



DOW CHEMICAL U.S.A.

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TEXAS DIVISION
FREEPORT, TEXAS 77541

ENVIRONMENTAL HEALTH REPORT

PLAINTIFF'S
EXHIBIT
DOW-176

ASBESTOS FIBERS
MAGNESIUM CASTING B
B-842

FILE NO. B8-1818

DATE June 1, 1979

AUTHOR E. P. Whatley

CHECKED

[Signature]
DATE June 11, 1979

Summary

A survey was conducted to determine employee exposures to asbestos fibers while racking unquenched ingots at Magnesium Casting B, B-842, during April, 1979. Employee exposures were about 1% of the short term exposure limit, and less than 0.5% of the permissible exposure limit calculated as an 8 hour time-weighted average.

Further monitoring is not necessary at this time.

Employees should be informed of the results of this survey, and the informing documented.

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bbs

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AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

INTRODUCTION

A survey was conducted to determine employee exposures to asbestos fibers at Magnesium Casting B, B-842, on April 18, 1979.

PROCESS DESCRIPTION

Molten magnesium from Magnesium III is transported to Magnesium Casting B in covered crucibles, where it is then poured into furnaces. The magnesium is pumped from the furnaces into molds on conveyors, and is allowed to cool in both air and water as the molds traverse the length of the conveyors. At the ends of three of the conveyors, the ingots are hand- or mechanically-stacked; a towmotor is used to remove and stack the large ingots from the remaining conveyor.

Occasionally the magnesium ingots do not fall out of the molds into the water quenchers; as a result they fall under the conveyor as the molds turn upside-down while traveling back to the end of the conveyors to be refilled. Since these ingots have not been through the water quenchers, they are too hot to handle with the cotton gloves routinely worn by the Casting Operators while racking ingots, and asbestos gloves are worn during the few moments necessary to retrieve and rack them.

METHODOLOGY

Since only a few moments are normally required to retrieve and rack the ingots which fall under the conveyors, a simulated procedure was used to determine the employee exposures to asbestos fibers at these times. The water quencher was turned off on conveyor #4, and employees wearing asbestos gloves racked the hot (dry) ingots for periods of 10-25 minutes.

Fixed station and personnel samples were collected by drawing a measured volume of air (approximately 1.5 liters per minute) through aerosol filters (Millipore MAWG 937AO) using Bendix Micronair II air sampling pumps. The pumps were calibrated before and after use with a calibrated Gilmont rotameter (S/N B-2241). Sampline times ranged from about 10 to 50 minutes. Analyses were done by optical microscopy at Central Laboratory, B-1225. Sampling locations are shown in Figure 1.

EVALUATION CRITERIA

Permissible exposure limits (PEL's) are concentrations of airborne substances to which nearly all employees may be repeatedly exposed throughout a working lifetime without adverse effect.

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EVALUATION CRITERIA (continued)

Most PEL's are time-weighted average concentrations for 8 to 12 hour work days and 40 hour work weeks. Permissible exposure limits do not represent fine lines between safe and dangerous exposures; they are based on industrial experience and experimental human and animal toxicological studies, and are intended for use as guides for plant design and for evaluating employee exposures.

The permissible exposure limit for asbestos fibers is two fibers per cubic centimeter of air (2 fibers/cc), as an eight-hour time-weighted average. An asbestos fiber is defined as a particle greater than or equal to five microns in length. Ten fibers/cc are allowed as a ceiling concentration for periods up to 15 minutes, provided the exposure for the entire 8-12 hour work day does not exceed 2 fibers/cc, and there are no more than four excursions per day, which are separated by at least an hour.

RESULTS AND DISCUSSION

Monitoring results are shown in Table I.

Employee exposures to asbestos fibers while racking unquenched ingots are significantly below allowed exposure levels. The average employee exposure to asbestos fibers while racking was 0.1 fibers/cc air, substantially less than both the short term exposure limit of 10 fibers/cc air (for periods up to 15 minutes) and the permissible exposure limit of 2 fibers/cc air (as an 8 hour time-weighted-average).

The average asbestos concentration in the area surrounding the employee (about 2 feet away) was approximately half of the average employee exposure, or 0.04 fibers/cc air.

CONCLUSIONS AND RECOMMENDATIONS

Employees at Magnesium Casting B are not being overexposed to asbestos fibers while racking unquenched ingots. Exposure levels are so low that the total employee exposure for racking a full 8 hour shift would be only 5% of the permissible exposure limit. Since racking unquenched ingots is not a routine procedure and the time involved is unlikely to exceed 15 minutes per shift, employee exposures are actually closer to 0.5% of the permissible exposure limit (as an 8 hour time-weighted-average)*, and 1% of the short term exposure limit for the few minutes spent actually racking.

* Calculated using the following equation:

$$8 \text{ hour average exposure} = \frac{\text{asbestos concentration} \times \text{duration of exposure (hr)}}{8 \text{ hr.}}$$

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June 1, 1979

CONCLUSIONS AND RECOMMENDATIONS (continued)

Further monitoring is not necessary at this time.

Employees should be informed of the results of this survey, the consequences of overexposure to asbestos fibers (attached), methods of control, and the care and use of protective equipment. This informing process should be documented.

