



Dean

Construction Products Division

GRACE

TO: P. E. Korenberg
FROM: J. C. Hortenstine
DATE: June 11, 1990

cc: J. J. Adams
B. C. Rugg

You may have seen this package from American Energy Products which refutes the MMMF study from IRAC.

We may want to provide some answers. We have already replied to the E-136 argument.

J. C. Hortenstine

/pf
Attachment

15192807



American Energy Products Corporation

**AEP'S INITIAL
TRANSMITTAL**

CORPORATE HEADQUARTERS
1175 EAST GARVEY (NORTH) SUITE 101
COVINA, CA 91724
(818) 915-1428
FAX (818) 331-2587

Western Plant 300 East 600 South • Provo, Utah 84601
(801) 377-1122 FAX (801) 377-1127

Eastern Plant 17B Marlen Drive • South Gold Industrial Park-Robbinsville, New Jersey 08691
(609) 890-0033 FAX (609) 890-8599

Southern Plant 6717 Polk No. B • Houston, Texas 77011
(713) 923-4933 FAX (713) 923-4934

May 4, 1990

Ms. Lisa Vandeman
Vastale, Loftus and Kalista
1140 C West Pioneer Parkway
Arlingotn, Texas 76013

RECEIVED

MAY 07 1990

vlk architects, inc.

Re: North Halthom Road Elementary School

Dear Ms. Vandeman:

This is following to our conversation today, regarding the specifications for the above referenced project.

Our understanding is that publicly funded projects must be open for bidding for all products that meet the pertinent specifications. Naming a single product is not open bidding. On the contrary, it appears to us that this is a closed specification.

You stated that the fireproofing must be listed in UL Design S701 in order to be used. The only products approved in Design S701 are W. R. Grace Products MK4, MK5, MK6, RG and RG1, for general concealed fireproofing.

The enclosed information shows that MK4 and MK5 are contaminated with asbestos. RG and RG1 are used in asbestos abatement resprays. That leaves only MK6, which is manufactured exclusively by W.R.Grace and Co. Therefore, only one product is specified.

You may also find it interesting that the enclosed information shows that MK6 and RG do not pass ASTM E136 non-combustibility test. The enclosed information regarding the requirements of SBCCI (Southern Building Code Congress International), & BOCA (Building Officials and Code Administrators International) may also be of interest to you. Also, GSA Masterspec requires that both sprayed fiber and cementitious fireproofing shall be non-combustible.

SprayDon Fireproofing has been effectively used in many air plenums throughout the country. The following are just some of the jobs where SprayDon has been used in this situation:

World Trade Center New York City, NY
Buffalo General Hospital Buffalo, NY
IBM Headquarters Charleston, SC

15192808

Ms. Lisa Vandeman

- 2. -

May 4, 1990

Marine Midland Bank Buffalo, NY
New England Executive Plaza Burlington, MA
Broadway Building Los Angeles, CA
Sears - West Town Boise, ID

The enclosed ASTM E859 Air Erosion Test was made on unsealed SprayDon. The result is well below the 0.025 gr/ft² dust accepted under this criteria.

American Energy, however, requires that the SprayDon surface be tamped and oversprayed with SprayDon Sealer in air plenum areas. This is to ensure that any loose fibers that might have been deposited on the finished application by overspray, is well bonded and locked in place to the surface.

Our UL Design S803 is comparable to Design S701.

We appreciate your taking time to review the enclosed information, and we hope you will include SprayDon as an approved product on the specification for the above referenced job.

If you have any questions, or desire additional information, please let me know.

Sincerely yours,

AMERICAN ENERGY PRODUCTS CORPORATION

Terry L. Wildeboer
Terry L. Wildeboer
Manager

TLW/s

encl: MK Packet

cc: Hobson Harrell - AEP

Esteban Torres - Congress of the US

George White - Los Angeles Times

15192809



Hellmuth, Obata & Kassabaum, P.C.
Architecture, Interiors, Planning, Graphics, Engineering

1110 Vermont Avenue, NW, Suite 330, Washington, D.C. 20005
Telephone: 202 457 0400

March 30, 1987

Mr. Jose Lora
Homart Development Co.
55 W. Monroe Street
Suite 3100 - Xerox Center
Chicago, IL 60603

Re: Tysons II Retail Center
Fireproofing
HOK File No. 4232-711

Dear Jose:

Please advise Gordon McLennan and the General Contractor for Hyman Construction Company that HOK will not approve W.R. Grace's Monokote IV or Monokote V for fireproofing for the Tysons II Project.

The Specifications list W.R. Grace as one of the acceptable manufacturers for the specified fireproofing. However, we have recently learned that W.R. Grace's fireproofing products noted above contain some amount of asbestos. Although the manufacturer claims that the asbestos content is "very low" and within current allowable Government limits, we have had an established policy for some time of not specifying any product which contains any asbestos whatsoever.

Please provide us with a copy of any written instructions you issue to the parties involved in this matter.

Sincerely yours,

Donald O. Francke
Construction Administration

cc: Gordon McLennan
Jim Hampel
Scott Kirk
Dick Sweeney
Bob Barr

cc: Roger Harriman
for your info

15192810

OBSERVER

Covering Albemarle, Charlottesville and the University

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100 South Street West

February 19-February 25, 1987

Attorney General's Office ignores oversight law

by A.L. Peaslee

The Attorney General's office appears to have ignored the Virginia State Code in not investigating possible rigging of bids on government services and goods used in the building the new U.Va. replacement hospital.

The *Observer* wrote to Attorney General Mary Sue Terry last December suggesting that the University had accepted a bid for fireproofing the new addition of the U.Va. medical hospital that was not only higher than others submitted, but would use a fireproofing material containing asbestos. The letter asked if any Virginia laws had been violated in the bidding process. A copy of the letter was sent to Senator Thomas J. Michie Jr. and U.Va. officials involved in the bidding process.

The reply to the *Observer's* letter from assistant Attorney General, Russell L. Boraas, referred any questions to the University "its architects and the Commonwealth's

Department of General Services and the court files of the litigation which took place." The Attorney General's office appeared to disclaim any responsibility or authority to deal with a possible case of manipulation of bidding by a state agency (U.Va.).

In fact, the Virginia State Code not only says that rigging, altering or otherwise manipulating bids for state government agencies is "unlawful," it says that the Attorney General "shall have concurrent power and authority to investigate and prosecute any violation of Section 59.1-68.7 (which prohibits manipulating bids to state agencies). The code also authorizes the Attorney General to investigate complaints about possible violations of the Virginia Antitrust Act.

