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To T. R. Robinson, M. D. Address

From H. M. Taylor Address

Subject Asbestos, Industrial Hygiene Survey, Baton Rouge Date September 18, 1973

Enclosed is a report which summarizes industrial hygiene activities relevant to employee exposure to air borne asbestos fibers within the Baton Rouge Plant.

I shall be happy to discuss any questions you may have concerning the data or my interpretations.

Sincerely

Henry Taylor
Industrial Hygienist

HT:ws

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SUMMARY REPORT OF ASBESTOS AND THE INDUSTRIAL HYGIENE SURVEY OF AIRBORNE ASBESTOS FIBERS WITHIN THE BATON ROUGE PLANT

Survey Conducted June 26 and July 27, 1973

by

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REPORT FORMAT

BACKGROUND

General Information

Asbestos is the general name for a group of naturally occurring, crystalline, hydrated, mineral silicates. The technological utility of asbestos derives from its occurrence in a fibrous state and from its properties of exceptional physical strength, resistance to thermal degradation, and resistance to attack by acids or alkalis.

MEDICAL AND INDUSTRIAL HYGIENE INVOLVEMENT

Inhalation of asbestos dust has been recognized as an industrial hazard since the early 1930s. In 1935, evidence began to accumulate that certain other poor health effects were also associated with long term inhalation of unknown concentrations of asbestos fibers. During the following years the effects of asbestos upon worker health became better recognized and accepted by medical authorities. In those industries whose primary interest concerned asbestos, various methods were being evaluated to characterize hazardous asbestos concentrations accurately in the work environment[1].

[1] Early procedures for characterizing environmental airborne levels of asbestos called for counting all the visable material which had been captured upon a sampling filter when examined under a light field microscope. It was soon learned this microscopic method had severe limitations. However, since most measurements of asbestos fiber concentrations in industrial environments are economically practical only for those fibers visible by light microscopy, an analytical technique has now been standarized that employees 400x magnification, phase contrast illumination and which counts fibers longer than 5 microns.

Baton Rouge Plant

Within Ethyl Corporation, records indicate plant and corporate medical department personnel met in July of 1969 to develop recommendations for a course of action concerning asbestos use within the Baton Rouge plant where asbestos is incidental to the mainstream effort. Consequent to that meeting, W. E. Rinehart had a survey performed to determine asbestos levels at what should have been the worse conditions. The asbestos concentrations found were well within the bounds of the Threshold Limit Value (TLV) of and accepted industrial practice recognized at that time. Nevertheless, a strong recommendation was made for continuance of the practice of wearing "Dust-Foe" type respirators. The results from the 1969 report and an additional column which presents the same data in terms of todays permitted exposures as defined in the Department of Labor, Occupational Safety and Health Administration (OSHA) standards follows:[1]

Site and Condition	1969 No.of asb.fibers[2] (mppcf)[2]	1973 No.of asb.fibers[3] (ppcc)[3]
In shop of second floor alloy area at breathing zone during hand sawing of asbestos board	0.3	11.0
Near vibrating conveyor of second floor alloy area at breathing zone during hand sawing, slicing and fitting of pipe insulation	0.1	3.5
In shop of hydrocarbon area at breathing zone during hand sawing of asbestos board (doors Closed)	1.2	42.0

Outside shop of hydrocarbon area at breathing zone during ripping of asbestos	4.2	150.
Recommended standard and present OSHA level	2.0	5
1976 OSHA level		2

1 The 1973 conversion assumes all the 1969 fibers were greater than 5 micrometers in length.

2 In 1969 the value recommended by the American Conference of Governmental Industrial Hygienists as a TLV for asbestos was 2 million particles per cubic foot (mppcf) of work air. This assumed repeated 8 hour workdays under relatively constant exposure conditions.

3 In 1973 the value permitted by OSHA requires appropriate respiratory protection for those exposed to asbestos fiber levels in concentrations of fibers in excess of 5 fibers longer than 5 microns in length per cubic centimeter of work air. In 1976 this will be lowered to 2 fibers. This limit is an 8 hour time weighted average. However, it permits only brief excursions above base level to a ceiling of 10 fibers per cubic centimeter.

I would omit #1 & #2 today

SUMMARY

1. Although a complete indepth study was not made of every location where asbestos fibers might be stored, transferred, cut, applied, removed or disposed of, there was no indication that a significant acute environmental health hazard was present at any of the locations evaluated.

2. There was no evidence of a chronic environmental health hazard.

3. There was indication in light of the Occupational Safety and Health Standards of need for engineering controls to be instituted in certain processes which handle asbestos.

ASBESTOS INSULATION WITHIN BATON ROUGE PLANT

Insulation handlers at the Baton Rouge Plant constitute a craft within the maintenance worker organization. They are reported to be a very stable group with very little turnover who for the most part are long term employees. Of the 14 insulation workers, seven are assigned to TEL and sodium areas, six work in the hydrocarbon area while one works in construction. Insulation is handled in PVC on a routine basis, but not by the same men each day. Some nine men may handle asbestos within the PVC area on an irregular basis. In addition, there are three or four caustic chlorine operations people who are involved in preparing caustic cell diaphragms and assisting with the cell installation.