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TABLE I
ASBESTOS MONITORING RESULTS

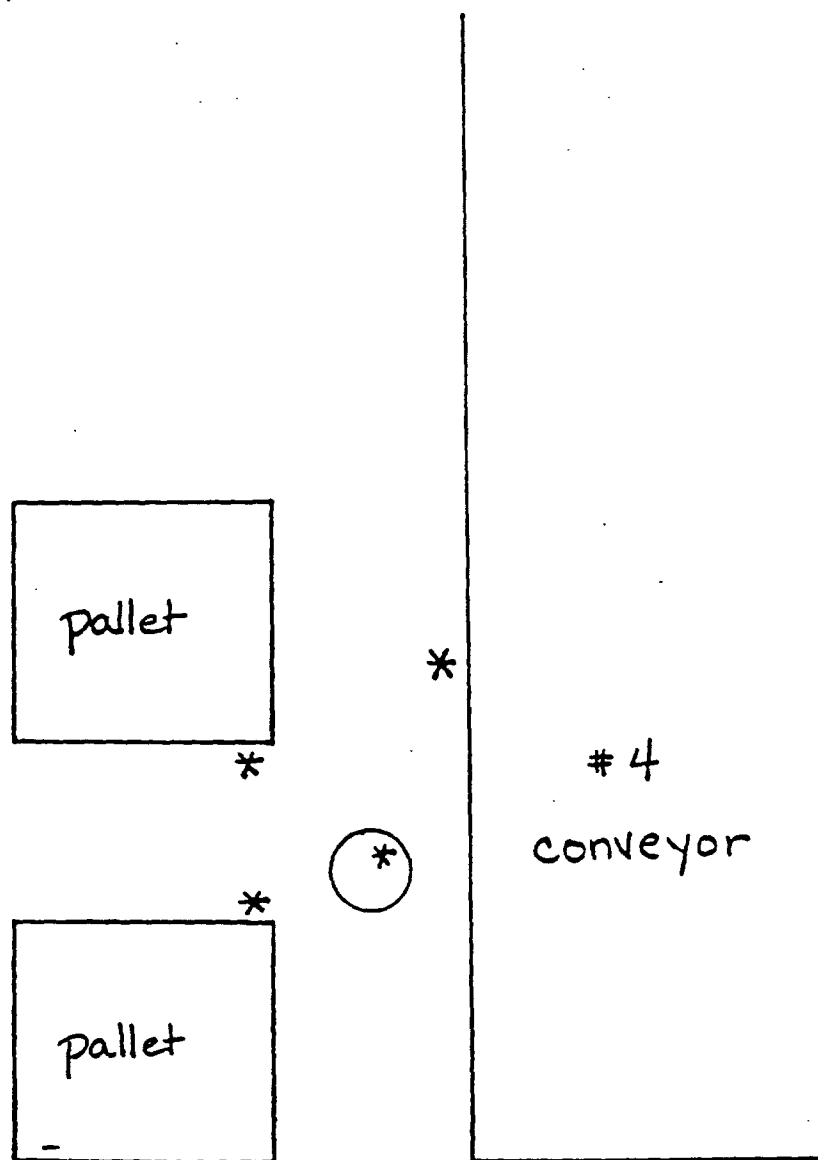
EMPLOYEE [*] /LOCATION	SAMPLE #	ASBESTOS CONCENTRATION (FIBERS/CC AIR)
140613	B8-1818-1	.064
141514	B8-1818-6	.094
140613	B8-1818-7	.16
141514	B8-1818-10	.12
Average employee exposure during racking procedures		.11
On conveyor - to left of employee	- 2	.045
On conveyor - to left of employee	- 5	.048
On pallet - behind employee	- 4	.018
On pallet - behind employee	- 9	.066
On pallet - to left of employee	- 3	.032
On pallet - to left of employee	- 8	.048
Average area concentration		.042

Short term exposure limit (periods up to 15 minutes) - 10 fibers/cc air
 Permissible exposure limit (8 hour time-weighted average) - 2 fibers/cc air

* Master numbers are shown for the employees monitored

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Figure 1 - Asbestos sampling locations, B-842



- * - sample locations
- - employee position

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CONSEQUENCES OF OVEREXPOSURE

COMPOUND: ASBESTOS

EXPOSURE LIMIT: 2 FIBERS/ML , > 5 MICRONS IN LENGTH

ODOR: NONE

EYES: CONTACT WITH THE DUST CAN CAUSE IRRITATION
SIMILAR TO THAT CAUSED BY SIMILAR FOREIGN
BODIES.

INGESTION: SOME EVIDENCE INDICATES THAT SWALLOWED
ASBESTOS MAY INCREASE CHANCES OF STOMACH
CANCER.

DUST INHALATION:

SHORT TERM: INHALATION OF HIGH CONCENTRATIONS
OF THE DUST MAY CAUSE MODERATE
DISCOMFORT. INHALATION OF
MODERATELY HIGH CONCENTRATIONS
MAY CAUSE NO DISCOMFORT.

LONG TERM: INHALATION OF THE ASBESTOS FIBERS
IN CONJUNCTION WITH SMOKING HAS BEEN
SHOWN TO INCREASE CHANCES OF LUNG
CANCER BY ABOUT 90 TIMES THAT OF A
PERSON WHO NEITHER SMOKES NOR WORKS
WITH ASBESTOS. CAN ALSO CAUSE A
SERIOUS LUNG DISEASE CALLED ASBESTOSIS.
CAN ALSO CAUSE CANCER OF THE CHEST
LINING.

COMMENTS: PROPER RESPIRATOR IS REQUIRED WHEN WORKING WITH
ASBESTOS.

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