

# BREATH OF FRESH AIR

**Closed-circuit rebreathers have always been seen as something for elite tech divers, but the Poseidon Mk6 Discovery looks set to change all that, bringing an electronic CCR to recreational divers**

Text and photographs by **MARK EVANS** Additional photographs by **SIMON MORRIS**

**L**et's make this clear, I am not a rebreather diver. I have dabbled in the past, spending an afternoon in a pool on the Draeger Dolphin semi-closed unit and a couple of days with the Buddy Inspiration CCR with Martin Parker down in Cornwall, but I have never been fully convinced to take the plunge. The semi-closed circuit rebreather didn't seem to offer much over my normal open-circuit rig, and the Inspiration – and other electronic fully closed-circuit rebreathers I have seen but not dived – were undoubtedly fantastic, very capable units which have been to extreme depths, etc, but for me personally seemed to require far too much time and discipline on the set-up and break-down stages. I am just used to sticking a BCD or wing on to a

cylinder, bunting a first stage on the pillar valve, turning it on and jumping in. All that faffing about with O-rings and scrubber systems just didn't set my world alight. However, my view on CCRs has been mellowed by a couple of days spent diving the Poseidon Cis Lunar Mk6 Discovery, which has been launched on to the market aimed squarely at recreational users.

I was a bit dubious when Simon Morris, MD of Poseidon Diving Systems, invited me up to give the Discovery a trial, but I had seen prototypes of the unit at various shows, and the genuine article at Dive 2009, and I knew it was hitting the diving world designed to be used by divers in recreational situations. More importantly, it was supposed to be very user-friendly and great for non-rebreather divers to get their first

taste of CCR diving – that'd be me, then!

So it came to pass that I drove up the A14 and M1 to Stoney Cove at the beginning of December – why when I agreed to do this did I not think of what the temperatures would be like at that time of year? – to hop on a week-long course for a couple of days to see how the unit performed firsthand.

The course was being run by well-known technical diving instructor Jack Ingle, and it was primarily for other CCR instructors to swap over to the Discovery, and non-rebreather instructors to get qualified to teach with the unit. Jack teaches CCR courses on various rebreathers, but it was interesting to hear him saying that he thought the Discovery was one of the best on the market, and that certain functions it has will soon be seen being adopted by other manufacturers. High praise indeed from someone of his calibre.

With outside temperatures hovering in the low single-figures, the first day was spent in one of the nice, warm classrooms in The Underwater Centre at Stoney Cove getting to grips with the unit. Jack basically started from scratch, opening a brand-new box in front of us and taking out and discussing



Laying out the pieces; the full unit; the 'clever' bit





## “Extremely user-friendly and great for non-rebreather divers to get their first taste of CCR diving”

each part until a disassembled but fully complete CCR was lying on the desk. There didn't seem to be a lot there! With this CCR being aimed at recreational divers – it is designed to be used to a maximum depth of 40m with no decompression – this simplicity was a welcome sight.

Once the unit was out of the box, Jack took us through the assembly process, again step by step, and we all basically shadowed him, following what he did on our own rebreathers. The main body of the unit is solidly constructed from aluminium and durable plastics, and it has been well thought out – for example, the bottom of the Discovery will only go on one way, so you can't get it wrong. Similarly, the head unit, which contains all the fancy electronics and sensors, can only slot into place one way. All the hoses to link the cylinder first stages to the rebreather are coloured coded so you don't end up getting an oxygen one on the diluent, and vice versa. The BOV mouthpiece is, according to Jack, the best-designed and most-comfortable available. It does sit extremely well in your mouth, and switching from open circuit to closed circuit, and back again, is simply a case of moving a lever 90 degrees. In the event of an emergency or the unit not being happy with something and wanting you to bail out on to open circuit and go to the surface (basically the unit's solution to any

major issue while diving), you will hear a buzzer, feel the mouthpiece vibrate and see a red light flash on the HUD in front of your mask. With my ancient traditional-style twin-lens black-skirted mask, I couldn't see the HUD, but there was no mistaking the mouthpiece vibration or the sound of the buzzer. With a teardrop-style mask, it was possible to see the HUD easily, even with a black skirt, but it is worth bearing in mind that you might need to get another mask if yours doesn't allow you to see the HUD.

