C-146-3

UNION CARBIDE

INTERNAL CORRESPONDENCE

PLAINTIFF'S EXHIBIT UC-786

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To (Name) Mr. John A. Riddle
Division Chemicals & Plastics
Location P. O. Box K
King City, California 93930

Date January 19, 1968

Originating Dept. Medical

Answering letter date

Copy to

Subject

Dear John:

The relation between crocidolite and mesothelioma seems to be pretty strongly established by experience in South Africa and elsewhere. The relation between chrysotile and mesothelioma is not clear. If it exists, it apparently is much less prounced than that shown by crocidolite.

The limit of 5 MPPCF that we observe in our operations is still recognized in the United States as satisfactory for chrysotile, but there is strong feeling that it is much too high for crocidolite. I wouldn't be at all surprised to see supplied-air respirators recommended for handling the latter.

In our own operations with chrysotile, I feel that we should try to control the dust to levels as far below 5 MPPCF as reasonably possible. That is, I don't believe we should be content with control that just maintains the level at 5 MPPCF. Actually, this figure is known as a threshold guide and not a level that strictly defines safe and unsafe conditions.

There is some thought that metals associated with asbestos either from the ore or from milling machines, etc., may be part of the problem. Investigation is underway to evaluate this potential; and as soon as I hear more about it, I'll let you know.

Very truly yours,

Paul W. McDaniel
Industrial Hygiene Engineer

PWM:dmf

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...may have been ...oing candidates for ...w boards have been. ...stacles to return should be ...minish the rate of emigration in ...ents for career guidance of trainees ...oved and that more opportunities should ...or academic careers. The Minister of Health studying these recommendations.

...he loss of 300 doctors a year is indeed serious, but should be seen in proportion to the numbers Britain gains from other countries. Last year almost 2,000 doctors from the Commonwealth alone applied to enter Britain. In 1965, the most recent year for which figures are available, there were 6,000 doctors working in National Health hospitals who had been born abroad—about 30 per cent of the total. Of general practitioners 2,600, or 12 per cent of the total, were born abroad. If every doctor were to practise in the country of his birth, Britain would not be the gainer. But this is not to decry any efforts that the ministry may now make to encourage the return of expatriates, and to allay the discontent of those who would follow them.

More on Asbestosis

THAT there are risks associated with asbestos is not now disputed. A review of the problem as it occurs in Britain has just been published as a memorandum by the Advisory Panel on Problems Arising from the Use of Asbestos (HMSO, 3*s*. 9*d*.). The advisory panel, set up in 1965 by HM Factory Inspectorate, is responsible for considering the use of asbestos in relation to the health of those directly or indirectly exposed to asbestos in their occupations. Over the whole country the panel estimates that about 20,000 persons are exposed to asbestos in the use or handling of the fibres. The figure is probably higher than this; people can easily be put at risk by working near to where asbestos is handled. The present Asbestos Industry Regulations, 1931, are applied to some 300 registered factories, but the report says that there are many other factories which use asbestos products and which do not come within the regulations. The Ministry of Labour is at present drawing up new regulations to cover a wider range of factories.

It was in the 1920s that it was first clearly recognized that asbestosis, a fibrotic condition of the lungs, is caused by occupational exposure to asbestos. Within a few years it was suggested that the disease might be complicated by the development of carcinoma of the lung, but an association was not generally accepted until the 1950s. Recently, there has been concern over the occurrence of mesothelial tumours of the pleura or peritoneum which appear to be causally related to asbestos exposure in many cases. Since 1966 mesothelioma has been a scheduled industrial disease.

The advisory panel concludes that there is an increasing incidence of asbestosis in the country. The most likely explanation for this increase is the greater use of asbestos and the greater numbers of people employed in the industry over the past 20 years. But the panel says that "there is no evidence that the overall attack rate has decreased in the industry over this period, although it has in some textile mills in which the dust conditions have been greatly improved". It appears that if the regulations are more widely and more stringently applied than at present, the number of cases should inevitably fall.

The panel indicates that crocidolite has a special significance in relation to mesothelial tumours. It recommends that other types of fibre should be substituted for crocidolite wherever possible, and, where this is impossible, special precautions should be taken to reduce the risks of inhaling the material. The panel admits that at the moment the level of exposure below which the risk may be negligible is not known. The quantity of crocidolite (blue asbestos) imported into the country is much less than the other varieties of asbestos, and it has remained at about 7,000 tons per year for the last few years. But time may show that other fibres are also implicated in the development of mesothelial tumours.

Finally, the report suggests that action should be taken to control the discharge of dust-laden air from asbestos factories and the dispersal of dust from waste dumps. It emphasizes, however, that the problem of mesothelioma in association with asbestos exposure should be kept in a proper perspective. Even though the incidence is increasing, the total number of cases of mesothelioma in Britain over several years is very small when compared with the annual total of deaths from cancers of the trachea, bronchus and lung.

CIGARETTE, ANYONE?

