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Internal Correspondence

To: W.B. Reitze 1-06 Date: July 18, 1980

From: D.R. Christensen R-24

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G.L. Swallow 1-06

Subject: INDUSTRIAL HYGIENE DETERMINATIONS
TRANSITE PRODUCTS - SIMULATED FIELD CUTTING

The purpose of this study was to simulate probable worker exposures to asbestos-containing dust while cutting various Transite products and to conduct industrial hygiene evaluations by the method used in the United States prior to 1969, (the year OSHA became effective) and changed the sampling analytical methodology. The method used for evaluation was the midget impinger which results in concentration determinations in MPPCF, or million particles per cubic foot. Sampling was also done by the current OSHA approved method for asbestos determination and results are given in F/cc, or fibers per cubic centimeter. *No*

In the United States the Greenburg-Smith standard impinger and its midget counterpart were the most widely used instruments for obtaining dust samples for evaluation by counting prior to 1969. In the impinger, air is drawn through a nozzle and impinged against a glass plate set perpendicular to the orifice. The plate is covered with dust-free water or other suitable liquid, which serves to trap and retain the dust particles after they strike the plate. The impinger is operated by an electrically driven vacuum pump. This instrumentation is generally suitable for sampling most dusts in the 0.7 to 10 micrometer diameter range.

The actual apparatus used for these evaluations was the midget impinger filled with 10 milliliters of distilled water, aspirated at 1.0 liter per minute by a personal sampling battery operated pump. Analysis of samples was done by light-field microscope at 100X (magnification) using 10X oculars and a 10X (N.A. = 0.25) flat field achromatic objective. The microscope ocular was equipped with a Whipple graticule which is divided into 100 ruled fields of which 25 are used in the evaluation.

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The concentration in MPPCF, or million particles per cubic foot is calculated using the following formula,

$$\text{Particles per Cubic Foot} = \text{Count/mm}^2 \times 4 \times 1000 \times \frac{\text{Vol. sample liquid, ml.}}{\text{Cubic Feet of Air Sampled}}$$

Cubic Feet of Air Sampled

Cutting the Transite products was done with a Rockwell, Model 368-1, 8½" builders power hand saw, Figure 1. The saw was equipped with a Carborundum RCC Double Reinforced Silicon Carbide Masonry Cutoff Blade, Catalog Number RCC8A.

Two work environments were sampled, one inside a 40 foot semi-trailer with doors open and approximately 10 feet inside the trailer and the second outside in the ambient environment. These two situations were chosen as those most closely representative of field conditions. Neither of these situations utilize any ventilation control. Both general area and personal or operator breathing zone samples were taken in the two work environments.

Three Johns-Manville Transite products were tested in this study.

1. Transite Pipe - 6" Pressure (Fig. 2 & 3)
2. Transite Flat Sheet - ½" (Fig. 4 & 5)
3. Transite Corrugated Sheet - 3/8" (Fig. 6 & 7)

The results of the industrial hygiene determinations are found in Table 1. Please note that the sample durations were from 10 to 15 minutes, corresponding to a peak exposure.

INDUSTRIAL HYGIENE DETERMINATIONS
 TRANSITE PRODUCTS - SIMULATED FIELD CUTTING
 SAMPLED WEEK OF JULY 7, 1980

TABLE 1

FIGURE NUMBER	PRODUCT	WORK ENVIRONMENT	SAMPLE TYPE	MPPCF CONC.	MPPCF TLV	F/cc CONC.	F/cc TLV
2	TRANSITE PIPE	INSIDE TRAILER	PERSONAL	371.1	5.0	18.7*	10.0
			AREA	255.9	5.0	25.0*	10.0
3	TRANSITE PIPE	OUTSIDE TRAILER	PERSONAL	6.9	5.0	5.0	10.0
			AREA	13.2	5.0	5.9	10.0
4	TRANSITE FLAT SHEET	INSIDE TRAILER	PERSONAL	174.1	5.0	67.8*	10.0
			AREA	220.7	5.0	62.2*	10.0
5	TRANSITE FLAT SHEET	OUTSIDE TRAILER	PERSONAL	92.3	5.0	71.2	10.0
			AREA	101.8	5.0	63.3	10.0
6	TRANSITE CORRUGATED SHEET	INSIDE TRAILER	PERSONAL	81.2	5.0	10.0*	10.0
			AREA	87.9	5.0	10.0*	10.0
7	TRANSITE CORRUGATED SHEET	OUTSIDE TRAILER	PERSONAL	1.2	5.0	2.9	10.0
			AREA	8.8	5.0	17.2	10.0

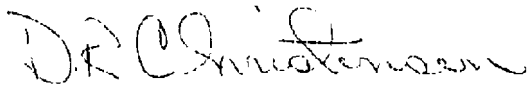
* = Concentration extremely heavy, number is best estimation

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Major points of discussion regarding the sample results are the following.

1. Visual observations support the high concentrations found by the analytical methods.
2. No pattern exists as to personal and area samples, that of one being consistently higher than the other.
3. Inside trailer results are greater than those found outside trailer. This is to be expected due to confinement.
4. All inside trailer samples exceed respective TLV's.
5. Majority of outside trailer samples exceed respective TLV's.

The above study was conducted at the Denver - Research & Development Center by R.C. Cordova and D.R. Christensen.

A handwritten signature in dark ink, appearing to read "D.R. Christensen", with a stylized, cursive script.