One thing I was impressed with was the



Mark finishes running through the PST

scrubber canister. Unlike other units where you need to pour loose absorbent into a canister, here they are pre-packed and just slot into place. No need to spend time patting and shaking canisters to ensure there are no air spaces or channels in the 'sorb, just slide the pre-packed canister into the unit. Dive time on a single canister is advised as three hours, and if you have done a couple of hours one day and are going to be diving again the next, you can put the used canister in a ziplock bag or slot the lids back into place and then reuse it for another hour the following day. It has been tested beyond three hours, but Poseidon are playing safe by advising users to stick to replacing the canisters after three hours of use. There is a cost implication in using pre-packed canisters – they come in at around £20 each – but the piece of mind you get from knowing these were professionally packed in the factory that makes the absorbent, along with the ease of use, helps offset this to an extent.

Once the Discovery is assembled, the really clever part kicks in, which is the automated pre-dive system PST (power up self-test). You turn on the handset, or 'paddle' as it is referred to, by wetting two contacts on the back, and then the unit starts running rapidly through a series of checks. Once it has reached a certain stage, you are finally asked to do



something – turn on the oxygen. Once it has monitored both the oxygen content and the fill of the three-litre cylinder, it asks you to turn on the diluent – in this case air, other gases will be online in 2010 (see later) – and again checks the pressure, etc. It then asks you to take a couple of breaths, and then is it off again on another series of checks. Watching your unit buzz, light up, vibrate and inflate and deflate by itself is slightly unnerving, but it shows how advanced the electronics are in this rebreather. Finally it will ask you to turn the mouthpiece to closed circuit, then back to open circuit, and last but not least, breathe the loop on closed circuit for a few minutes to ensure it is maintaining the right PPO2 level. After that it is a case of turning the mouthpiece to open circuit and that's that, you are ready to go diving. Written here, this PST seems to take forever, but in reality it is all over and done with in a matter of minutes.

For our first foray into the water, we went down to The Underwater Centre's indoor pool.



Mark returns from his first pool session with the CCR

## “The Poseidon Cis Lunar Mk6 Discovery has captured my imagination”

Though the water is lovely and warm, we went in with our drysuits on, so that we could get our weight sorted out.

One by one we got into the water and Jack worked with us individually to get us submerged and weighted correctly. Just getting underwater in a rebreather takes a lot more weight than I use on open circuit, and while Jack did say that as your experience grows, you can drop some, you will always use more weight as, in his words, ‘a CCR is just a big bag of wind attached to you’.

A long-time open-circuit diver, I am used to breathing out and sinking, but with the Discovery, I had to get used to changing my buoyancy by venting air through my nose, so it bubbled out of the skirt of my mask. I think that was the hardest thing to get used

to – on open circuit you are able to control your buoyancy by breathing in or breathing out, here it makes no difference as the air in your lungs just goes into the counterlungs, or back again, so there is no change in your buoyancy whatsoever. Once you've achieved neutral buoyancy, and you are just hanging there with no sound or bubbles, it is an awesome feeling, but it does feel very alien.

We all spent an hour or so in the pool, getting used to the feel of the unit, moving up and down in the water column, switching back and forth from open circuit to closed circuit, and monitoring the read-out on the ‘paddle’. Once Jack was happy that we'd all got the hang of it, it was time to move on.

A coffee and some essential diver-fuel later

– bacon-and-egg cobs are the way forward – and we were ready to get into the Cove. We all ‘booted up’ our units again and ran through the PST before we walked down to the water's edge and made our way into the chilly waters. Once in the water, Jack checked that we were all comfortable and that we were monitoring our ‘paddles’ and then we slowly descended and made our way down to the 6-7m ledge. We spent the next 35 minutes

### What the future holds...

While the Poseidon Cis Lunar Mk6 Discovery CCR has entered the market aimed squarely at recreational divers, a full decompression software package will be available from next February or March, and then trimix will be offered at the end of 2010, making this unit just as capable as all the other electronic CCRs currently on sale. So, it is good to know that if you start out with the Discovery in its current guise, it can develop and grow with you as your experience builds.

swimming up and down the ledge, from the Viscount cockpit to the Nemo sub, fine-tuning our buoyancy now we could achieve a bit more depth, and running through a few drills, including switching back and forth between open and closed circuit, going up and dropping down a few metres, and emptying the loop of any gloop that had gathered during our breathing cycles.

We ended the session with a quick swim down the ‘road’ to 15m, which gave us another chance to work on our buoyancy both descending and ascending, before heading back to the surface for a debrief.

