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From:
Sent: Tuesday, February 19, 2008 4:32 PM
To: NIOSH Docket Office (CDC)
Subject: Responce to PAPR Concept Paper
Attachments: NIOSH PAPR Concept R-1.doc

Please find attached my response to the PAPR Concept Paper of Dec 21,2007

Response to PAPR Concept Paper

Feb 19, 2008 R-1

To: NIOSH Docket Office

Following are my thoughts and observations on the PAPR Concept Paper date December 21, 2007. Please feel free to notify me by Email for any need clarification. I am employed by Avon Protection Systems Baltimore office but am submitting my concerns as an independent party. If need be I can be reached at

- 2.8** Breath-response PAPR – a tight fitting PAPR which continuously monitors the user's air demand rate and electronically adjusts air flow by changing the blower speed accordingly.

This statement is limiting based on;

- a. Changing the blower speed is not the only way to archive this, it has been done with constant blower speed and modulating the airflow to the head-piece. How this is accomplished should not be defined.
- b. Is breath response limited to tight-fitting?? If so why? It is possible to achieve this with other types of head-pieces.

Thinking should only define what breath response is not how to achieve.

4.1.2.2 Indicate user to low pressure in the breathing zone.

The breathing zone is not defined, in a loose-fitting there is only 1 zone but in a tight-fitting you have the eye and the nose-cup space both which are normally at different pressures during inhalation, nose-cup the lowest. Also reference 4.1.9 and 4.1.9.1

4.1.9 Low pressure indicator

Even though this would be the best way to indicate insufficient air it will cause some integration and logistics issues. My interpretation is that reading the pressure inside the mask or head-top, eye space, is where you're looking. This makes sense but, to accomplish this following will need to be redesigned to accommodate;

- a. The inlet to the head-piece will have to change for allowance for a sampling line/tube to give access into the space. This will require current masks to be upgraded for integration, not practical.
- b. Hose design will become more complicated as a second attachment for the sampling line will be needed. This eliminating any current hoses.

This will be more complicating and I'm sure that the current manufactures will have issues with changing Mask and hose designs for PAPR integration.

There also are some current US Patents that cover this and are currently still active, hence limiting.

In addition, currently most of the tight-fitting masks have 2 breathing zones, eye space and nose cup I have found in my testing the nose-cup region, during inhalation, is at a lower pressure than the eye space. Reviewing some of the current masks the chin seal is part of the nose-cup region meaning that the pressure should be measured in the nose-cup, the lower of the 2 zones in the mask. This being the case a leak could occur directly into the breathing zone, nose-cup, without going through the eye space. This scenario complicates how the pressure is measured even more than measuring the eye space.

4.1.9.1 Pressure below ambient during more than twelve consecutive breaths during blower operation.

Currently most of the newer PAPR design and monitoring flow to the head-piece by different means, but this does not require any changes to the Head-piece or hose. The issue with this is that some have a very slow response time when the delivered flow becomes insufficient. But if you're looking for 12 consecutive breaths below ambient then this method may be sufficient without major changes to the mask or hose.

Thinking, if your requirement is above ambient with 12 consecutive breaths at designated flow requirement then doesn't specify the means at which this is done. There may be other technologies that could be used but you are limiting the design. Can this not just be specified as an alarm if 12 consecutive are below ambient? This may entice the manufacturers to raise their flow rates to ensure sufficient air BUT this would affect the flow through the filter as I stated in section 4.2.7.3

My belief is that measuring the pressure is the best and would be used by manufacturers in the higher flow rate and Breath-response units, but these are units that are being built for a specific application and a new hose and mask are looked at as part of these systems. In the low and moderate flow rate ranges PAPRs can/are looked at as an addition to an existing APR

4.2.7.3 -- For PAPR with two or more canisters, canister test shall be performed at the required flow divided by the number of canister –

Understand but, what is the practice when PAPRs, which most do, move more air than specified in required chart. IE loose-fitting is 170lpm so at 3 filters tested flow will be $170/3=57$ lpm current filters are tested at 64lpm this will be in the service life of the filter. Know I have a PAPR that I state moves 230lpm, $230/3=77$ lpm filter service life is shorted. How is this addressed with service life? When you get into High-flow PAPRs and breath-response we're pushing the upper flows higher and the filter service life is compromised. Should the Filter testing flow rate be the maximum stated flow divided by # of filters? Or is this a limitation due to the test equipment?

4.2.7.7

IDLH – is not defined in the definitions.