TO	FIELD POINT OR AKRON DEPARTMENT & BLDG. NO.	DATE YOUR LETTER
E.B Katzenmeyer, Jr.	D/0020 - B/5-H	
FROM	FIELD POINT OR AKRON DEPARTMENT & BLDG. NO.	DATE THIS LETTER
J.C. McCool	D/0020 - B/5-H	6/4/74
SUBJECT		

MONITORING AMBIENT VCM LEVELS WITH A BULLARD DOSIMETER

Objective

Compare VCM levels measured by a Bullard Dosimeter with those measured by charcoal tube sampling. This instrument conceivably could be used as a self-contained personal monitoring device.

Conclusuions

1) The Bullard Dosimeter has a possible application as a personal alarm to warn employees when ceiling levels of vinyl chloride have been exceeded.

2) It is quite unsuitable for use as a leak detector because of the long response time, (10 - 15 minutes), required to reach equilibrium.

3) There is a correlation between the readout values measured on a Dosimete memory cell and the VCM values based on charcoal tube sampling; further work is indicated to provide a clearer evaluation.

4) The high cost of this apparatus ($1900.00) precludes its' wide spread use, but it could be warranted as a means of backing up results of other VCM analysis procedures.

5) The Dosimeter could serve as an area monitor because it is a self-contai unit, and would be readily located as desired.

Recommendations

Average another monitoring trial to compare the Dosimeter data with the charcoal sampling results. Special attention must be given to proper calibration of the Dosimeter.

Discussion

This is a preliminary report of how the Bullard Vinyl Chloride Dosimeter performed as a vinyl chloride monitoring device in poly bldg. 451 at Avon Lake. The results were compared with results obtained by charcoal tube sampling performed at the same time. The Dosimeter features a sensor which "breathes" vinyl chloride (for which the instrument is factory-calibrated). These vapor diffuse into a special solid state crystal, and the signals developed provide a measure of the VCM concentration. These signals can be divided into memory cells for specified sampling periods; based on the counts/hour, the VCM concentration (in ppm) can be graphically estimated. The Dosimeter could provid an immediate estimate of worker exposure to VCM, in contrast to the long time required to work up and analyze the VCM collected by the charcoal tube proced

Like the Charcoal tube approach, the Dosimeter is suitable for being used as

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personal monitor for the employees who may be exposed to VCM.

Mr. Lynn Willis (of ALGC) and I quickly established that the Dosimeter is quite unsatisfactory as an instantanious leak detector. We estimate that it takes 10 - 15 minutes for the Dosimeter vinyl chloride scale reading, to reach equilibrium.

We fitted a poly cleaner, (Mike Novotny), in Bldg. 451 with both the Dosimeter and the standard charcoal tube (5/8/74). This was to compare how the total VCM values as measured by the two instruments. In both cases, the air sample was taken from Mr. Novotny's breathing zone. Results are shown in Table I:

TABLE I

VCM Dosimeter		Charcoal Tube	
Counts	57	Air sampled(1)	35
Time	35 min.	mg. VCM in sample	1.2
Counts/hr.	98		
ppm VCM*	8	ppm VCM	13.4

(* from graph)

Encouraged by these results, we repeated the comparison on 5/9/74 with another poly cleaner (J. Allgood). This test was performed to evaluate Dosimeter sensitivity - how short an exposure time was required to obtain a significant read out with the Dosimeter? Table II shows the results of a 110' exposure as measured by the Dosimeter and by the charcoal tube:

TABLE II

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OPERATION: J. Allgood Bldg. 451 Poly 19
EXPOSURE TIME: 5/9/74 0925 to 1115

VCM Dosimeter		Charcoal Tube	
Counts	290	Air sample (liters)	110
Time	110 min.	VCM (mg) in sample	5.6
Counts/hr.	158		
ppm VCM	13	ppm VCM	19.9

At this point, we switched to a new charcoal tube, and continued the monitori study. It is to be remembered that when the memory cell is read, the count then starts over. It had been hoped to integrate these readings for the different steps in the poly cleaning operation. Unfortunately, this does not wor unless the electricity cell is purged after the memory cell is read. For wha is worth, I am reporting the following results in Table III:

TABLE III

POLY CLEANER: J. Allgood Bldg. 451 Poly 43

Sample Time	Time	Count Readout	Counts/hr.	VCM ppm*	Dosimeter ,Reading
1115 - 1240	85 min.	438	309	28	22
1327 - 1345	18 min.	46	153	13	25
1348 - 1410	22 min.	44	120	12	12

* VCM value from graph based on counts/hour.

The charcoal tube covering the period from 1115 to 1410 gave a suspiciously low value, and is not reported here.

It will be noted that in Table 3, nothing is reported for the interval betwee 1240 and 1327. This represents the poly cleaners lunch period. While I had discharged the memory cell at 1240 (438 reading), it was a complete surprise to me that when Mr. Allgood returned from lunch at 1327, the memory cell show a count of 290! It is very difficult fo me to see why this should be, since he supposedly was in a non-VCM area. It appears that the high gas concentrat left in the cell at 1240, kept on diffusing, giving for the signals which resulted in the 290 value at 1327. This is why a purge would have to be used (to draw out the vapors from the cell by heat), if our wished to make a seri of integrated readings.

I have seen enough of this instrument to feel that a repeat trial would be in order. The charcoal tube analysis situation now is in much better shape and we would get speed analyses to compare with the Dosimeter data. AI am convinced that we should know more about the potentials of this direct read out instrument. (In spite of its' $1900.00 price tag).

John G. McCool

elc

D/0020 - B/5-H
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