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SECTION 9

DOW CHEMICAL / ATMOSPHERIC CONCENTRATION OF ASBESTOS FIBERS WHILE CUTTING GASKETS

4/24/73

PLAINTIFF'S EXHIBIT
DOW-159

Cef File

DOW CHEMICAL U.S.A.

50983

TEXAS DIVISION
FREEPORT, TEXAS 77541

ENVIRONMENTAL HEALTH REPORT

ATMOSPHERIC CONCENTRATION OF ASBESTOS FIBERS WHILE CUTTING GASKETS

FILE NO. A24-173

DATE April 19, 1973

AUTHOR R. L. Silverthorne

CHECKED

DATE 4/24/73

Summary

Concentrations of asbestos in the general atmosphere during the cutting of gaskets was found to be border line when compared to the Federal Regulation, but may be significant when considering possible carcinogenesis.

Attached is a copy of the survey with recommendation to reduce the atmospheric asbestos fiber concentration.

Distribution
Billy Parrack A-2431
File

PROBLEM

At the request of supervision, Industrial Hygiene was asked to evaluate the Asbestos hazard presented by the cutting of gaskets in A-1876.

CONCLUSION

(1) Asbestos fibers are liberated by the gasket cutting operation in significant quantities and found in the atmosphere throughout the building.

(2) The concentration of asbestos fibers found were as follows:

(a) Breathing zone of man doing the cutting----4.03 f/cc
(b) Breathing zone of man cleaning up area with broom----------2.04 f/cc
(Note: Area has not been cleaned up for several days)
(c) At top of stairway 15' from cutting table--5.44 f/cc
(d) Breathing zone of man cleaning table off---3.08 f/cc with broom and picking up material off floor with a scoop.

NOTE: (a)→(d)were taken when the area had not been cleaned for several days

(e) Breathing zone of man doing the cutting---- .78 f/cc
(f) At top of stairs 15' from cutting table---- 0 f/cc
(g) In middle of shop downstairs during cutting- .12 f/cc
(h) Breathing zone of man doing cutting--------- .90 f/cc

NOTE: (e) thru (h) were taken after the upstairs area had been cleaned up.

Current government regulations allow no more than an 8 hour time weighted average concentration of 5 f/cc. The regulation also states that no employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers/cc.

(3) The current regulations governing permissible exposure to asbestos are based upon the possibility of contraction of asbestosis. Asbestos fibers, however, have also been shown to be carcinogenic. No dose/disease relationship has been established, so efforts must be made to reduce and eliminate, if possible, the workers exposures.

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RECOMMENDATIONS

(1) The gasket cutting device should be equipped with dust collection devices.
(2) Cutting of gaskets should be done in an environmentally seperate area from the rest of the work area, to reduce exposure of other employees.
(3) The man assigned to cutting gaskets shall wear an approved dust respirator.
(4) Work clothing should be changed and washed daily.
(5) A suitable periodic medical examination program should be arranged for employees exposed to asbestos fibers.
(6) Environmental measurements should be made annually to determine the adequacy of precautions.

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DISCUSSION

Asbestos fibers inhaled over a prolonged period can cause a pulmonary disease called asbestosis. This fact has been recognized for many years by those involved in the production and sale of asbestos. During the last few years a threshold limit value has been established for asbestos fibers in the atmosphere, the purpose of which is to prevent asbestos workers from contracting asbestosis. The current standard is 5 fibers/cc as recognized by the Federal Government. However, over the last few years respirable asbestos fibers have been recognized as being carcinogenic. A dose/disease relationship has not yet been established, so efforts must be made to reduce and eliminate the worker's exposure.

For this reason exposures must be reduced to as low level as is possible. This is done most desiresbly by reducing the exposure to the workers, and then providing protective equipment if the exposure cannot be eliminated.

A total of 8 samples were taken on Milliport 0.8 micron 47 mm AAWG membrane filters. MSA Monitaire portable vacuum pumps calibrated and used. Used filters were cropped into 4 grid sections and immersed in 10% solution of diethyl oxylate and dimethyl phthalate on a slide, and then covered with a cover slip. When the membrane became transparent counting was performed using 40X objective and a 12.5X eyepiece, for a total magmafication of 500X. The eyepiece was equipped with a micrometer of 100 divisions 2.5 microne each.

