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CHLORINE CELL MAINTENANCE, 853 BUILDING

The Utility Men's exposures to asbestos fibers were evaluated during the application of asbestos diaphragms on the chlorine cells. The time-weighted average and peak exposures to asbestos were within acceptable levels, though the peak exposures could approach the maximum allowable concentration. The utility men should continue to wear respiratory protection during the dumping of asbestos into the pulling tank. Recommendations are given for revising the local exhaust system for better dust control and revising the clean-up procedure for OSHA compliance.

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ISSUED TO

ATTENTION OF

Midland

PLAINTIFF'S EXHIBIT

DOW-1273

DOW-1273

H. B. FROGE, CHLOP-ALKANU, 851 (11-22-72)

NBH34.21-21-3(3)

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ST0000913

PROBLEM

Industrial Hygiene was asked to evaluate the exposures of the Utility men to asbestos fibers during the application of asbestos diaphragms on the chlorine cells.

CONCLUSIONS

1. The Utility Men's time-weighted average and peak exposures were within acceptable levels.
2. During the weighing and dumping of asbestos the peak levels could approach the maximum allowable concentration for short-term exposures. The Utility Men should continue to wear respiratory protection during these operations.
3. For compliance with the Occupational Safety and Health Act (OSHA);
 - (a) Empty asbestos bags should be thrown in a plastic bag and sealed before disposal.
 - (b) A vacuum sweeper fitted with a filter should be used to pick up loose asbestos.
4. Respiratory protection should be worn when the empty asbestos bags are put into the plastic container.
5. Several revisions to the local exhaust system (figure 1) would improve the dust control during the weighing and dumping of asbestos into the pulling tank.

ST0000914

PROCESS

Asbestos is received at 853 Building in burlap and plastic bags which are stored near the pulling tank. As needed, the bags are hand-carried to the tank edge, slit and dumped into the tank. The bags do not give the exact weight required, so some handling of the dry asbestos is necessary in weighing the last increment. A small canopy-type hood provides some local exhaust during the weighing and dumping operations.

In the pulling tank, the asbestos is slurried with a caustic solution, using a hoe to break up the lumps. A vacuum is used to draw the slurry into a mixing tank where the asbestos is more evenly dispersed in the caustic solution. After being wetted with the caustic solution, the asbestos does not present a dust problem.

The slurry is returned to the pulling tank after a diaphragm has been positioned. A vacuum is drawn on the cell forming a thin asbestos mat on the diaphragm. The caustic filtrate is returned to the mixing tank.

After removing the excess slurry and filtrate, the diaphragm is placed in a drying oven. After drying, the asbestos mat is hard and non-friable and does not present a dust problem.

SAMPLING AND ANALYSIS

General and breathing zone air samples were collected on 2 inch diameter and 25 mm diameter membrane filter (0.2 micron pore size) at 18.0 and 1.2 liters per minute, respectively.

The fibers on the filters were counted by the standard phase-contrast microscopy method at 450 magnification (AL40-602 and AL38-103). A particle size distribution was also obtained for an approximate comparison with earlier asbestos surveys.

PRESENTATION OF DATA

Table 1 shows the Utility Men's time-weighted average (TWA) exposure to asbestos fibers based on an 8-hour day when the pulling tank is in operation. The TWA and peak exposures were both within acceptable levels. The Threshold Limit Value of 2 fibers/ml (instead of 5 fibers/ml) is used as the most likely standard that will be included in the 1972 revisions of the OSHA. The asbestos exposures are also viewed from the standpoint that the TLV may eventually be reduced to 1 fiber/ml. At present, there is not an indication that the ceiling of 10 fibers/ml, for short-term exposures, will be revised.

Table 2 shows the results of the filter sample analyses for the various cell maintenance operations. The highest asbestos fiber concentrations, up to 3.5 fibers/ml, were found during the

*TLV - the time-weighted average concentration to which most people could be exposed daily without adverse effect.

weighing and dumping of asbestos. Because of the variability in the asbestos handling operations (and in the fiber counting technique) the Utility Man's peak exposure could approach the allowable ceiling concentration. The men should continue to wear respiratory protection during the time the asbestos is weighed and dumped into the pulling tank.

Table 2 also shows the concentration of total particles >1 micron, counted on the membrane filter. The results indicate that if the old asbestos TLV of 2 MPPCF was exceeded, the TLV of 2 fibers/ml would also be exceeded. This is only an approximate comparison since the old TLV required a different method of particle counting.

For compliance with the OSHA, the empty asbestos bags should be placed in plastic bags and sealed before disposal. Loose fibers should be picked up with a vacuum sweeper fitted with a filter to contain the asbestos. Samples were not taken, at this time, of the asbestos levels when the empty bags are placed in the plastic containers. However, as a precaution (and extension of the asbestos handling operation), the operator should continue to wear respiratory protection during the disposal of the bags.

The local exhaust system, used during the weighing and dumping operations, could be improved with some minor revisions. The present canopy-type opening is too large and non-directional for effective dust control. Figure 1 shows a rough sketch of the proposed revisions. The exhaust opening should be located as close as possible to the work site and in a position so that the air flow is away from the operator.

TABLE 1

CHLORINE CELLS MAINTENANCE, 853 BUILDING -- UTILITY MEN'S EXPOSURE TO ASBESTOS

FIBERS

OPERATION	A Time per 8-Hr Day (min)	B Average Concentration (Fibers/ml)	A x B 480
<u>Handling Asbestos - Weighing, dumping into pulling tank, mixing and blending into slurry</u>	90	1.71	0.32
<u>Pulling Tank - Sampling slurry, running filter tests, drawing diaphragm on cell</u>	90	0.15	0.03
<u>General Cell Work - Preparing cells, putting cells in oven</u>	225	0.07	0.03
<u>Clean-up Around Pulling Tank</u>	15	0.36	0.01
<u>Lunch and Breaks</u>	60	----	0.00
Totals	480		
Time-weighted average exposure			0.39
* Threshold Limit Value			2.0
Maximum allowable concentration		10.0	

*TLV - The time-weighted average concentration to which most people could be exposed daily without adverse effect.

TABLE 2

CHLORINE CELLS MAINTENANCE, 853 BLDG. - SUMMARY OF SAMPLE ANALYSIS

OPERATION	No. of Samples	Asbestos Concentration (Fibers $>5\mu$ per ml)		Total Particle Concentration $>1\mu$ (MPPCF*)	
		Range	Average	Range	Average
Handling Asbestos	14	0.33 - 3.46	1.71	0.20 - 1.80	0.98
Pulling Tank	11	0.03 - 0.40	0.15	0.13 - 0.74	0.33
General Cell Work	2	0.03 - 0.11	0.07	0.15 - 0.22	0.19
Clean-up: Pulling Tank	1	- - - - -	0.36	- - - - -	0.43

*Million particles per cubic foot of air

FIGURE 1

CHLORINE CELLS MAINTENANCE

853 BUILDING
PULLING TANK OPERATIONS

PROPOSED REVISIONS TO CANOPY EXHAUST HOOD:

- (1) Reduce Area of Opening to Total of $0.5 - 1.0 \text{ ft}^2$
- (2) Cut Slot in Cone (2-3 inches) to Provide Directional Flow of Air