Boraas' letter said that the information requested by the *Observer* involved "legal advice to a state institution. Such advice from an attorney to a client is not normally shared with other parties."

Boraas' reply raises the question: is the Attorney General's office meeting its responsibilities under the Virginia Antitrust Act and acting as a defender of the U.Va. Hospital? If such is the answer, there may be a conflict of interest with the law enforcement arm of the state government protecting another state agency against outside complaints.

The question of the safety of the new hospital's fireproofing was first raised by the *Observer* in its July 17, 1986 edition. This quoted Washington attorney David M.F. Lambert as saying that using a fireproofing material containing asbestos will mean that in the future, to meet standards of the Environmental Protection Agency (EPA), the fireproofing (Monokote MK-5, manufactured by W.R. Grace Company) will have to be removed at great cost.

MK-5, said Lambert, contains minute quantities of asbestos. A Grace Company office later certified

see OVERSIGHT, page 12

OVERSIGHT, from page 1

that the MK-5 would never exceed one percent. However, the Grace Company did not record that it would indemnify the University for any safety hazard or future rectification of mistakes in using asbestos-containing fireproofing. MK-5 meets current EPA standards.

U.Va. changed its specifications for fireproofing materials from its

first bid on November 4, 1985 which required "asbestos-free" fireproofing. In a revised bid specification on January 22, 1986, the requirement for "asbestos-free" was removed.

During the bidding process, Southeastern Shelter of Durham, N.C. had placed a bid for fireproofing using asbestos-free materials and asking \$150,000 less than the Grace

Company. The University said it refused that bid because asbestos-free fireproofing does not adhere as well as one containing asbestos. An official of the Veterans Administration which had used this material told the *Observer*, however, that asbestos-free fireproofing is not only cheaper than the MK-5, but just as effective if applied properly. □

15192811

HAZARDOUS BEDFELLOWS:

The VERMICULITE- ASBESTOS CONNECTION

Since 1971, government and industry have known that virtually all vermiculite produced in this country is contaminated with asbestos.

Why don't the 4 million people who live in homes insulated with vermiculite know this?

EXPOSURE

Environmental Action Foundation
724 Dupont Circle Building
Washington DC 20036

15192812

By Dave Pontzer with Alice Cave

It's a thoroughly modern product for the lifestyle we've grown accustomed to. Vermiculite is lightweight and non-combustible. It's free-flowing and insoluble, chemically inert, resilient and non-abrasive.

This impressive array of attributes enables vermiculite to insulate, fireproof, extend, lighten, and aerate products ranging from potting soil to concrete, plaster board to kitty litter.

In our trusting consumer role we've scattered free-flowing vermiculite about our attic, and we've spread vermiculite-loaded fertilizer onto our lawns. Unfortunately, in our all too frequent uninformed consumer role, we've handled vermiculite without knowing that it's contaminated with asbestos, a proven carcinogen.

Contamination Revealed

The vermiculite/asbestos connection went public in 1971. That's when W.R. Grace and Co., the largest domestic supplier of vermiculite, revealed the results of tests confirming asbestos contamination in the ore mined at their Libby, Montana site, producer of 80% of the nation's vermiculite ore.

In 1976, both the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration got involved when workers in the vermiculite industry came under regulatory "protection" from asbestos dust. Prior to this involvement vermiculite workers were exposed to asbestos dust concentrations as high as 245 fibers per cubic centimeter (f/cm³). The new OSHA standard of 2 f/cm³ is even recognized as too high.

In 1979 the Consumer Product Safety Commission (CPSC) acknowledged the contamination problem when they ordered a general study of the use of asbestos in consumer products and included "potting material" (vermiculite) among the products to be tested. However, the scope of the study was later narrowed to include only products in which asbestos is intentionally added.

Dave Pontzer, a recent graduate of Georgetown University, just completed an internship with the WaTS Project. Alice Cave is a researcher with an environmental consulting firm.

"In 1971, the producer of 80% of the nation's vermiculite announced that virtually all of their ore was contaminated with asbestos."

EPA Releases Documents

Through Freedom of Information requests Environmental Action Foundation has been able to examine EPA documents on asbestos contamination of vermiculite. These reports date back to 1977.

Although vermiculite has been mined in the United States since 1929, no studies on the health effects of exposure to the mineral have been located. The effects of exposure to asbestos, on the other hand, is well documented.

By 1918 there was enough evidence on asbestos hazards to cause American and Canadian insurance companies to stop selling life insurance to asbestos workers. The cancer-causing potential of asbestos was suspected as early as the 1930's, although the first standard for occupational exposure to asbestos wasn't set until 1971 by OSHA.

"32 of the 221 vermiculite workers tested had lung disorders normally associated with asbestos exposure."

One of the first reported incidences of asbestos-like health problems appearing among vermiculite workers was in 1978 by O.M. Scott and Sons Co., a manufacturer of agricultural chemicals. Workers at their Maryland fertilizer plant developed lung disorders normally associated with asbestos exposure. Of 221 tested, 32 had disorders ranging from fibers in the lungs to bloody pleural effusions, with symptoms ranging from coughing, fatigue and chest pain to hypertension.

The crucial point is that research on asbestos-caused cancer in laboratory animals has shown that there is no threshold level below which exposure causes no effect. Therefore, since no safe levels for atmospheric concentrations of asbestos exist, any exposure will produce a percentage of cancers in those exposed.

Regulatory Options

OSHA, under their broad mandate to provide a safe environment for workers, has two regulatory options with regards to vermiculite. The first is an exposure standard and the second a labeling requirement. Theoretically, OSHA's current exposure standards protect workers even after the vermiculite has left the processing plant. But as an EPA report notes, "Realistically, however, it is difficult to imagine the standard being enforced at many of these sites. For example, it is doubtful that employers at greenhouses where vermiculite is used as a soil conditioner run their businesses with the asbestos standard in mind. Few employers besides those involved in the initial stages of vermiculite processing know that vermiculite is often contaminated with asbestos. This is the case with many other

industries using vermiculite as well including construction workers, drywall installers, brick and stone masons, plasterers, insulation workers, and anyone involved in commercial agriculture.