D.R. Christensen



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FIGURE 1

ROCKWELL
MODEL 368-1
8½" BUILDERS SAW



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FIGURE 2

TRANSITE PIPE
6" PRESSURE
INSIDE TRAILER



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FIGURE 3

TRANSITE PIPE
6" PRESSURE
OUTSIDE TRAILER



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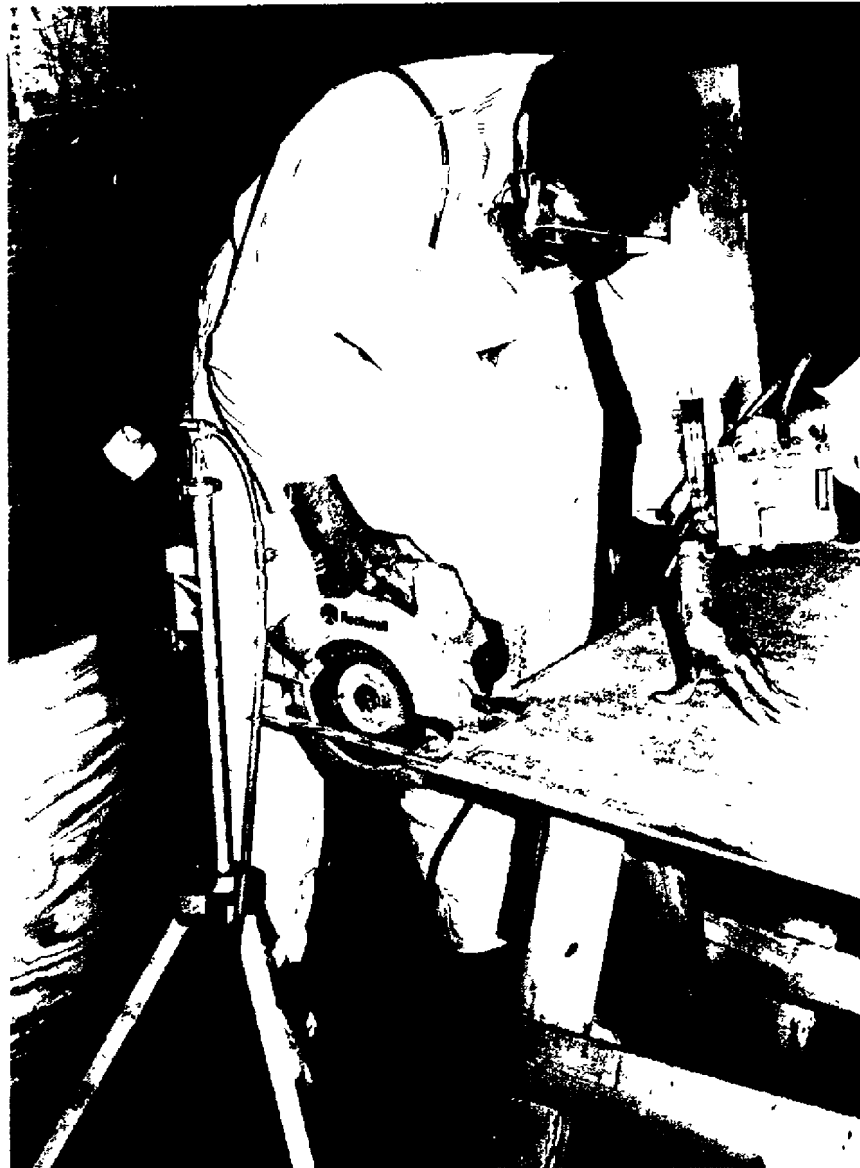


FIGURE 4
TRANSITE FLAT SHEET
1/2"
INSIDE TRAILER



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FIGURE 5

TRANSITE FLAT SHEET
1/2"
OUTSIDE TRAILER



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FIGURE 6

TRANSITE CORRUGATED SHEET
3/8"
INSIDE TRAILER



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FIGURE 7

TRANSITE CORRUGATED SHEET
3/8"
OUTSIDE TRAILER

JUN 23 1980



Johns-Manville

Field in Denver
Report
Internal Correspondence

To: W.B. Reitze 1-06

Date: June 20, 1980

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Subject: LEGAL REQUEST FOR INDUSTRIAL HYGIENE MONITORING
ENVIRONMENTAL EVALUATION OF SIMULATED FIELD
FABRICATION OF TRANSITE PRODUCTS - AS DETERMINED
BY THE "IMPINGER" METHOD.

In response to the request by the Legal Department to evaluate simulated field fabrication of Transite products as determined by impinger, the following itinerary has been proposed.

Sampling Dates: Week of July 7, 1980

Sampling Locations: 1. Denver R&D
Inside 40' semi-trailer
2. Denver R&D
Open atmosphere

Products to be Tested: 1. Transite Pressure Pipe
2. Transite Corrugated Sheet
3. Transite Flat Sheet

Fabrication Routine: Each of the three products to be tested will be evaluated separately. Cutting will be done with an 8-inch skill saw equipped with a carborundum blade.

Environmental
Evaluations:

1. Impinger sampling to determine particulate concentration. Results will be in MPPCF, million particles per cubic foot.
2. Membrane filter sampling to determine fiber only concentrations. Results will be in F/cc, fibers per cubic centimeter. This sampling is being done for potential future data needs.

If the above sampling program is inadequate in any area please notify me as soon as possible so appropriate actions can be taken.

D.R. Christensen
D.R. Christensen

6/30/80 All systems go!
7/14/80 Field work completed.