As I was just joining for a few days to get a taster on the unit, this was where I left off, but the couple of hours I had spent underwater on the Poseidon Cis Lunar Mk6 Discovery had captured my imagination, and I can see myself signing up for a full course in 2010... ■

**Sport Diver's technical expert Mark Powell gives his opinion...**



The pool session allowed the divers to sort their buoyancy

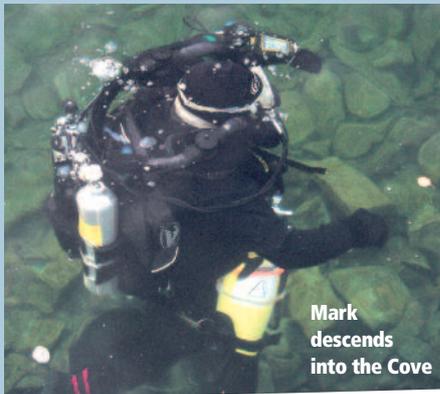
## NOW FOR ANOTHER VIEW...



Sport Diver's tech guru Mark Powell has dived on various rebreathers, including the Inspiration, rEvo and KISS, and here he gives his opinions on the Poseidon Discovery Mk6

Text and photographs by **MARK POWELL**

When I was asked to try out the Poseidon Discovery Mk6 I expected to hate it, because almost everything about it seemed to be counter to standard practice on every other rebreather. The fact that it only used two oxygen cells instead of the more-common three, the fact that it made all the decisions for you, and the fact that there was no way for the



Mark descends into the Cove

**“I certainly respect the thought and attention to detail that has gone into the design”**

user to control what was in the breathing loop were all things that went completely against conventional rebreather logic. Now sticking to conventional logic is not always a good idea, but most of that have grown up around rebreather design have arisen for very good reasons.

The day started with Simon from Poseidon giving me an overview of the unit and allowed me to ask questions about the design decisions they had made. What quickly became clear is that the Discovery has adopted a very-different approach because Poseidon wanted to build a very-different rebreather. They did not want to build a rebreather that would appeal to technical divers, but instead

wanted to build one that appealed to recreational divers. The most-common answer to my questions was “but this is a recreational rebreather”. It took me most of the day to get my head around this concept. To begin with I wasn't even sure what a recreational rebreather was, or whether there was even a market for a recreational CCR.

I was sitting in on a course and talking to the guys that had bought the unit gave me an insight into why they had gone down this route. Two of them were single-cylinder divers who did not want to go down the twinset route but wanted to extend their diving by giving themselves a new challenge, the other was a twinset diver who had resisted the idea of a



Mark makes his way to the water's edge

rebreather. One was interested in photography and saw a rebreather as a benefit. In each case the existing models of rebreather had not appealed to them and seemed overly difficult, it was only the Discovery that had seemed practical for their style of diving. Gradually, I began to see why for them a CCR such as the Discovery would offer some benefits.

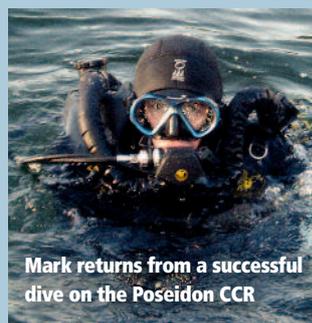
Once we got round to diving the unit it was no surprise to find that it is very easy to set up and use. Putting the unit together is very straightforward, although to be fair, no easier or faster than some of the better tech CCRs. The use of the Extend Air cartridges, rather than having to pack the scrubber yourself, saves time and effort, but works out slightly more expensive than packing it yourself.

The Discovery runs through over 50 self-checks when you turn it on which tests everything from buzzers and electronics through to checking for leaks in the breathing loop. It also prompts the user whenever they need to do anything. This is designed to ensure that the unit is set up correctly

and is working fully without depending on the user to remember to do the pre-dive checks. If any of the tests fail then the unit will not go into dive mode and so prevents the user diving when there is a problem.

The Discovery does have some very clever features. For example, the controller regularly validates each of the oxygen sensors during the dive to detect any problems. Air is flushed over the sensors at regular intervals to check that the reading is as expected. Existing rebreather dives refer to this as a diluent flush, where the whole breathing loop is flushed with the diluent gas so that the diver can check that their cells are reading correctly. Doing this manually has a number of disadvantages. It uses up valuable diluent gas, it takes time, it can affect buoyancy and finally it depends on the diver being able to calculate the readings they expect to see at whatever depth they are at. However, the Discovery does this automatically every five minutes using only a tiny amount of gas. This allows the unit to constantly monitor the behaviour of the cells. All of this is invisible to the diver and they are only alerted if the unit thinks there is a problem with the cells. It is this constant validation of the cells that allows the Discovery to use two cells rather than the traditional three or more cells.

After two days of diving the unit I certainly didn't hate it as I expected and I respect the amount of thought and attention to detail that has gone into the design. I'm not sure how big the recreational closed circuit rebreather market is going to be, but whatever the size, the Discovery is well placed to satisfy that market.



Mark returns from a successful dive on the Poseidon CCR