



PORTABLE AIR MONITOR IS ON THE STREETS

By: LCDR (RN) Jim Pearson

It is now 18 months since September 2007's Faceplate Article 'New Portable Air Monitor (PAM) Undergoes Field Testing' introduced the concept of a portable monitor capable of approving Divers' air for use without the need to conduct bomb sampling. I am pleased to report that 25 PAMs have been purchased by the Navy and are in the process of being issued to the fleet. At the time of going to press MDSU ONE and TWO, UCT ONE and CTG 56.1 Bahrain are already in receipt of one or more PAMs.

The path from research and development to operational use has not been a smooth one. There has been much internal debate as to whether the benefit of having the ability to conduct real time screening for dangerous levels of CO, CO₂, O₂ and Volatile Organic - Compounds (VOCs) is outweighed by the risk of not being able to measure oil, mist and particulates, water vapor, and halogenated compounds (solvents) in accordance with Tables 4-1 and 4-2 of the U.S. Navy Diving Manual. Clearly, if the PAM is used in addition to the current air sampling program we have a 'gold standard' in terms of safety but have gained nothing in turns of versatility. I will try to summarize some of the main areas of discussion be-

fore highlighting the current policy and the way ahead.

The PAM is unique in that it is the first unit to be able to measure CO, CO₂, O₂ and VOCs in the same box. High or low O₂ levels or high levels of any of the other gases are immediately life threatening to the Diver and the PAM will alarm if the dive table limits are exceeded. Not only does this mean that the PAM can be used to sample a compressor, or another air source, to immediately confirm that the air is suitable for life support, but it also means that the PAM can be left attached to an operating compressor to warn the surface team if the compressor begins to malfunction or draw in poor quality air.

What the PAM cannot do, due to its extremely small size, is warn the user if the weight of oil, mist and particulates, the presence of certain solvents, or the presence of water vapor and separated water exceeds the limits in the Dive Manual. 00C has been looking closely at the real risk associated with these hazards and how such risk may best be mitigated. Looking back at historical data we have found that the number of ANU compressors failing air sampling on the basis of high levels of oil, mist and particulates is very low (less than 0.5%). We have also been reviewing the actual health risk to the Diver from oil, mist and particulates and it appears that the biggest risk comes from chronic exposure over a long period of time. Most occupational exposure limits are referring to industrial factory workers, e.g., in car plants, and the risk would appear to be far lower for a military Diver. One other potential risk, which requires more investigation before it can be completely ruled out, is any fire risk when using the ORCA for in water O₂ decompression if there is potential for oil, mist, and particulates to be present.

The water vapor risk is slightly easier to quantify. The main risk associ-

ated with water vapor is one of regulator freeze up, but there are no health risks to the Diver. Change A to Revision 6 of the Dive Manual will state that Divers' air authorised for use with a PAM is not to be used for cold water diving as defined in the manual. There is also an additional requirement to visually inspect flasks on completion of diving for the presence of water. There are also a number of very simple hand held devices designed to detect the presence of water vapor which NAVSEA is looking at to see if they could be used in conjunction with the PAM. The solvents requirement in Table 4-2 dates back several decades and was incorporated to detect the presence of a number of specific solvents that some disreputable contractors were using to clean flasks and that the U.S. Government recognised as being dangerous



Portable Air Monitor

Calibration and Span Gas

Reducer and Connection Equipment

to the Diver. The PAMs VOC detector will pick up only one of these solvents so there is a requirement to determine whether or not these solvents are still in use and whether there is still a requirement to screen for them.

To further 'muddy the waters' the current requirements in Table 4-2 are based on FED SPEC BB-A-1034 B which is no longer extant but for which, as far as I am aware, no replacement has

Portable Air Monitor cont'd on page 5.



Portable Air Monitor cont'd from pg 3.

been issued. NAVSEA is investigating the overall Table 4-1 and 4-2 requirements for future updating to meet current needs and requirements.

Having covered the background to fielding the PAM here is the current situation. NAVSEA owns 25 PAM sets. A set consists of a PAM, a reducer kit (reducer, HP whip, SCUBA, FADS III, LWDS, CGA 580 connections and tubing for connecting to the PAM), Calgas and PAM instructions. The 25 sets are being held at the ESSM Base in Virginia and are being issued to a preapproved list of commands that NAVSEA feels will gain the most from the PAM. ACN-6A (Diving Advisory 08-18) to Revision 6 to the U.S. Navy Dive Manual authorizes the use of the PAM for approving any source of Divers' compressed air, 00C3

letter, Ser 00C3FN/3017 dated 6 March 2009 temporarily restricts the use of the PAM to those occasions when a dive unit cannot utilize the air sampling program (i.e. they would normally be forced to request a waiver from NAVSEA in order to dive).

NAVSEA wants to lift the restriction on the use of the PAM as soon as practicable. To this end NSWC have been asked to investigate the availability of, or if necessary develop, a portable filter which could be used in conjunction with the PAM to remove oil mist and particulates. We are also looking for any other COTS solutions that would allow us to test for those contaminants not currently detected by the PAM without significantly increasing the overall foot print. The second part of a two-pronged approach is to review the cur-

rent compressed air breathing requirements to see if any of the requirements in the current tables can safely be removed or updated in light of advancements in dive equipment and general safety.

In summary the PAM is out there and is already helping the fleet. It has been used in the Gulf and is currently being used on various operations across the globe. We have asked those units in receipt of a NAVSEA PAM to provide feedback to 00C on the monitor. Initial indications are that it works extremely well and will prove to be a rugged and valuable addition to any dive locker's inventory.

LCDR Jim Pearson is a Royal Navy Exchange Officer working for Diving Programs at NAVSEA 00C and is the Program Manager for Contaminated Water Diving.

Reproduced by kind permission of Faceplate