Phase contract illumination was used.

DISCUSSION (continued)

It should be remembered that the numbers given as the concentrations of atmospheric asbestos fibers is not to be considered as the absolute concentration, but the best technique presently known. Tests have shown that this method produces numbers that are difficult to reproduce from lab to lab, or microscopist to microscopist. However, it is the best technique we have.

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ASBESTOS IN ATMOSPHERE DURING CUTTING OF ASBESTOS GASKETS

Filter Factor = 154

SAMPLE	TIME (min.)	SAMPLE RATE L/M	TOTAL VOLUME (L)
1	3	2.57	7.71
2	2	2.69	5.38
3	3	2.69	8.07
4	3	2.57	7.71
10	1 min. 10 sec.	2.69	3.13
20	1 min. 10 sec.	2.57	2.99
30	3	2.57	7.71
40	3	2.69	8.07
50	-0-	-0-	-0-

$$\text{Concentration} = \frac{\text{Total Fibers}}{\text{Total Volume}} = \frac{\text{Fibers}}{\text{cc}}$$

FIBERS 75 u PER SQUARE	FILTER FACTOR	TOTAL FIBERS	FIBERS PER cc
(1) 204	154	31416	4.03
(2) 72	154	11,088	2.04
(3) 288	154	44,352	5.44
(4) 156	154	24,024	3.08
(10) 16	154	2464	.78
(20) 0	154	0	0
(30) 2	154	308	.12
(40) 48	154	7392	.90
(50) 0	154	0	0

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ENVIRONMENTAL SURVEY SAMPLE RECORD

DATE: 3-29-73

BUILDING NO.	PROCESS	SUPERVISOR
A-1876	Cutting Asbestos Gaskets	Harold Hewett

MATERIAL OR CHEMICAL	SAMPLING METHOD	TRAPPING MEDIUM
Asbestos	Air	Millipore filter paper

TYPE EQUIPMENT	FLOW INDICATOR	SAMPLING RATE	WIND DIR.	VELOCITY	TEMP
MSA Pump	10		NE.	9MPH	6

REMARKS: Floor had been swept the day before. Area and table top is clean.

Sample No.	Container No.	SAMPLE DESCRIPTION	TIME Start	TIME Stop	TIME Δ	Sample Volume (Liters)	Analysis
10	Pump 2	On ~~Loyd Tuchan~~ Herbert Bridges cutting gaskets Wearing respirator			1:10	3.13	16
20	Pump 1	At top of stairs during cutting			1:10	2.99	0
30	Pump 1	In middle of shop - during Loyd Tuchan cutting asbestos gaskets			3min	7.71	2
40	Pump 2	On Loyd Tuchan during cutting of gaskets			3min	8.07	48
50		Sample Blank					

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ENVIRONMENTAL SURVEY SAMPLE RECORD

DATE: 3-22-73

BUILDING NO.	PROCESS	SUPERVISOR
A-1876	Cutting asbestos gaskets	Harold Hewett

MATERIAL OR CHEMICAL	SAMPLING METHOD	TRAPPING MEDIUM
Asbestos	Air	47 mm. filter pa.

TYPE EQUIPMENT	FLOW INDICATOR	SAMPLING RATE	WIND DIR.	VELOCITY	TEMP
MSA pump	10		—	—	

REMARKS: Area of cutting is upstairs in A-1876 in ~~South~~ North side of bldg. Table top has neoprene cork material on it. The floor has not been swept for several days.

Sample No.	Container No.	SAMPLE DESCRIPTION	TIME Start	TIME Stop	TIME Δ	Liters Sample Volume	Total Fibers Analysis
1	Pump 1	Mr. Gammage cutting asbestos gaskets	8:15	8:18	3 min	7.71	264
2	Pump 2	Mr. Gammage cleaning up area with broom. Pump #2 at top of stairway. (In breathing zone) Not on Mr. Gammage	8:25	8:27	2 min	5.38	72
3	Pump 2	At top of stairway during cutting of asbestos gaskets at cutting table. Table top is a neoprene cork material	8:15	8:18	3 min	8.07	288
4	Pump 1	Mr. Gammage cleaning up area with broom. Sweeping top of table and floor up.	8:25	8:28	3 min	7.71	156

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