you do if your computer fails while diving?

Considerations

There are three considerations to take into account when planning multilevel dives.

Topography. You need to estimate ascending depth levels when planning your dive. A sloping reef, wall or other moderate rise in the bottom is nearly ideal for multilevel diving because it offers almost any depth level you want. Some "single-depth" sites, such as wrecks or flat reefs have few practical opportunities for making a multilevel dive. At an unfamiliar dive site where you have no information about depth levels, it may be impossible to plan your first visit to the site as a multilevel dive. Of course your computer will extend your no stop time if you do, in fact, find appropriate topography and follow it. Just be sure to include this possibility in your planning.

Air supply. As mentioned in the section on hazards, your no decompression time can be longer than your air supply. Be sure you watch your air when you dive your plan.

Contingency plans. Multilevel dives require contingency planning. If your computer fails, you need to know what to do (discussed in a moment). If intermediate depth levels are deeper than you planned, you need to be ready to skip up a level or revert to a single-depth dive plan, especially if you're using the eRDPML without a dive computer.

Multilevel Planning with Computers

If you're diving with a computer, there are a few steps to take for planning. You will get your initial and repetitive dive no decompression limits from your computer, and you can use the eRDPML to estimate the time your computer will allow on a

multilevel profile. You also need to know what to do if your computer crashes.

Obtaining no decompression limits. For first and repetitive dives, most dive computers display their no decompression limits for various depths when you activate the scroll mode. Different models activate their scroll modes in different ways, so consult the computer's instruction manual or your instructor.

Using the eRDPML to plan computer dives. The eRDPML helps estimate your computer's no stop time. For the first dive, simply calculate the multilevel profile you intend to follow. The eRDPML will *approximate* the time you can expect at each level.

You will get your initial and repetitive dive no decompression limits from your computer, and you can use the eRDPML to estimate the time your computer will allow on a multilevel profile.

For repetitive dives, you need to find a pressure group for use with the eRDPML. The easiest way to do this is with the RDP Table. First, set your computer in scroll mode and find your no decompression (no stop) limit for a repetitive dive to 12 metres/40 feet. Using Table 3 on Side 2 of the RDP Table, follow the 12 metre/40 foot row from left to right until you find the scrolled time in the bottom (blue) portion of each Pressure Group box. If the exact time isn't shown, use the next greater time. Come up the column to find the Pressure Group letter to use with the eRDPML to estimate what your computer will allow when planning your next dive.

If you don't have an RDP Table, you can find your Pressure Group using the eRDPML, and trial and error. In Dive Planning mode, select Multilevel: no, First Dive: no, PG after SI: yes. At PG Start Dive, estimate a PG letter – the shorter the scrolled limit, the higher the letter you should guess. At Enter Depth, put in 12 metres/40 feet. The eRDPML will show you the ANDL. If it is longer than scrolled no decompression limit, repeat the steps with higher Pressure Group letter; if it is shorter, with a lower letter. Do this until you determine the Pressure Group that equals or gives the next longer ANDL, and then use

that Pressure Group for the eRDPML to estimate what your computer will allow when planning the next dive.

If your computer fails while you're diving, make a long stop – perhaps as long as your air supply permits. Do not dive again for 24 hours, or as stipulated by the manufacturer's instructions.

In using the eRDPML to assist in planning computer dives, remember that your computer follows your exact profile and may have different no decompression (no stop) limits. When diving with a computer, stay within the computer's limits. Your computer is your source for no decompression time; the eRDPML simply helps you plan the dive.

If your computer fails. If your computer fails between dives, you will have to wait at least 24 hours (longer if recommended by the manufacturer) before resuming diving with another computer or the eRDPML. This is because there's no accurate way to account for the nitrogen in your body. You must wait until the excess nitrogen has left your body for all practical purposes. An exception is if your maximum depths and times fall within the single-depth limits of the RDP (Table or eRDPML). In this case, you can calculate the day's dive profile and determine a pressure group for planning another dive. But this is often impossible because multi-level dive times frequently exceed single depth limits, especially if your first level was deeper than 18 metres/60 feet.