Recording Weather

AN automatic weather recording station which can operate unmanned for at least three months has been produced by the Plessey Company Ltd. This station, which can make and record more than 82,560 measurements in a three month period, is available from the Marine Systems Division of the Plessey Electronics Group at Ilford. The value of automatic weather stations was recognized by a recent report from the World Meteorological Organization (*Nature*, 215, 1324; 1967). They are important because modern developments in weather forecasting require information about climate from all over the world—sometimes from uninhabited areas—and it is becoming increasingly hard to persuade amateur meteorologists to provide accurate data day by day. Professionals cost money, and so there should be a real market for automatic stations which can do the job reliably for long periods without attention.

The Plessey station is virtually self-contained and can monitor parameters such as rainfall, humidity, wind speed and direction, air, soil and water temperatures, barometric pressure, *p*H, solar radiation and water level and flow. The basic design was evolved in co-operation with the British Water Resources Board, the Meteorological Office and the National Physical Laboratory. By adding various instruments to the basic design, it has been possible to produce a family of stations including hydrometeorological, climatological, water level, water quality and recording rainfall stations. Each can be arranged for automatic operation, and the recorded data can be sent by telemetry to a control centre on demand.

Each station is supplied as a complete system with sensors, recorder, power supply, 'Stevenson' screens and a stayed aluminium mast which supports the sensors. The memory of the station samples up to eight sensors in turn, recording their outputs in ten-bit

UNION CARBIDE CORPORATION
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ASBESTOS TOXICOLOGY REPORT

It has been known for many years that some persons working in asbestos production were prone to develop a disabling lung disease. In time, this condition became known as asbestosis and was related to exposure to high concentrations of asbestos dust. With further experience, it was found that men could work with asbestos without development of lung disease if dust concentrations were kept below a certain level. It is now generally accepted that a man can work a 40-hour week for a lifetime without developing asbestosis if the asbestos dust particle count is kept at or below 5 million particles per cubic foot of air. This dust concentration of 5 million particles per cubic foot of air is the Threshold Limit Value for asbestos, and no cases of asbestosis are known to have occurred when exposures have been maintained at or below this level, despite large-scale utilization (now approaching one million tons per year in the U.S.A.). This concentration of dust is generally not visible in the average work area unless a beam of light causing a Tyndall effect is present. Usually the dust concentration must be from 8-10 million particles per cubic foot before its presence is visible in average lighting conditions.

Several years ago, it was reported that there was an increase in the incidence of cancerous tumors, especially of the lung, associated with asbestosis. Recently there have been reports of some cancers occurring in individuals exposed to asbestos dust, but who have not developed clinical asbestosis. It is believed by most authorities that these cases have been associated with exposures significantly exceeding the Threshold Limit Value. A major manufacturer of asbestos products who also mines asbestos has not been able to show an increase in cancerous growths in men working where dust concentrations were maintained at the Threshold Limit Value.

Control of asbestos dust exposure is therefore necessary. The control methods are the standard ones applicable to a variety of dusty operations. They include closed flow systems, wet processes where possible, and adequate exhaust ventilation where openings in the system are necessary. Pelletizing is sometimes used to improve the handling characteristics of otherwise dusty materials. Where satisfactory containment to stay within the Threshold Limit Value is impractical or impossible, efficient and reliable respirators are available for the protection of the employee. A program of environmental monitoring is highly desirable to determine that Threshold Limit Values are not being exceeded. In paper manufacturing, it would be desirable to know the dust concentrations where the asbestos is dumped from bags into the pulp slurry. Concentrations should also be determined where dusting occurs in finishing products. While initial dust determinations should be made at frequent intervals, once the level has been established as satisfactory, the frequency may be extended to occasional tests to assure continuation of a satisfactory condition.

Pre-employment and periodic physical examinations of workers are desirable. These should include chest X-rays to insure that the worker has no chest condition prior to work with asbestos and to determine that no lung changes are resulting from work with asbestos.

It is believed that the addition of asbestos at the proposed levels during the manufacture of paper products would be harmless to the consumer. Total dusting would have to be well in excess of any levels acceptable to the consumer for the asbestos concentration to approach the Threshold Limit Value.

In conclusion, while asbestos dust in excess of the Threshold Limit Value is potentially harmful, as are many other dusts encountered in industry, it is as readily controlled as other such dusts and it can be used safely with appropriate precautions.

Carl U. Dernehl, M. D.
Director of Toxicology

K. S. Lane, M. D.
Assistant Director of Toxicology

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MAR 28 1966
C.C.-MNG. & METALS DIV.

MEMORANDUM

TO: Messrs. T. Dougherty
R. A. Miller
R. W. Stobaeus
B. K. Barton
T. R. van Fleet
N. J. Setter
R. T. Larkin

DATE: March 22, 1966

CC: L. S. O'Rourke
T. J. Hall
H. F. Reichard/R. G. Woolery
J. A. Riddle
J. Derbecker
P. R. Cheston
T. F. Frangos

SUBJECT: Asbestos - Toxicology

Gentlemen:

Early in March the "New York Times" and the "Herald Tribune", reporting the establishment of a new environmental health laboratory at Mt. Sinai Hospital (New York City), revived some publicity (copy attached) in regard to Asbestos dust as a health hazard. We understand that a few newspapers in other cities picked it up.