Why are employers and employees largely unaware of vermiculite contamination with asbestos? OSHA's labeling regulations for asbestos, "... all (asbestos-containing) raw materials, mixtures, containers ..." covers vermiculite, but the regulation is self-service. Compliance is voluntary as long as "... manufacturer believes that the use (handling, storage, etc.) of a product will not create fiber levels above the OSHA standard." Even this is ultimately a moot point, since OSHA stated in April of 1980 that the exposure standard is insufficient to protect workers' health.

Vermiculite next finds its way into the home, where it is "regulated," by CPSC. The Federal Hazardous Substances Act gives CPSC the mandate to regulate hazards presented by the presence or use of toxic and other hazardous substances in the home. Like OSHA, they have the authority to ban, regulate, or require labels on products.

CPSC has already exercised this authority with respect to asbestos banning two consumer products containing asbestos fiber; artificial embers and spackling compound. Neither is associated with the vermiculite industry. At that time CPSC went so far as to say that there is no safe level of exposure to asbestos in consumer products, and that, "only banning these products can adequately protect the public from unreasonable risks of injury associated with them." As was mentioned earlier, CPSC began a study of asbestos in consumer products over three years ago, excluding products like vermiculite which contained asbestos as a contaminant. To date, nothing has been reported.

CPSC also has the authority to require content labeling of products. In view of EPA reports concerning the significant levels of consumer exposure to vermiculite, this action, at the very least, should have been taken some years ago. A study prepared for EPA by an independent Virginia-based consulting firm makes this quite clear. The report states that, "Over 74 million persons use lawn and garden fertilizers each year. If the fertilizer is vermiculite-based, estimated exposure levels to asbestos of 4.4 ug/m^3 and 28 ug/m^3 could

"This weight method of measuring asbestos exposure (ug/m^3 -milligrams per cubic meter) contrasts with the earlier volume method (f/cm^3 -fibers per cubic centimeter) in the same way that a pound of eggs contrasts with a dozen eggs. Unfortunately, the Virginia study we refer to only used this weight method, and it's virtually impossible for us to correlate the two different systems with the information we have on hand. Further, OSHA only uses the volume method in its asbestos standard. Suffice to say, however, that as the general "rule of thumb" regarding asbestos, there is no safe exposure level, indicates these latter figures using the weight method are all to be considered extremely hazardous.

result from lawn treatment and gardening, respectively." The report goes on to estimate that 188,000 people a year are exposed to levels of asbestos as high as $13,600 \text{ ug/m}^3$ during the installation of vermiculite attic insulation. 4,230,000 people live in homes insulated with vermiculite.

Additionally, there are at least 3,000 owners of hobby greenhouses whose exposure to vermiculite should be comparable to that of a greenhouse employee occupationally exposed. Anyone repotting their houseplant with potting soil containing vermiculite would be exposed to a small amount of asbestos fiber, as would people who handle kitty litter, barbecue base, or who put up their own drywall, plaster, etc.

The consumer has no idea what's being handled. None of these products, from attic insulation to kitty litter is labeled. CPSC apparently not being sure how to proceed. After the strong stand taken in respect to artificial embers and spackling compound, i.e., no safe exposure level, this inaction is incomprehensible.

The EPA has done extensive research into the problems associated with asbestos contamination of vermiculite, compiling a wealth of information on the subject. As yet they've done nothing with it, issuing no regulations or warnings. It appears that since a safe lower limit for asbestos exposure cannot be found, the problem is being covered up. How else can one explain that at least three government agencies have been studying a known toxic substance, occurring in the market place, for at least five years, and not done so much as require that it be labeled. Another EPA report, also obtained through FOIA, frames the problem:

"Although the quantities of asbestos released during end-use of vermiculite are small in comparison to the mine and workplace, the aggregate risk to the consumer of product end user may be large in view of the large number of people exposed. Moreover, users may be particularly vulnerable and unprotected due to ignorance of the potential hazard."

Using vermiculite in an enclosed area, such as an attic, greatly increases the exposure level to asbestos fibers in the air. Or a garage. Or a basement. The point is clear, workers and consumers are being exposed to a known hazard without

the information to handle it safely, to avoid it altogether. As the EPA report points out, "There are adequate substitutes for most of the uses of vermiculite. If vermiculite were not available, perlite, cellulose concrete and fiberglass would be the most common substitutes."

There the matter now stands. The tragic consequences of asbestos exposure are well established. Vermiculite is a known carrier of asbestos fibers. These microscopic fibers are released into the atmosphere from the time vermiculite is mined through its end use as a consumer product. Yet only the mining and processing of vermiculite have come under any kind of regulation. Upon leaving the processing plant, vermiculite is unregulated, and those handling it are exposed to a toxic substance with no warning to its presence.

Our thanks to Dr. Arthur Rohl, of the Environmental Sciences Laboratory at Mount Sinai School of Medicine in New York, providing us with critical data and recent studies on the asbestos contamination of vermiculite.

Just When You Thought It Was Safe To:

- Insulate Your Attic
- Repot Your Plants
- Change Your Kitty Litter

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Whistleblower Blues

"An independent group has found that my constitutional right to freedom of speech has been violated and that top officials in the EPA conspired to discredit me and tried to stop me from informing the public and Congress about the failure of

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What and Where is Vermiculite?

Vermiculite is a naturally occurring mineral of the mica family. It occurs in thin flakes packed together in plate-like layers. Tiny droplets of water are trapped between the layers, providing the mechanism by which vermiculite achieves its versatility. Heating vermiculite to between 1,000-2,000 degrees Fahrenheit causes the droplets to evaporate, allowing the mica to expand into small, lightweight, low-density pieces. Pure vermiculite can expand up to thirty times its original volume. Expanded vermiculite is known as exfoliated and the heating process as exfoliation.

The majority of vermiculite's uses fall into three general categories:

lightweight aggregates used in construction, agricultural and horticultural products, and insulation. The building industry uses vermiculite in concrete, plaster, wallboard, and similar material. Vermiculite concrete weighs much less than regular sand-based concrete and has excellent insulating properties. One inch of vermiculite concrete has the same insulating capacity as twenty inches of regular concrete. Mixed into plaster or wallboard, vermiculite adds sound deadening and fire resistant properties.

As insulation, vermiculite is poured loose between attic joists and into hollow cement block. It's also used as a packaging agent to prevent break-

age during shipping.

Because of its large surface area and ability to absorb water and gas, vermiculite is used extensively in agriculture and horticulture. Though most familiar as a soil conditioning agent for house plants and in greenhouses, vermiculite is also used as a plant growing medium, chemical fertilizer carrier, packing material for nursery stock, and carrier and extender for pesticides and herbicides.

