

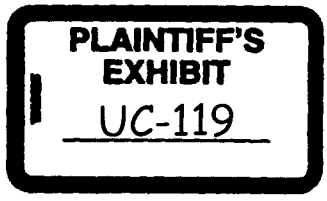
UNION CARBIDE CORPORATION
Nuclear Division

New York, N. Y.

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MEMORANDUM

January 12, 1965



To: Messrs. T. Dougherty
R. A. Miller
R. Stobaeus
T. R. van Fleet

cc: Messrs. K. W. Lentz
A. E. Pufahl

G. S. Jordan
H. F. Reichard
N. J. Setter
R. G. Woolery

J. A. Riddle

Dr. C. U. Dernehl

Subject: ASBESTOS TOXICOLOGY REPORT

Gentlemen:

Recently several reports were given at technical meetings and summaries of them carried by the national wire services concerning possible carcinogenic properties of asbestos. Some of you may have received questions from your customers on this subject.

In order to counteract any serious problems or worries before they get out of hand, we have asked Dr. C. U. Dernehl, Director of Toxicology, Union Carbide Corporation, to formulate a statement for us. A copy of his statement is enclosed. Additional copies can be obtained from me or you may make your own copies if you wish to pass them on to interested customers. You will note that, in essence, the report states that good housekeeping -- such as would be required in any dust-producing operation -- should be sufficient to prevent any problem with asbestosis. You will also note that he mentions use in a wet system -- which certainly applies to the paper mill -- and a pellet form -- one of the strong points of our asbestos -- as additional means of minimizing any potential problem with the product.

Further, other asbestos producers and those acquainted with the subject feel that the original data upon which the cancer-producing report was based did not take into account any outside influences, such as smoking or corrosive atmospheres, which also might produce cancer. Here, it should be noted that much asbestos usage considered in the technical papers is in conjunction with tar and pitch compounds which are known to contain carcinogenic materials.

You should have this statement available for any questions which might arise from your customers. If appropriate in your judgment, perhaps it should be discussed with certain customers who have not yet raised the subject. I do not feel we should make a big issue of it thereby drawing unnecessary attention to the subject since the conclusions are still questionable.

If you have any questions, please discuss them with me.

Very truly yours,

Thomas J. Hall

T.J.Hall/dk

enc.

UNION CARBIDE CORPORATION
270 PARK AVENUE, NEW YORK, N.Y. 10017

ASBESTOS TOXICOLOGY REPORT

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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

UNION CARBIDE INTERNAL CORRESPONDENCE

UNION CARBIDE CORPORATION • 270 PARK AVENUE, NEW YORK, NEW YORK 10017

To (Name) Messrs: C. Benjamin
T. F. Frangos
B. E. Godard
J. L. Myers
J. A. Riddle
N. J. Setter
J. T. Sinclair
J. R. Stickney
W. S. Young

Division
Location

Copy to

Date: April 3, 1969

Originating Dept.: Medical Department

Answering letter date:

Subject: Asbestos

RECEIVED
APR 7 1969
U.C.C. CHEM. & PLASTICS

Gentlemen:

Both because of changes in regulations and availability of data developed after the issuance of our report in 1964, Dr. Dernehl and I have revised the asbestos memorandum. A copy of the revision is enclosed.

The major changes are the decrease in the Threshold Limit Value from 5 million particles per cubic foot of air to 2 million particles per cubic foot of air. (There is also a provision for another method of counting but it does not appear applicable to our short fiber asbestos.) We briefly discuss mesotheliomas, but data is too scanty as yet for a definite policy to be established. It is worth mentioning that the American Conference of Governmental Industrial Hygienists considered in 1968 a requirement that airline respirators be required for all contact with crocidolite asbestos. The resolution did not pass, but may come up again in future meetings.

Any questions or comments will be welcome.