"Out of context" reporting leads to erroneous conclusions, and this is no exception. Nevertheless, we should reckon that such a commentary will recur, and all of us should use the tool we now have at our disposal to make certain our customers are acquainted with the facts:

1. You have copies of Dr. Dernehl's "Asbestos Toxicology Report." Additional copies are enclosed. Use these, and call particular attention to Dr. Dernehl's statements in regard to "Threshold Limit Value" for asbestos. Control of asbestos dust exposure is necessary, as is control of exposure to any of a variety of dusty operations.

2. Union Carbide pellets offer a clear-cut means of handling asbestos under exceptionally low dust conditions.

3. No work yet conducted or published presents, nor professes to present, incontrovertible proof of a relationship between cancer and asbestos. Some publications have referred to the association of deleterious organic compounds, among them jute oils from jute sacking material, and 3,4 benzo(a) pyrene. We do not use jute bags. Further, we are

analyzing random samples of our product, and expect shortly to prove the absence of any polycyclic aromatics.

Your pelleted asbestos affords customers the best means of avoiding dust hazards. Make this clear.

Very truly yours,

A.E.Pufahl/dh

Enclosures

Asbestos Dust Called a Hazard To at Least One-Fourth of U.S.

By JANE E. BRODY

Asbestos dust, which has already been connected with the development of fatal cancer in one-half of asbestos workers, may be a potential health hazard for one-quarter of the population or more, it was reported yesterday.

This preliminary finding was described by Dr. Irving J. Selikoff in announcing the establishment of an environmental health laboratory at Mount Sinai Hospital. The laboratory will further investigate the dangers to man of asbestos and other environmental contaminants.

Dr. Selikoff said the link between cancer and asbestos had led him to suspect that other mineral dusts that contaminate both urban and rural air might create medical hazards for the public.

The new laboratory will be headed by Dr. Selikoff who, with Dr. Jacob Churg, found that asbestos workers eventually showed to seven times the normal death rate from lung cancer and three times the normal death rate from cancer of the stomach, colon and rectum.

Other Workers Affected

Dr. Selikoff noted that the dangers of exposure to asbestos dust were not limited to those who work directly with this ubiquitous insulator and filler material. The dangers, he said, extend to workers in "contiguous trades," such as other construction workers and their families.

According to the findings of three recent limited studies, the dangers might extend to the general population. The studies, which involved autopsies on 1,100 persons in three cities, showed that 25 per cent of the people had asbestos lodged in their lungs.

Dr. Selikoff explained that the studies had used a "crude technique" that disclosed only those asbestos fibers that had become coated by an iron-rich material while lodged in the lungs. A more refined technique now shows that many persons harbor noncoated asbestos fibers as well, he said.

New Study Started

Dr. Selikoff and his colleagues at the new laboratory have started a three-year study in which they will:

¶Examine, with the deceased's family's approval, the lung tissue of the from 3,000 to 4,000 persons expected to die in the next two years at Mount Sinai, Elmhurst Hospital and Veterans Hospital in the Bronx. The doctors will look for uncoated as well as coated asbestos fibers in the tissues.

¶Look for correlations between the causes of death and the presence of asbestos fibers in lung tissue.

¶Determine the occupational history of the deceased and their relatives and other pertinent background information.

Asbestos is a fibrous mineral highly valued for its noncorrosive and long-wearing properties. In addition to its common use as a fireproof material, Dr. Selikoff said, asbestos makes up about 50 per cent of asphalt tile and is used in dental cement, brake linings, plastics, beer filters, gas masks and paper. Until last year, some schools used asbestos dust instead of sand for children to play in.

Study Links Asbestos To Cancer

By Earl Ubell
Science Editor

Scientists have known for a long time that asbestos was bad for your lungs. Now a study of New York City workers, both roofers and insulation blowers, reveals that exposure to the mineral sends lung-cancer death rates skyrocketing.

The figures—gathered by doctors at Mount Sinai Hospital—show that such workers have eight times the lung-cancer death rate as would be expected in a non-exposed population.

More suprisingly, the studies reveal that such workers run four times the risk of getting cancer in other parts of the body, with cancer of the colon particularly singled out. For all other diseases, the insulation workers have the same death rate as the rest of the population.

These findings were emphasized yesterday by Dr. Irving J. Selikoff, head of Mt. Sinai's Division of Environmental Medicine, on the occasion of the establishment of an environmental health laboratory in the hospital. The laboratory has received grants totaling $324,000 from the United States Public Health Service and the New York City Health Research Council.

Dr. Selikoff also pointed out that cigarette smoking seems to heighten the effects of the asbestos. Among 130 men exposed to asbestos 20 years or more who were nonsmokers, he found one lung-cancer death among 310 smokers, 21 such deaths.