Vermiculite's other "minor" uses include use as a filler in paints, plastics and rubber, in kitty litter, and in barbecue base to retain and reflect heat.

Payday for Environmentalists

Based on interviews with 1,310 people selected to mirror the national population, plus 263 corporate executives and 343 members of environmental groups, the survey found:

- 55 percent of those interviewed favor maintaining present air pollution standards "even if some factories close as a result."

- 50 percent favor keeping current environmental regulations "even if it slows the production of more energy."

- 60 percent favor giving priority to environmental cleanup "even if companies have to charge more for

interviewed, 59 percent from small companies and 51 percent from "Fortune 500" companies said there should be emphasis on cleaning up the environment, even if that required them to raise their prices for goods and services.

The above findings reinforce earlier polls by Louis Harris Associates, which found 53 percent of Americans favor keeping the Clean Air Act intact or strengthening it, in the face of administration proposals to relax standards.

15192815

The Vermiculite Asbestos Connection

By Dave Pontzer with Alice Cave

It's a thoroughly modern product for the lifestyle we've grown accustomed to. Vermiculite is lightweight and non-combustible. It's free-flowing and insoluble, chemically inert, resilient and non-abrasive.

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Vermiculite next finds its way into the home, where it is "regulated" by CPSC. The Federal Hazardous Substances Act gives CPSC the mandate to regulate hazards presented by the presence or use of toxic and other hazardous substances in the home. Like OSHA, they have the authority to ban, regulate, or require labels on products.

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CPSC also has the authority to require content labeling of products in view of EPA reports concerning the significant levels of consumer exposure to vermiculite, this action, at the very least, should have been taken some years ago. A study prepared for EPA by an independent Virginia-based consulting firm makes this quite clear. The report states that, "Over 74 million persons use lawn and garden fertilizers each year. If the fertilizer is vermiculite-based, estimated exposure levels to asbestos of 4.4 ug/m³ and 25 ug/m³ could

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EXPOSURE

The Monthly Journal of The Waste and Toxic Substances Project
Environmental Action Foundation, Washington, D.C.

HAZARDOUS BEDFELLOWS: The VERMICULITE- ASBESTOS CONNECTION

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Why don't the 4 million people who live in homes insulated with vermiculite know this? See page 5

EXPOSURE
Environmental Action Foundation
724 Dupont Circle Building
Washington DC 20036

Non-Profit
Bulk Rate
U.S. Postage
PAID
Permit No. 41131
Washington, D.C.

15192817

FACT SHEET

The VERMICULITE- ASBESTOS CONNECTION

WASTE AND TOXIC SUBSTANCES PROJECT
ENVIRONMENTAL ACTION FOUNDATION
1346 CONNECTICUT AVE., NW
WASHINGTON, DC 20036
202-296-7570

MAY 1983 \$10.00

15192818

DECISION PAPER

for

ASBESTOS-CONTAMINATED VERMICULITE

Prepared by

Albert Colli

William Stigliani

Kirk Johnson

Chemical Control Division
Office of Toxic Substances

February 1981

IV. BACKGROUND

Exposure to asbestos-contaminated vermiculite workplace and during mining operations.

In December 1978, O.M. Scott and Sons submitted to EPA regarding serious health problems experienced by workers who were processing asbestos-contaminated vermiculite at a chemical fertilizer plant in Marysville, Ohio.¹⁰ The submission indicated that bloody pleural effusions had been detected in 4 of 350 employees; symptoms and clinical findings of the employees were similar to those found in individuals with asbestos-related diseases. Subsequent follow-up studies initiated by OSHA¹¹ revealed that the prevalence of health problems among employees at O.M. Scott and Sons was greater than originally expected. Thirty-two cases of pleural and/or interstitial abnormalities were detected by chest x-rays and spirometric measurements (x-rays were taken for 125 of 221 workers).

The cause of the disease was most probably due to inhaled asbestos dust. Monitoring data revealed that prior to the installation of more stringent safety controls in 1976, plant employees were occasionally acutely exposed to airborne asbestos. One air sample taken in the unloading area was found to contain 245 fibers/cm³. Subsequent microscopic studies identified other types of fibers and cleavage products in addition to asbestos. Similar high fiber levels have been reported elsewhere. A plant in St. Paul, Minnesota which processes vermiculite containing asbestos was found to have levels as high as 163 fibers/cm³.¹²

Although adverse health effects developed by workers at Scott & Sons appear to be caused by asbestos exposure, other factors cannot be discounted. Since little data exists for health effects from pure vermiculite (fibrous or nonfibrous) it is possible that cleavage fragments or fibers of vermiculite itself caused the effects. Free silica present in the dust is another possible toxicant. Alternatively, fertilizer and pesticide chemicals, which are coated onto the vermiculite surface in the production process, may have adhered onto the fibers that were inhaled and could have contributed to the adverse health effects. Further studies would have to investigate these possibilities. At this time, the only known toxic chemical to which the workers were exposed is asbestos.

The source of asbestos contamination may have resulted from the use of vermiculite from Grace mines in Libby, Montana. The company acknowledged the presence of asbestos in the vermiculite from that mine in 1971.¹³ In 1977, an EPA study reported the presence of substantial amounts of asbestiform amphibole fibers in the tailings (residues) from mining and milling operations.¹⁴ In the beneficiation, impurities in the raw vermiculite ore are physically separated by a "wet" process in which adhering cl

Other impurities are removed by washing. However, attempts to remove all impurities have been unsuccessful and tremolite asbestos remains as a contaminant in the vermiculite. The present asbestos concentration in ore leaving the Libby mines has reportedly been reduced to 0.5%.¹⁵

In the past, mining employees had been exposed to asbestos-containing fiber levels in excess of the current OSHA 8-hour TWA standard of 2 fibers/cm³.⁷ Current levels in the ambient air surrounding the Libby mines range from 0.3 to 2.6 fibers/cm³.⁷ Equipment operators are exposed to levels of 0.6-1.8 fibers/cm³,¹⁶ and workers in loading areas are exposed to fiber levels in the range from 0.2 to 5 fibers/cm³.¹⁷ To date lung scarring has been noted in some employees and there were two reported cases of "dust related lung diseases" in 1979.¹⁸ NIOSH is currently conducting a thorough study on adverse health effects of Libby miners.¹⁹

Release of Asbestos from Vermiculite Products or End Uses

In addition to workers, a substantial number of consumers and product end-users are potentially exposed to asbestos from asbestos-contaminated vermiculite. Although no data exists to substantiate this premise, engineering calculations have shown that levels of asbestos release into the atmosphere during end use may not be negligible.²⁰ Figure 1 diagrams the estimated amounts of asbestos released during mining, production and use of vermiculite. The greatest source of current asbestos release to the atmosphere is during the exfoliation process. At present exfoliation is estimated to release 140 kkg/yr of asbestos, or 58 percent of the total airborne releases. The second major source of airborne asbestos is the mining and milling process, which is estimated to release 102 kkg/yr, or 42 percent of the total. Vermiculite end uses account for less than 1 percent of total airborne releases. Although the quantities of asbestos released during end-use are small in comparison to the mine and workplace, the aggregate risk to the consumer or product end user may be large in view of the large number of people exposed. Moreover, users may be particularly vulnerable and unprotected due to ignorance of the potential hazard.