Very truly yours,

K. S. Lane, M. D.
Assistant Medical Director

KSL:lk
Enclosure

ASBESTOS TOXICOLOGY REPORT

It has been known for 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 has been generally accepted that a worker will not develop asbestosis if he is exposed to no more than 5 million particles per cubic foot of air, even if this exposure continues for his entire working lifetime. Although no cases of asbestosis are known to have occurred when exposures have been maintained at or below this level, the ACGIH (which sets the threshold limit value (TLV) in the U. S. A.) has indicated they intend to lower the TLV for asbestos to 2 million particles per cubic foot in an effort to increase the safety factor incorporated in the limit. The U. S. Department of Labor has already issued a regulation under the Walsh-Healy Act placing the TLV for asbestos at 2 million particles per cubic foot for public contracts in which they have jurisdiction. 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 (MPPCF) before its presence it 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 type of cancer named mesothelioma has been noted to be associated with asbestos exposure in recent years. These tumors, while rather few in number to date, may occur in individuals with histories of only slight exposures, and that as much as twenty to forty years earlier. There is considerable evidence that crocidolite is most frequently associated with mesotheliomas. From the data available it appears that the TLV of 5 MPPCF is not low enough to protect against mesothelioma, and it is quite possible that 2 MPPCF is not, either. Research on the problem continues.

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 examination 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 cons[illegible] for the asbestos concentrations 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.

Industrial Medicine And
Toxicology Department
Union Carbide Corporation

UNION CARBIDE CORPORATION
270 PARK AVENUE, NEW YORK, N.Y. 10017

ASBESTOS TOXICOLOGY REPORT

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

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

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RECEIVED
MAR 28 1966
U.C.C. - ING. & METALS DIV.

M E M O R A N D U M

DATE: March 22, 1966

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

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

ress in painting the ...

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. J b Churg, found that asbest workers eventuall showed to seven times th 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 n mited to th se 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 ma , 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.

UNION CARBIDE CORPORATION
270 PARK AVENUE, NEW YORK, N.Y. 10017

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

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

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UNION CARBIDE BELGIUM N.V.

RECEIVED
DEC 5 1967
J.F. FRANGOS

BRUXELLES 5, 30 November, 1967
149, AVENUE LOUISE

V. REF.
N. REF. 1415 /TJH/MLF

Mr. F. Dexter
Union Carbide Corporation
New York Office

Dear Frank:

As you know we have been trying to keep close to the asbestos toxicology work in the U.K. Fred Mumpton at Niagara Falls arranged for some work to be carried out on a sample and gave us a report on this. Ian Sayers took the report to the laboratory group in the U.K. which is co-ordinating this work. I am enclosing a copy of his hand written report for your information. When they come back to us for additional analytical work we will pass it on to you. There continues to be a great amount of concern about this subject and we are going to have to learn to live with the problem in the U.K. So far there has been no indication of it being passed on to the continent. OVER

In this report Ian passes on the request for permission to publish our data and I would like your comments on this. Even if you agree we would try to find out in more detail the conditions under which this data would be presented before agreeing directly with them. Perhaps it would be better to have this sort of publication first approved by Carl Dernehl before we finally agree. Also I will ask Ian to follow directly on obtaining the spectrographic analysis method.

If you or any of the others receiving this letter have any comments I would welcome them.

Best regards,

Very truly yours,

THOMAS J. HALL.

Encl.

This is a good deal of background information which is most familiar to me but is complicated here. Suggest we hold the matter for discussion until then. Let's hear.

UNION CARBIDE

INTERNAL CORRESPONDENCE — cc: JAR 5-1-70

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RECEIVED
APR 6 - 1970
UCC - CALIDRIA
KING CITY, CA.

To (Name) Mr. C. E. Metten
Division Chemicals & Plastics
Location 2770 Leonis Blvd.
Los Angeles, Calif. 90058

Date March 21, 1970

Originating Dept. Medical Department

Answering letter date

Copy to bcc: M. B. VerNooy - TT
W. J. Fitzpatrick - LA
W. G. Farrell - LA
John Meyers - King City

Subject Toxicity of Calidria Asbestos

Asbestos has practically no acute toxicity regardless of its type or form. The harm associated with asbestos is from the fibrogenic properties of the inhaled dust. This usually is seen only after prolonged exposure measured in terms of 15-20 years although cases rarely will occur in less time.

Because of the rather unique structure characteristics of Calidria Asbestos, there was concern that it might be unusually fibrogenic and perhaps cause an acute asbestosis.

To test this possibility, Calidria Asbestos was injected into rats and rabbits intraperitoneally using a standard long fibre asbestos as a control. The results of this test showed Calidria Asbestos to be slightly more fibrogenic than long fibre asbestos but the difference was not so great as to suggest an unusual degree of hazard. From this I conclude that the same precautions to avoid breathing asbestos dust must be observed whether the dust be from Calidria Asbestos or from a standard long fibre form.

