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Biochemical Research Department
THE DOW CHEMICAL COMPANY

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SUBJECT: RESULTS OF AIR ANALYSIS MADE
WHILE MIXING ASBESTOS -
VINYL FLOOR TILE

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CONCLUSIONS AND RECOMMENDATIONS

Air analysis showed that the presence of air borne materials near the operators was of sufficient concentration to create a health hazard for repeated eight hour exposure. The present equipment should be equiped with local exhaust ventilation if it is planned to operate continuously on this material.

Sufficient quantities of lead were found in the air samples in two of the operations, such that blood lead analyses were thought necessary. The results of the blood lead analyses showed the men had not been exposed for long enough periods of time to result in excessive exposure to lead.

PRESENTATION OF DATA

During the processing of experimental formulations of asbestos - vinyl tile, it was beleived a health hazard existed due to the dustiness of the dry ingredients used. The Industrial Hygiene Laboratory was asked to investigate this hazard.

The 23rd of December 1954, samples were taken of the air while the men were operating the different pieces of mixing equipment on the 3rd floor of 433 building.

The amount of dry material found in the air during the different mixing operations was such that if these operations were run on a continuous basis a health hazard would exist. Any further large scale work should be done with improved ventilation. This ventilation should include exhaust ventilation hoods over each piece of equipment and the dry mixing with the electric mixer in the laboratory should be done in an approved hood.

The majority of dry materials in the air was assumed to be asbestos fibers and calcium carbonate. No specific tests were made at the time of sampling to determine the amount of each present. The two materials are reported as inerts. Any future work with this or similar material should be checked for the amount of asbestos in the air. An excess, that is more than 5 million particles per cubic foot of air, is a health hazard for repeated eight hour exposures.

Owing to the presence of lead-organic compounds in the dry mixtures, it was deemed necessary to have blood lead analyses made on the men concerned. The examinations showed the blood lead level was low. The men have not suffered any ill effects because they have operated the equipment for short periods of time only. Continuous eight hour operation would constitute a health hazard. This information is shown in Table I.

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The amount of material found in the air as solid inert material, assumed to be calcium carbonate and asbestos, is shown in Table II, along with the samples that were analyzed for metals.

TABLE I

Blood lead content of men working with asbestos - vinyl tile

<u>Name</u>	<u>Clock No.</u>	<u>Mg. Pg per</u> <u>100 cc Blood</u>
		0.024
		0.024
		0.016
		0.08

Samples drawn, 3-7-55

Recorded, 4-4-55

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TABLE II

Sample No.	Location of Sample	Analysis	Concentration Mg/m ³
1	Man was mixing a batch of vinyl-asbestos tile on a differential speed 2 roll mill. Sample taken about 2 feet above the hot rolls (285°F. & 235°F.) Odor of coconut oil present. Asbestos fibers could be seen in the air for a few minutes.	Pb cd Inert	3.47 <.66 102.00
2	Same operation as Sample #1, a different formulation used. No odor of coconut oil. Fumes or steam could be seen rising from the rolls.	cd Inert	<.66 93.00
3	Breathing zone sample of the operator while he was running a third batch of material on the same machine as in Samples 1 & 2. Man stated the odor was strong and disagreeable.	Ba cd Inert	4.00 <.66 16.00
4	Same as sample #3 but included cleaning the rolls after the run. Different formulation than in Sample #3.	Pb Ba Cd Inert	.98 4.90 <.445 Nil
5	Blending dry ingredients in a Baker-Perkins mixer. CaCO ₃ being added to dry vinyl plus stabilizer. No asbestos fibers added at this stage. Material became plastic after mixing.	Inert	50.00
6	Same mixing operation as above but as the asbestos fiber is added. The material already in the mixer was soft. This and sample #5 are done about 20 runs per day when doing this particular experiment about 10 min. per run.	Inert	0.00
7	Breathing zone of the operator on the Bandbury Mill, as he added the dry filler material (asbestos & CaCO ₃) to the molten mixture of vinyl. Dry filler material was visible in the air for several minutes but was dissipated by the room ventilation, operation takes about 3 min.	Inert	66.00

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<u>Sample No.</u>	<u>Location of Sample</u>	<u>Analysis</u>	<u>Concentration Mg/m³</u>
8	Sample taken in the lab while the operator was mixing dry ingredients in a "Kitchen-aid" electric mixer. This is done about 10 times a day.	Inert	24.20
	Industrial Hygiene Standards for repeated eight hour exposures.	Pb Ba Cd Inert	0.15 0.50 0.10 15.00

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