5

OFFICE OF TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Review of Priority Review Level-1
(PRL-1) Report - Asbestos-Contaminated Vermiculite

FROM: Joseph J. Merenda, Director
Assessment Division (TS-792)

TO: Warren R. Muir
Deputy Assistant Administrator
for Testing and Evaluation (TS-792)

James Reisa, Acting Director
Health Review Division (TS-792)

John Ficke, Acting Director
Environmental Review Division (TS-792)

The attached PRL-1 report entitled Asbestos-Contaminated Vermiculite is being distributed for review within the Office of Testing and Evaluation. This chemical was referred to the Chemical Review and Evaluation Branch for consideration in the Priority Problem Assessment (PPA) process as a potential (backlog) 4(f) candidate. Consequently, the attached document does not address all potential sources and effects of the chemical. Instead, it addresses only those sources and effects relevant to the identified priority problem; i.e., the risk of asbestos-related diseases among workers who mine and process vermiculite.

Based on my review of the PRL-1 report, I recommend that assessment activities be continued after completion of data gathering activities to provide additional exposure information relevant to an assessment of risk. In addition to the problem originally recommended for consideration, I also recommend that data gathering and subsequent assessment activities be expanded to include an evaluation of the risk to the general population through use of products containing asbestos-contaminated vermiculite. Because section 4(f) of TSCA is not applicable to the vermiculite problem (c.f., Meeting Summary for 4(f) Meeting, May 5, 1980), such assessment activities should enter the PRL-2 stage of the PPA process without further consideration of 4(f) applicability/criteria.

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MATERIAL SAFETY DATA SHEET

①

W. R. Grace & Co.
62 Whittemore Ave.
Cambridge, MA 02140

Number: Z-8303
Labels: Z-144-2
Date Prepared: 9/24/86

Telephone Number for
Information and Emergency Response
(617) 876-1400
X-3140 or 3897

SECTION I - PRODUCT IDENTIFICATION

Trade Names and Synonyms: MONOKOTE; MK-4, MK-5

Chemical Name and Family: Lightweight Gypsum-Vermiculite Plaster

Formula: Blend of Gypsum Vermiculite, Cellulose and (in MK-5 only) Fiber Glass

State: Not Applicable (mixture)

Hazard Class/ID# /Label: Not Applicable

Portable Quantity (RQ): Not Applicable

Surface Freight Classification: Wall Plaster

OSHA-HMIS Hazard Index:

- Health: 1*
- Flammability: 0
- Reactivity: 0
- Personal Protection: E

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

(CAS#, Chemical & Ingredient Common Names)	Percent by Weight	<u>Exposure Limits</u>	
		OSHA	ACGIH
<u>Total Dust</u>			
Gypsum may add up to Quartz CAS# 14808-60-7)	Not Applicable	PEL = $\frac{30\text{mg}/\text{M}^3}{\frac{1}{2} \text{ Quartz} + 2}$	TLV = $\frac{30\text{mg}/\text{M}^3}{\frac{1}{2} \text{ Quartz} + 3}$
<u>Respirable Dust</u>			
Gypsum may add up to Quartz CAS# 14808-60-7)		PEL = $\frac{10\text{mg}/\text{M}^3}{\frac{1}{2} \text{ Quartz} + 2}$	TLV = $\frac{10\text{mg}/\text{M}^3}{\frac{1}{2} \text{ Quartz} + 2}$

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point Not Applicable Specific Gravity (H₂O = 1) 12-15 PCF (Dry Bulk Density)

Vapor Pressure (mm Hg.) None % Volatiles None

Relative Density (AIR = 1) Not Applicable Evaporation Rate
(Butyl Acetate = 1) Not Applicable

Solubility in Water Slight pH Approximately neutral, variable with water source

Appearance and Odor Coarse, free flowing grayish powder

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SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used) N. A. Flammable Limits None LEL UEL

Extinguishing Media Not Applicable

Special Fire Fighting Procedures None

Unusual Fire and Explosion Hazards None Known

SECTION V - REACTIVITY DATA

Stable: Yes

Conditions to Avoid: Not Applicable

Incompatibility (Materials to Avoid): Prior to welding or cutting, MONOKOTE must be removed from steel surfaces in those immediate areas where direct exposure to excessive heat from the cutting or welding equipment is possible.

Hazardous Decomposition or Byproducts: Sulfur Dioxide SO₂ (Due to excessive heat from cutting or welding)

Hazardous Polymerization: Will not occur

Conditions to Avoid: Not Applicable

SECTION VI - HEALTH HAZARD DATA

(Include all known acute and chronic effects, signs, and symptoms of exposure and medical conditions generally aggravated by exposure)

Routes of Exposure:

Inhalation: Exposure to excessive airborne dust may cause coughing or sneezing. Long term exposure to Quartz Dust, which may be present up to 2%, can cause risk of silicosis, pneumoconiosis, dyspnea and decreased lung function.

Skin and Eye: Eye contact with dust may cause minor mechanical irritation. Direct eye contact with MONOKOTE Spray may cause physical injury. Prolonged or repeated skin contact may dry skin.

Ingestion: Not expected to be harmful.

Carcinogenicity According to NTP, IARC and OSHA: Not Applicable.

Emergency and First Aid Procedures:

In case of contact, immediately flush eyes with plenty of water. Do not rub eyes. Consult a physician.

If inhaled get fresh air. If symptoms persist consult a physician.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Warning Statements:**CAUTION!**

Contains Vermiculite CAS# 1318-00-9, Gypsum CAS# 7778-18-9 and up to 2% Quartz CAS# 14808-60-7.

