

TO
E. D. Dickens, Jr.
Corporate Research

FIELD POINT OR DEPT. & BLDG. NO.
Corporate Research

FROM
M. P. Dreyfuss, M. A. Centanni
Corporate Research

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SUBJECT

DATE YOUR LETTER

25-2946

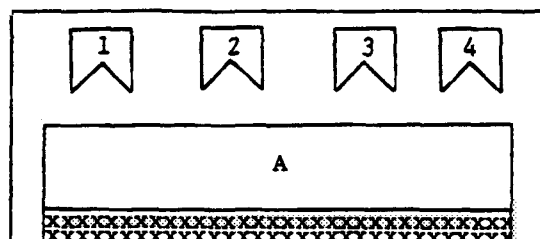
DATE THIS LETTER

5/17/79

New Passive Monitor Concept

On Friday May 11, 1979, Stanley Armstrong, Marketing Representative, Industrial Hygiene Instruments, of the duPont Company visited the BFG Environmental Group. Paul Zakriski informed us of this visit and invited us to sit in. The purpose of the visit was to show us several new developments of duPont in the Industrial Hygiene area.

Perhaps the primary motivation was to show us a new disposable passive dosimeter developed by two physical chemists at duPont. The badge consists of three (or more) solutions (probably aqueous solutions) sealed in a cleverly designed plastic package (see sketch below). The plastic is duPont's polyethylene ionomer, Surlyn. This clear plastic package is then encased in a rigid white plastic holder for wearing during the exposure period.



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The solution in compartment A absorbs contaminant during the exposure period. The contaminant reaches the solution via a sealed in place diffusion material (it was a white opaque material which felt rubbery) shown as the shaded area in the sketch. After the exposure period (normally 8 hours) the user adds the chemical reagents in the other compartments in sequence to the solution in A. Squeezing the reagent bubble between thumb and forefinger causes the seal between the reagent bubble and A to break. The liquid is then squeezed into A via the two small channels which have been opened (shown as dotted lines in the sketch). The chemistry chosen produces a color change; the intensity of the color is proportional to the amount of exposure. Thus a qualitative indication of the amount of exposure is immediately evident. A quantitative evaluation is obtained with the use of an associated colorimeter which is calibrated and designed to read out a time weighted average exposure in ppm. The colorimeter is designed so that the clear plastic badge can be inserted and measured directly.

The contaminants which can be monitored by this system are:

 NO_2 SO_2 NH_3

Badges for monitoring other contaminants are under development and can be expected in the future. The sample which Armstrong showed us was a NO_2 badge. Adding the two reagents present caused a pink color to develop in A which looked very much like the red/pink of phenolphthalein in base. Perhaps this was only a simple acid-base demonstration badge, but this is not what we were lead to believe.

The badges are priced at \$20.00 and are not reusable. The colorimeter will be sold for \$500.00. Both will be available in June, 1979.

This is obviously a cleverly conceived and designed package. The basis for its operation depends critically on the diffusion material used to allow the contaminant to get into the solution in A. Such diffusion across or through what seems a rather long thin path would seem to be a relatively slow process. The inherent deficiencies remind us of the REAL carbon badge in which diffusion was through a thin silicon rubber cover. The consequent insensitivity to short exposure to high levels of contaminants would appear to be a deficiency in this new badge also.

In the near future Armstrong said that the two chemists who developed this badge will be in town for a more detailed presentation and discussion. This will give us an opportunity to explore this question and any other technical questions we want to pursue. Armstrong seemed to be a recent college graduate and a rather new employee. His technical background is minimal and his experience with this new technology is very limited. Thus it was impossible to obtain answers to any question of a technical nature at this time.

Armstrong also showed us duPont's version of a passive carbon absorption organic vapor badge (cost \$6/badge). Its sampling range is reported to be 0.2-2000 ppm-hrs. Their claim is that the badge out-performs Abcor's and 3M's badges by giving four times greater sensitivity. They accomplished this by several design changes. Absorption and analysis is unchanged.


M. Peter Dreyfuss


Michael A. Centanni

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cc: J. M. Marks

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