Insulation material is brought into the plant storage area often from railroad cars and is then withdrawn as needed and generally goes to either of three areas, TEL, sodium and chlorinated hydrocarbons.

During the past year it has been and still is plant practice to encourage substitution of asbestos with non-asbestos materials where feasible. This has essentially been accomplished with pipe covering and spray type insulation. However, to date a satisfactory substitute has not been found for Transite, Marinite or insulating blocks.

Finally, it is understood the plant has adopted a policy of bagging all nonwetted asbestos materials which go to waste.

INDUSTRIAL HYGIENE EQUIPMENT AND METHOD

Environmental work air was sampled by use of a personal sampling system which was powered by a M.S.A. Montair portable pump which was clipped to the belt of the various process operators involved in the study. This pump, set at a pre-calibrated flow rate of 2 l/min. drew work air through a flexable tube which was connected to an open faced 37mm, 0.8 μ pore size, type AA Millipore filter. The filter holder was clipped to the involved workers' shirt collar.

After sampling, the filters were taken to the GSRI laboratory; and mounted in a high-vicosity solution which consisted of membrane filter material in a 50/50 mix of dimethyl phthalate and diethyl oxalate; then covered with a No. 1 cover glass; and viewed through a binocular Leitz microscope using a polorizing substage condenser with corresponding objectives and parfocalized eye pieces equipped with a calibrated grid and at a 400X magnification. A minimum of 20 optical fields were examined for each sample.

AIRBORNE ASBESTOS FIBERS

Based on past experience in other facilities, little or no asbestos fibers have been introduced into the work air by incidental handling or passive use of the type of asbestos rope, listing tape, safety gloves, paper or asbestos cloth used for heat shields as purchased by the plant. Likewise, the hand cutting of gasket materials of the type purchased has not introduced fibers into the work area. Consequently, processes which involved use of these products were not re-evaluated.

For the purpose of brevity, the system of reporting which follows in this report presents a series of impressions or observations related to the 18 work situations which were evaluated and to asbestos in a general manner, followed by relevant recommendations for your consideration.

IMPRESSIONS

Storage

1. Generally, asbestos materials in the various storage areas and shops were not identified with warning signs in accordance with OSHA requirements.

Transfer

1. Asbestos materials were not identified per OSHA requirements.

Cutting

1. All fiber exposure levels produced during cutting of asbestos were in excess of OSHA lower limits and therefore these processes require the operators to wear respirators for OSHA compliance. In most cases, asbestos handlers were using OSHA acceptable protection by wearing Bureau of Mines approved 3-M respirators. However, in several power sawing operations, in the R&D maintenance shop and in the central shops carpenter shop area, dusting spread throughout the immediate area and if cutting had continued, would eventually have produced fiber levels high enough to require every-

including air lines

one in these shops to wear approved respirators for OSHA compliance.

2. Asbestos materials which were cut included Transite (of known composition) asbestos blocks and Marinite (a Johns-Manville product which contains about 23% asbestos.)

Application

1. Installation of asbestos blocks was not evaluated.
2. Caustic chlorine workers exposure to asbestos fibers was again found to be well below the minimum OSHA levels. In addition their work environment is stable to the point that adverse weather conditions could not produce a more concentrated fiber level.
3. Fiber production during operation of the machine in the R&D laboratory glass blowing room was minimal and below minimal OSHA level.
4. It is understood the plant now uses a non asbestos substitute in place of asbestos shorts to prepare "mud" used to seal insulation.

Removal

1. Inside removal produced asbestos fiber levels which were found to be at the lower levels of OSHA requirements.
2. The data indicates outside removal produced personal exposure to a fiber level significantly less than the minimal OSHA asbestos concentration.

Disposal

1. Airborne asbestos was not witnessed or quantified for a complete disposal process.

AIRBORNE ASBESTOS FIBERS
Recommendations

Storage

1. It is understood the plant has adopted a policy to post appropriate asbestos warning signs.

Transfer

1. Presumably, development of storage warnings will also produce a system which will identify asbestos materials in transfer and also at temporary depot locations. Those employees who eventually cut asbestos material should be aware of the associated hazard and what protective measures to adopt per OSHA requirement.

Cutting

1. All of the asbestos cutting procedures are of variable duration and concern processes which may last from a minute to an all day operation. Consequently; depending upon the job requirements for a particular day, the 8 hour time weighted exposure level which will often increase with increased production will range from low to high in relation to the OSHA Levels. In addition, most of the locations observed in which asbestos is cut are subject to wind effects. During those days when natural ventilation dillution from the wind is nil, even minimal asbestos cutting might produce levels in excess of OSHA requirements. Consequently, there doesn't appear to be a convenient practical operational base upon which to recommend when to require employees to use or not to use respirators. Therefore, after the table saw dust capture systems have been upgraded, it is recommended plant management continue to require employees to use approved air purifying respirators while cutting asbestos. If fitted properly and replaced when needed this type of respirator will be adequate for operator protection and will meet OSHA requirements.