May be harmful if inhaled.

Long-term overexposure to airborne dust may cause silicosis or other lung disease.

May cause minor mechanical irritation to eyes. Direct contact with spray can damage eyes.

Floors in spray area may be slippery when wet.

Precautionary Measures:

Avoid creating dust.

Equip mixers with dust covers.

Provide ventilation and respiratory protection.

Wear eye protection to avoid contact with dust or spray.

Post "slippery when wet" signs where appropriate.

Steps to be Taken in Case Material is Released or Spilled:

Observe precautions noted above. Remove material for disposal.

Waste Disposal Method:

MONOKOTE waste is not defined as hazardous according to EPA (40 CFR§ 261.3). Dispose of all waste in accordance with applicable federal, state and local regulations.

SECTION VIII - CONTROL MEASURES

Respiratory Protection (Specify Type): Wear an approved dust mask (NIOSH TC-21C-XXX) to prevent exposure above the limits specified above in Section II.

VentilationLocal Exhaust:

Exhaust fans may be necessary when mixing in enclosed areas.

Mechanical:

Special: Not Applicable.

Other: Not Applicable.

Protective Gloves: Work gloves or hand creams may prevent drying skin.

Eye Protection: Goggles are recommended where exposure to excessive dust or MONOKOTE spray is likely.

Other Protective Clothing or Equipment: Normal work clothes.

Work/Hygenic Practices: Use bag opening and disposal procedures which minimize dust release. Equip mixers with dust covers as referenced in the MONOKOTE Equipment Bulletin.

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FEB 14 89 13:30 FROM P.F.C. INC

implanted in their lungs.

This method of introducing MMMF into the mice effectively bypassed their natural immune systems.

The natural question that this raises is "would the same method of implantation of some other fiber such as cotton or nylon, which we are exposed to everyday or of vermiculite which we are also exposed to frequently, also show the same effects?

A symposium on "Occupational Exposure to Fibrous Glass" sponsored by the National Institute For Occupational Safety and Health (NIOSH) was presented by the University of Maryland on June 26-27, 1974. Papers were presented by several medical researchers on their work in this area e.g. "Gross et al, (1971) reported autopsy examinations on 20 fibrous glass workers whose exposure history ranged from 16 to 32 years. The autopsies failed to show evidence of fibrotic disease attributable to such exposure. In contrast to this experience populations exposed to other dusts causing disease, for example, free crystalline silica or asbestos, show discernable evidence of pulmonary abnormalities well within 10 to 20 years. One would expect, that if fibrous glass is a potent cause of chronic bronchitis or pulmonary fibrosis, some evidence of an excess of these abnormalities should be observable by now", and in the comments of this report it stated "Two conclusions are drawn:

Fiberglass dust, inhaled and deposited in the lungs, causes no harmful tissue reaction.

Fiberglass dust, deposited in the lungs, is readily removed from the lung tissue by the pulmonary mechanism".

Also, from The Federal Register Vol. 38 No. 66-Friday, April 6, 1973, "The substitution of ceramic wool, mineral wool, and fiberglass for asbestos is not now known to be a problem. There is no evidence that these cause health effects in the concentrations found in occupational or ambient environments."



American Energy Products Corporation

AMERICAN ENERGY PRODUCTS CORPORATION

NEWS - GRAM

88-1

Distribution: All American Energy Products Corp. customers.

Dear Customers:

Several of you have called regarding jobs you have lost or on which your bid proposals were not accepted because of either real or feigned concern about the health aspects of sprayed mineral fiber fireproofing.

This apparently is generated by The World Health Organization (WHO) and IARC Report on mineral man-made fibers (MMMF) which classifies these fibers as Group 2B; "Possibly carcinogenic".

I'm sure you have a pretty good idea where these scare tactics and propaganda are coming from, but if anyone bothers to read the report they will find the following:

1. Extensive animal inhalation tests by various laboratories have shown that MMMF fibers have no potential to induce cancer.
2. Mice exposed to high levels of airborne MMMF did not have a greater occurrence of lung tumors than those that were not exposed.
3. X-ray and lung function studies on current MMMF workers have not shown exposure to mineral wool to be associated with lung abnormality.
4. The only increase of lung cancer in the WHO report occurred with mice who had MMMF fibers



Spray
Seal

SPRAYED MINERAL FIBERS

15192827

SUPPLEMENTAL INFORMATION

One of the components of this product is vermiculite, a naturally-occurring mineral that contains tremolite in the ore body. Except for trace amounts, the tremolite is removed from the vermiculite during processing. It is this purified vermiculite which is used in the manufacture of MONOKOTE; MK-4 and MK-5.

The EPA has stringent standards covering the spray-application of fireproofing materials. With levels below .001% (10 parts per million), MONOKOTE is more than 1000 times below the current EPA standard. MONOKOTE 4 and 5 are in full compliance with all current and proposed Federal regulations and standards, including the proposed EPA ban and phase-out of products containing commercially-added asbestos.

Using sophisticated, state-of-the-art electron microscopy analysis, it may be possible to detect fibrous tremolite in MONOKOTE at levels of .001% (10 parts per million) by weight or less. Copies of such independent laboratory test results by Arthur D. Little, Inc. and Mt. Sinai Medical Center are available upon request.

On June 20, 1986 the United States Occupational Safety and Health Administration (OSHA) established new stringent regulations regarding occupational exposure to airborne asbestos fibers including tremolite. OSHA regulations include a maximum Permissible Exposure Level (PEL) of 0.2 fibers/cc (8 hr. time weighted average) and an action level of 0.1 fibers/cc. Grace frequently monitors jobsite exposure levels for workers applying MONOKOTE; MK-4 and MK-5. All tests have shown exposure levels consistently below the OSHA action level.

OSHA has officially informed Grace that its asbestos regulations are not meant to be enforced for any products which contain "de minimus levels" of naturally-occurring tremolite where exposure levels to employees do not exceed the OSHA action level.