If your computer fails while you're diving, immediately stop the dive and ascend according to the manufacturer's guidelines. If there are none, ascend no faster than 18 metres/60 feet per minute, or the computer's ascent rate, whichever is slower, to 5 metres/15 feet. Make a long stop – perhaps as long as your air supply permits. Do not dive again for 24 hours, or as stipulated by the manufacturer's instructions.

Quick REVIEW

Multilevel 7

1. Considerations when planning a multilevel dive include (check all that apply):
   - ☐ a. topography
   - ☐ b. oxygen decompression
   - ☐ c. air supply
   - ☐ d. contingency plans

2. Most computers display no decompression limits by activating the
   - ☐ a. decompression mode.
   - ☐ b. no decompression mode.
   - ☐ c. scroll mode.

3. Using the eRDPML to estimate what a computer will allow on a repetitive multilevel dive is similar to calculating
   - ☐ a. emergency decompression.
   - ☐ b. minimum surface interval.

4. If a computer fails, you should wait _____ before resuming diving with another computer or table.
   - ☐ a. 6 hours, or longer if recommended by the manufacturer
   - ☐ b. 12 hours, or longer if recommended by the manufacturer
   - ☐ c. 24 hours, or longer if recommended by the manufacturer

5. If a computer fails while diving, you should
   - ☐ a. make a normal ascent with a safety stop lasting as long as air supply permits.
   - ☐ b. rely on your buddy's computer.

How'd you do?
1. a, c, d; **2.** c; **3.** b; **4.** c; **5.** a.

PADI Multilevel Diver Specialty Course

Your Multilevel Adventure Dive may be credited (at the instructor's discretion) toward the PADI Multilevel Diver Specialty certification. In addition to what you've learned in this section and will practice on the Multilevel Adventure Dive, the Multilevel Diver Specialty course includes:

- more about computer performance
- more background on decompression theory
- continuing diving after a computer failure

The PADI Multilevel Diver course is highly recommended for getting the best use from your dive computer, or for using the eRDPML for multilevel diving when your – or your buddy's – computer crashes.

Multilevel and Computer Adventure Dive Overview

- Knowledge Review
- Briefing – Plan dive with the eRDPML and (optional) computer
- Gearing up
- Predive safety check (BWRAF)
- Entry
- Descent to deepest depth level
- Ascent to second depth level
- Ascent – safety stop
- Exit
- Debrief
- Log dive – Complete Adventure Dive Training Record

KNOWLEDGE REVIEW Multilevel & Computer Diving

1. Describe how no decompression limits are determined.

2. Because people vary in their _____ and susceptibility to decompression sickness, no _____ or _____ can guarantee decompression sickness will never occur, even when diving within its limits.

3. Describe how you should ascend when diving with any table or computer.

4. Why should a dive requiring an emergency decompression stop be the last, and preferably only, dive of the day?

5. List eight rules that apply to computer diving.

   1. _____
   2. _____
   3. _____
   4. _____
   5. _____
   6. _____
   7. _____
   8. _____

6. List the three pieces of dive equipment for any multilevel dive (in addition to the regular gear you need for the local environment).

   1._____

   2._____

   3._____

7. List the three potential hazards of multilevel diving.

   1._____

   2._____

   3._____

8. What are the two common mistakes to avoid while multilevel diving, with or without a computer?

   1._____

   2._____

9. What three considerations do you include in planning a multilevel dive?

   1._____

   2._____

   3._____

10. You can use the eRDPML to _____ the time your computer will allow on a first dive and repetitive dives.

11. Describe what to do if your computer fails during a dive.

Student Diver Statement: I've completed this Knowledge Review to the best of my ability and any questions I answered incorrectly or incompletely I've had explained to me, and I understand what I missed.

Signature _____ Date_____