Asbestos fiber levels found when cutting in the insulating building is low enough that air purifying respirators should be acceptable to OSHA. However, housekeeping is less than desirable. A shop vacuum, if maintained and used routinely, would help. In addition, less material would be spread around the shop if the inlet to the present capture system was in a usuable location and not in the operators way.

Finally, the OSHA inspectors interest that asbestos fibers be retained as well as captured and the consequent capitol cost for efficient fiber collection encourages the establishment of a single asbestos cutting location with a single collection system. It is understood this possibility is now under evaluation.

2. Band saw cutting of asbestos should be encouraged over wheel cutting when ever possible. Asbestos fibers can be captured more readilly if they are propelled from a slower velocity cutting blade.
3. The dust collection system for the lathe in central shops should be inspected. E.F. note

Application

1. Although asbestos block installation was not evaluated, dusting from this process require the installer to wear an air purifying type of respirator. If the installation occurs in an enclosed or poorly ventilated area and requires several hours or more installation time, an air line respirator will probably be required for OSHA compliance.
2. No action is suggested concerning the handling of asbestos during caustic cell diaphragm fabrication.
3. No action is suggested concerning the R&D laboratory glass blowing operation.

4. Although asbestos shorts have been replaced, the nuisance levels of the new replacement material will require the operator to wear an air purifying type of respirator for OSHA approval.

Removal

1. Conservative application of the 8 hour time weighted employee exposure concept to the inside removal data suggests those exposed in the area will be adequatedly protected for at least 1 1/2 hours by an air purifying respirator. (If reasonable dillution ventilation is present and insulation is handled in a manner to limit dusting)
2. If removal operations require longer than 1 1/2 hours of man exposure, the man should be rotated out and not exposed to asbestos for the rest of the day or he should be required to wear an air line respirator.
3. Since we cannot control weather conditions, a similar recommendation is necessary for outside removal jobs. (Air purifying respirators for jobs lasting up to 1 1/2 hours and air line type respirator for jobs of longer duration)

Disposal

1. If asbestos scrap is put into bags or kept wet, employee exposure to asbestos fibers from this source should not be in excess of OSHA limits.

Suggested Future Industrial Hygiene Asbestos Related Activities

1. Obtain exact data on fiber production resulting from an asbestos block installation procedure.
2. Re-evaluate asbestos fiber production every six months at:
   A. Caustic chlorine cell fabrication.
   B. All power cutting asbestos operations.

3. In addition, determine the fiber levels consequent to the following operations:

A. An inside hand saw asbestos cutting operation.

B. Re-evaluate the lathe dust collection system in central shops after it has been upgraded. WITH EF

TABLE 1

AIRBORNE FIBER COUNTS
Baton Rouge Plant
Sampled June 26, 1973[1]

Site and Condition	No. of Asbestos Fibers[2]
In R&D Maintenance shop;	
feeding 3/8" transite to an 8" table abrasive wheel	3.3
tailing 3/8" transite from an 8" table abrasive sheel	0.68
feeding Marinite-36 to a 10" table and radial saw	5400.
tailing Marinite-36 from a 10" table and radial saw	25.
In first floor tunnel of "F" building;	
removing 10" x 1 1/2" overhead pipe insulation while on ladder	2.8
assisting in removing 10" x 1 1/2" overhead pipe insulation while on ground	2.0
In Insulation Fabrication Building;	
feeding pipe insulation to band saw	7.1
tailing pipe insulation from band saw	5.7
preparing non asbestos shorts	8.6 (non-asbestos)
Out of Doors at Cooling Tower No. 4;	
removing insulation from a pipe and value	0.9
In R&D Laboratory Glass Blowing Room ;	
during operation of glass blowing machine	0.14

1. Breathing zone samples
2. Fibers greater than 5 micrometers per cubic centimeter of work air.
3. When the concentration of air borne fibers is subject to natural ventilation, two extreems can occur. First, with no air dillution the counts became infinately large; second, with abundant air dillution the counts may become infinately small.

TABLE 2

AIRBORNE FIBER COUNTS
Baton Rouge Plant
Sampled July 27 and continued Aug. 6, 1973
Corrected

Site and Condition	No. of Asbestos Fibers[2]
In sodium building - operator involved; with washing and preparing used cell for slurry vat	0.026
with asbestos slurry draw down, clean up and tape application to caustic cell	0.065
with opening bags of asbestos and dumping material into draw down vat to form cell diaphragm	0.65
In central shops; operator was trimming 4" transite pipe on a lathe	0.82
at air outlet of lathe dust collector (not a man sample)	2.0
operator cutting 3/8" transite using a table saw	1000.
operator cutting insulation blocks using a table saw	190.

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