"THE DATA INCLUDED HEREIN ARE PRESENTED ACCORDING TO W. R. GRACE & CO.'S PRACTICES CURRENT AT THE TIME OF PREPARATION HEREOF, ARE MADE AVAILABLE SOLELY FOR THE CONSIDERATION, INVESTIGATION AND VERIFICATION OF THE ORIGINAL RECIPIENTS HEREOF AND DO NOT CONSTITUTE A REPRESENTATION OR WARRANTY FOR WHICH GRACE ASSUMES LEGAL RESPONSIBILITY. IT IS THE RESPONSIBILITY OF A RECIPIENT OF THIS DATA TO REMAIN CURRENTLY INFORMED ON CHEMICAL HAZARD INFORMATION, TO DESIGN AND UPDATE ITS OWN PROGRAM AND TO COMPLY WITH ALL NATIONAL, FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS APPLICABLE TO SAFETY, OCCUPATIONAL HEALTH, RIGHT-TO-KNOW AND ENVIRONMENTAL PROTECTION."

Eurisol, UK Mineral Wool Association which studied and were involved with the WHO report state the following in their 29th June 1987

Mineral Wool and Health - A Summary "Unlike asbestos, mineral fibres have been cleared by the World Health Organization (WHO) of any link with mesothelioma, fibrosis or any other non-malignant respiratory disease". Also from the same summary:

"There is no evidence that mineral wool presents any risk to production workers today, or has done so for the past 20 to 30 years. In the general environment, levels to exposure are minute compared with the factory situation, and no hazard is posed to the public. The UK Government has stated that on the limited evidence available the risk to householders-from insulating a loft for instance-is negligible although sensible precautions should be taken by using dust masks when applying."

The American Conference of Governmental Industrial Hygienists (ACGIH) in their 1987-1988 TLVs[®], Threshold Limit Values and Biological Exposure Indices, list the TLV of mineral wool fiber, the same as nuisance particulates, 10 mg/M^3 , and higher than Grain Dust (oats, wheat, barley) at 4 mg/M^3 , and of Talc at 2 mg/M^3 respirable dust. Portland Cement and Gypsum both products we are exposed to regularly also have a TLV of 10 mg/M^3 the same as mineral wool.

The fact that some of these studies go back more than 10 years should assure us all that with the proper precautions and good housekeeping taken during the application of fiber fireproofing, neither the applicator, allied trades nor the general public is exposed to anything more than with other common everyday substances that should also be handled with good housekeeping practices and care.

I hope the foregoing is helpful to you. Please advise us of any project or architect you feel we should contact regarding this.

Sincerely yours,



M. E. Herrera
President

MEH/rw

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Enclosures listed:

Occupational Exposure to Fibrous Glass

TLVs - Threshold Limit Values and
Biological Exposure Indices for 1987-1988

General Industry Safety Order 5155-
AIRBORNE CONTAMINANTS

Federal Register Vol. 38 No. 66 -
Friday, April 6, 1973

Miscellaneous Information (4)

General Industry Safety Order 5155

AIRBORNE CONTAMINANTS

Nov. 1986

S-600

State of California
George Deukmejian, Governor
Ron Rinaldi, Director of Industrial Relations

TABLE AC-3
PERMISSIBLE EXPOSURE LIMITS FOR MINERAL DUSTS

Substance	PEL	
	mppcf ⁽¹⁾	mg/M ³
SILICA		
(1) Amorphous (including natural diatomaceous earth)	20	—
(2) Crystalline:		
Quartz (respirable)	—	10 ^(a)
		%SiO ₂ + 2
Quartz (total dust)	300 ^(a)	30
		%SiO ₂ + 10
		%SiO ₂ + 3
Cristobalite	Use one-half the value calculated from the formulae for quartz.	
Silica, fused	Use the value calculated from the formulae for quartz.	
Tridymite	Use one-half the value calculated from the formulae for quartz.	
Trippoli (respirable)	—	10
		%SiO ₂ + 2
SILICATES (less than 1% crystalline silica)^(d)		
Asbestos (including actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite), see Section 5808		
Graphite (natural)	15	—
Mica	20	—
Mineral wool fiber	—	10 ^(e)
Perlite	30	—
Portland Cement	30	10
Soapstone	20	—
Talc (fibrous, nonfibrous and mixtures) ^(e)	—	2 ^(e)
Tremolite, nonasbestiform	20	—
COAL (BITUMENOUS) DUST		
< 5% quartz, respirable fraction	—	2 ^(e)
> 5% quartz, respirable fraction	—	10 ^(e)
		%SiO ₂ + 2
NUISANCE PARTICULATES < 1% quartz		
Total dust	—	10
Respirable dust	—	5
> 1% Quartz—use appropriate formulae for crystalline silica		

(1) Millions of particles per cubic foot of air, based on long-term samples counted by light-field technique; mppcf x 25.3 = millions particles per cubic meter or particles per cubic centimeter.

(2) The percentage of SiO₂ (as crystalline silica) in the formula is the amount determined from airborne samples except in those instances where other methods have been shown to be applicable.

(3) Both the concentration and percentage of SiO₂ (as crystalline silica) used for this limit are determined from the fraction passing a size separator with the following characteristics:

Aerodynamic Diameter in Microns (unit density sphere)	Percent Passing Separator
5.3	90
2.5	75
3.3	50
3.0	25
10	0

(4) Use the value in mppcf or mg/M³ if the crystalline silica content is greater than 1%, use appropriate formulae for crystalline silica.

(5) All requirements of Section 5808, Asbestos, shall also apply.

TLVs®

**THRESHOLD
LIMIT VALUES
and
BIOLOGICAL
EXPOSURE INDICES
for
1987-1988**



Second Printing

ISBN: 0-936712-72-4

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Industrial Hygien

DUSTS

In this edition of the TLV list, dusts are also listed in the main alphabetical listing. Starting with the 1988-1989 edition, dusts will be listed in the main alphabetical listing only.

Substance	TLV-TWA
<u>SILICA, SiO₂</u>	
<i>Crystalline</i>	
Quartz ^a [14808-60-7]	0.1 mg/m ³ , Respirable dust
Cristobalite ^a [14464-16-1]	0.05 mg/m ³ , Respirable dust
Silica, fusc ^a [60676-86-0]	0.1 mg/m ³ , Respirable dust
Tridymite ^a [15465-32-3]	0.05 mg/m ³ , Respirable dust
Tripoli ^a [1317-95-9]	0.1 mg/m ³ of contained respirable quartz dust.
<i>Amorphous</i>	
Diatomaceous earth (uncalcined) ^a [68855-54-9]	10 mg/m ³ , Total dust
Precipitated silica ^a	10 mg/m ³ , Total dust
Silica gel ^a	10 mg/m ³ , Total dust
<u>SILCATES</u>	
<i>Asbestos^a</i>	
Amosite [12172-73-5]	0.5 fiber/cc, A1
Chrysotile [12001-29-5]	2 fibers/cc, A1
Crocidolite [12001-28-4]	0.2 fiber/cc, A1
Other forms	2 fibers/cc, A1
Mica ^a [12001-25-2]	3 mg/m ³ , Respirable dust
Mineral wool fiber	10 mg/m ³
Perlite ^a	10 mg/m ³ , Total dust
Ponland cement ^a	10 mg/m ³ , Total dust
Soapstone	3 mg/m ³ , Respirable dust ^a 6 mg/m ³ , Total dust ^a
Talc (containing no asbestos fibers) ^a [14807-96-6]	2 mg/m ³ , Respirable dust
Talc (containing asbestos fibers)	Use asbestos TLV-TWA. However, should not exceed 2 mg/m ³ respirable dust.

