DUPONT CHAMBERS WORKS CONSTRUCTION DEPARTMENT

AIR SURVEY

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Problem:

To determine:

A. Whether or not the total air-borne asbestos dust count generated during the fabrication and installation of asbestos containing insulating materials exceeds, either at the source or in the breathing zone, the Threshold Limit Valve of 5 million particles per cubic foot (m.p.p.c.f.) established by the American Conference of Governmental Industrial Hygienists (ACGIH).

B. Extent of air-borne asbestos contamination of the general shops area, surrounding grounds, and installation sites.

C. Total dust count for use in the evaluation of over-all atmospheric dust loading and for detection of other potential dust problems.

Note: Item C will involve little additional cost as the differential counting of the sample is nominal compared to the cost incurred in procuring the sample particularly where special set-ups of work, tools, and materials are involved.

Procedure:

I. Collection

Two methods will be used for the initial survey:

A. Station sampling - portable.

The "Unico Constant Rate Uni-Jet" "Freon - 12" powered sampler equipped with the improved standard midget impinger ("Unico 2000") followed by an 0.8 micron, pore size millipore filter (Cat. No. MAWG037AD) will be used. The dust collected in "dust-free" distilled water in the impinger will be counted at the University of Pittsburgh Graduate School of Public Health by the method approved by the Asbestos Textile Institute. The dust collected on the back-up filter will be counted also at the University of Pittsburgh. This filter will collect the particles in the size range below 3 microns which is not retained in the first stage as well as larger particulate which might carry over from the impinger. The limit of resolution in counting is 1.3 microns.

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The "Uni-Jet" sampler will be preset to aspirate air samples at the recommended standard rate of 0.1 cfm, and the sample volume calculated from the aspirating time (usually 1 cu. ft.). The sampling assembly is readily portable and can be located close to operating tools, machines, and manual operations.

B. Personnel.

The light-weight, compact battery operated "Unico Model 440 Mighty-Mite Air Sampler" has been selected for this phase of the survey. A water-filled "Micro Impinger" backed by the "Millipore" filter will be employed to collect the dust samples. This sampler assembly will be carried at all times by the man selected during his work assignment and will collect a continuous sample from his breathing zone. Samples collected by both methods simultaneously will reveal the amount of air-borne particulate at the tool and at the point of inhalation. These results will demonstrate whether the material does, in fact, get inhaled and the efficiency of the ventilating system in reducing the dust count.

II. Sample Counting.

Samples will be sent by Air Mail--Special Delivery to insure delivery to the analyst within 24 hours as specified by the Asbestos Textile Institute. The counting, sizing, and calculation of results will be carried out according to the Asbestos Textile Institute's procedure under the direction of Mr. Raymond J. Manella, Instructor in Occupational Health, of the University of Pittsburgh.

A differential count; that is, asbestos and total dust will be made on each impinger sample but only a total dust count will be taken from the filter as, by definition, fibers will not be present at this stage. This increases the cost to some extent, but only in this manner can a reliable conclusion be drawn in conformance with the criteria presented in the "Problem."

Equipment Required.

ITEM	ORDER NO.	PRICE
A) "Unico Automatic Uni-Jet Air Sampler" (Constant Rate)	Have on hand	Borrowed
B) "Mighty Mite Air Sampler"	Ordered	($124.50)
C) "Freon"(Registered) Gas Propellant	LO-PAC-7533 LO-PAC-7086	(47.30)

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D) Extra Midget Impingers	LO-PAC-7955 LO-PAC-7533	(75.20)
E) Hygrometer	LO-PAC-7872	(16.00)
F) Millipore Filters	LO-PAC-7871	(20.00)
G) Two-Range Temperature Thermometers	LO-PAC-7952	(72.00)
H) Micro-Impingers		(15.75) e:
TO DATE TOTAL PURCHASED		($230.50)

Other similar cost items may be required as the program progresses.

Interpretation of Results.

A. L. Linch of the Chambers Works Industrial Hygiene Laboratory will interpret the results. After the accumulation of approximately 50 counts, the problem will be evaluated and redefined if necessary. A preliminary report will be prepared and recommendations for continuation or termination of the study presented. With allowance for blanks, the 50 counts will permit collection of approximately twelve samples.

Scope.

This survey, to be effective, must encompass all facets of the work performed in the shops and in the field. Some, at least token sampling of sites other than Chambers Works should be included for control purposes. The possibility that this program may be required on a routine basis indefinitely whenever and wherever asbestos containing materials are encountered must be considered. Certain restrictive regulatory actions by Governmental agencies can be expected as a result of the publicity attached to the implication of asbestos in respiratory illness. The burden of proof of compliance with Threshold Limit Values will rest on the user.

Preliminary Results.

The initial dust counts have indicated a very low air-borne dust burden in the fabricating shop. This result was somewhat surprising and will require extensive confirmation. A conference held with Mr. Corn and R. J. Manella at the University of Pittsburgh on October 17, 1966, developed the following conclusions:

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1. Our sampling technique is acceptable but must be considered to represent the minimum required; that is, use of the backing filter should be continued and used whenever asbestos dust samples are collected. This precaution is necessary for our protection as health studies to date have not established which size range is responsible for pathological effects.

2. Samples should be collected with ventilation facilities shut down to determine what the potential dust burden could be if no protection was furnished. These results would provide an estimate of ventilation efficiency and maximum dust generation levels.

3. The personnel sampling program (Part B of Procedure-I Collection) is sound and would provide the first information of this type available on actual individual exposure levels during an entire work assignment. Both Mr. Corn and Mr. Manella expressed interest in a collabrative effort on this phase.

SPECIAL NOTE:

1. At least three counts will be made for each sample to differentiate between total count and asbestos, and then the after filter must be counted.

2. At this time we estimate we'll have to sample about 150 material-fabricating combination functions.

3. Each of these samples will get three counts costing $10 per count. Total cost is the projected to approximately $4,500 spread over the entire sampling period which will likely be 18 months.

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