Some people believe there is an association between exposure to asbestos dust and the development of lung cancer and mesothelioma. There is no information regarding Calidria Asbestos in this respect as yet. It would be prudent to assume that Calidria Asbestos will behave like other asbestos in this regard.

C. U. Dernehl M.D.

C. U. Dernehl, M. D.
Associate Medical Director

CUD:dp

Union Carbide Corporation
Mining and Metals Division
270 Park Avenue
New York, New York 10017

RECEIVED
FEB 1966
T. F. FRANGOS

February 4, 1966

Mr. Peter K. Cheston
Union Carbide Limited
8 Grafton Street
London, England

Toxicology

Dear Peter:

Your suggestion that we consider including "UK paper industry" comments in our General Sales Meeting is well taken -- and I plan to review the notes with Ian Sayers.

Apropos of your letter on toxicological studies we have to mention -- we have reviewed the two excerpts you sent us with Dr. Carl Dernehl. He counsels that the papers "do not by any means present incontrovertable proof nor do they profess to do so." Further: "Our position should remain that in United States experience there has been no increased incidence of lung cancer when the threshold limit has not been exceeded."

From past publications, we have also noted the references to organic contaminants, with the thought that proof of absence of polycyclic aromatics in Union Carbide asbestos might be useful. We are planning some extraction studies and analyses for 3,4-benzo(a)pyrene by techniques employed at South Charleston. We will let you know the results, probably in an appropriately written statement by Dr. Dernehl.

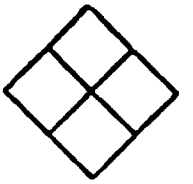
The matter of soft papers, facial and other tissues, has been a recurring subject with us. Primarily this is a question of skin sensitization. While the over-all statements by our Industrial Medicine and Toxicology people should suffice -- we have given thought to "patch tests, which, incidentally, cost appreciably to run. It would be meaningless to conduct such tests with paper containing UCC asbestos, since the other components of the furnish bear on the results. Hence we are considering patch tests using straight asbestos -- which, of course, would absolve only our product. The other components (including, as you know, a variety of organic compounds) of specific furnishes would have to be considered by the paper company involved. We shall let you know our plans.

Very truly yours,

A.E.Pufahl:uk

cc: M. F. Reichard
T. F. Frangos
R. F. Gray (Australia)

UNION CARBIDE Material Safety Data



September 1, 1976

UNION CARBIDE CORPORATION • 4625 ROYAL AVENUE • NIAGARA FALLS, NEW YORK • 14302

TELEPHONE: (716) 278-3378

PRODUCT: Chrysotile Asbestos CHEMICAL FORMULA: $Mg_6(OH)_8Si_4O_{10}$

TRADE NAMES: "Calidria" Asbestos

I. PHYSICAL DATA

BOILING POINT AND MELTING POINT: Not Pertinent

SPECIFIC GRAVITY ($H_2O = 1$): 2.45

VOLATILE CONTENT: Absorbed Water 1 – 4% By Weight. Structural Water Approximately 13% by Weight.

APPEARANCE: Pellets or Fine White Powder. No odor. Very Slight Solubility in Water.

II. HAZARDOUS INGREDIENTS

Asbestos contains no hazardous ingredients. However, the material itself can be hazardous under certain conditions. (See V below.)

III. FIRE AND EXPLOSION HAZARD DATA

NON-COMBUSTIBLE MATERIAL: No Fire or Explosion Hazard.

IV. REACTIVITY DATA

INERT MATERIAL: No Decomposition or Polymerization Conditions.

V. HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE TO AIRBORNE CONCENTRATION:

The current Occupational Safety and Health Standard (CFR 29, 1910.1001) contains the following exposure limits:

"The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed 2 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the membrane filter method at 400-450 X magnification (4 millimeter objective) phase contrast illumination. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method just noted."

EFFECTS OF EXPOSURE: CAUTION: Breathing asbestos may cause serious bodily harm.

EMERGENCY AND FIRST AID PROCEDURES: No acute toxicity. Use respirator if airborne asbestos fiber concentration exceeds OSHA limits.

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Avoid inhalation of dust. Remove spilled material by vacuum cleaner or by water wash.

WASTE DISPOSAL:

Bags and waste and scrap materials should be disposed of in a manner which will avoid airborne concentrations of asbestos, such as the use of dust-tight trash bags or containers. Ensure that disposal complies with all applicable federal, state or local regulations.

Deposition Exhibit No 22
5-14-87

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