OTHER DUSTS

Barium sulfate ^a [7727-43-7]	10 mg/m ³ , Total dust
Coal dust ^a	2 mg/m ³ , Respirable fraction
Grain dust (oats, wheat, barley)	4 mg/m ³ , Total particulate
Graphite ^a (natural) [7782-42-5]	2.5 mg/m ³ , Respirable dust
Graphite, synthetic ^a	10 mg/m ³ , Total dust
Nuisance particulates ^a (see Appendix D)	10 mg/m ³ , Total dust

^a See Notice of Intended Changes, 1987-1988 Adoption.

- (d) Fibers longer than 5 µm and with an aspect ratio equal to or greater than 3:1 as determined by the membrane filter method at 400-450X magnification (4 mm objective) phase contrast illumination.
- (e) The value is for total dust containing no asbestos and <1% free silica.
- (f) The value is for dust containing <5% free silica. For dust containing more than this percentage of free silica, the environment should be evaluated against the TLV-TWA of 0.1 mg/m³ for respirable quartz. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the "c." paragraphs of Appendix F.
- (i) The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the "c." paragraphs in Appendix F.

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF
THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 1985

Commission file number 1-3720

W. R. Grace & Co.

Incorporated under the Laws of the
State of Connecticut

I.R.S. Employer Identification No.
13-5114230

Grace Plaza, 1114 Avenue of the Americas, New York, New York 10036-7794
212/819-5500

Securities registered pursuant to Section 12(b) of the Act:

<u>Title of each class</u>	<u>Name of each exchange on which registered</u>
Common Stock, \$1 par value	New York Stock Exchange, Inc. Midwest Stock Exchange, Incorporated
4 3/4% Convertible Subordinate Debentures Due March 1, 1990	New York Stock Exchange, Inc.
12 3/4% Notes Due 1990	
12 3/4% Notes Due 1990	
6 3/4% Convertible Subordinate Debentures Due 1996	
10 3/4% Notes Due 1997	
11 3/4% Sinking Fund Debentures Due 2008	
5% Guaranteed Sinking Fund Debentures Due 1986 [issued by W. R. Grace Overseas Development Corporation]	

Securities registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

The aggregate market value of W. R. Grace & Co. voting stock held by nonaffiliates was approximately \$2.2 billion at January 15, 1986.

At March 7, 1986, 41,823,335 shares of W. R. Grace & Co. Common Stock, \$1 par value, were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

<u>Document</u>	<u>Where Incorporated</u>
1985 Annual Report to Shareholders (specified portions)	Parts I and II
Proxy Statement for Annual Meeting to be held May 9, 1986	Part III

PART I

Item 1. *Business.*

Introduction

W. R. Grace & Co. is primarily engaged in the chemical business on a worldwide basis, as well as in natural resource activities related to energy and in consumer and other businesses. Grace's chemical operations involve the production and sale of specialty chemicals and, to a lesser extent, agricultural chemicals. In natural resources, Grace engages in the exploration for and development and production of oil and natural gas and the production of coal and supplies services and equipment to the petroleum industry. Grace's consumer activities consist of the operation of restaurants and retail stores. Grace is also engaged in processing cocoa and chocolate, book distribution, manufacturing specialty fabrics and cattle breeding services. Grace has approximately 94,000 full-time employees worldwide.

W. R. Grace & Co., incorporated in Connecticut in 1899, conducts substantially all its foreign activities, and some United States activities, through subsidiaries. As used in this Report, the term "Company" refers to W. R. Grace & Co., and the term "Grace" refers to W. R. Grace & Co. and/or one or more of its subsidiaries. Grace's principal executive offices are located at Grace Plaza, 1114 Avenue of the Americas, New York, New York 10036-7794, and its telephone number is 212/819-5500.

This Report on Form 10-K is accompanied by Grace's 1985 Annual Report to Shareholders. Where this Report refers to information in the accompanying Annual Report, such information is incorporated by reference herein.

Recent Developments

Purchase of Shares and Financing Thereof. On January 2, 1986, the Company purchased 13.6 million shares of its Common Stock and shares of its preferred stocks (collectively, the "Shares") previously owned by Friedrich Flick Industrierwaltung KGaA, a West German company, for a purchase price of \$598.1 million; this purchase price was equal to the market prices of the Shares on December 5, 1985 plus certain transfer taxes. The funds used to purchase the Shares were raised with proceeds of \$119.8 million from a December 1985 offering of 2.6 million shares of Common Stock and with \$478.3 million of bank borrowings which were subsequently repaid with commercial paper borrowings. To effect such bank borrowings, the Company obtained additional lending commitments from certain of its revolving credit banks.

To permanently finance the purchase of the Shares, the Company issued \$250 million of 7% convertible subordinate debentures in the Eurodollar market in February 1986 and is considering additional debt and stock financings. Further, management decided to sell Grace's Retail Group (see "Sale of Herman's" and "Industry Segments—Retailing" below) and is also considering other divestments and restructuring alternatives.

Prior to the purchase of the Shares, the Company obtained from certain of its revolving credit banks and institutional lenders waivers of loan covenants which would otherwise have been violated by the purchase of the Shares or the related borrowings. These waivers expire on March 31, 1986. The Company believes that further waivers will not be required, and that it will be in compliance with these covenants, principally by reason of the classification of Grace's net investment in the Retail Group as a current asset, the Common Stock and debenture offerings referred to above and the temporary refinancing of certain long-term borrowings with short-term borrowings.

Further information regarding these developments and related matters is provided in Notes 1 and 14 to Grace's Consolidated Financial Statements and Management's Discussion and Analysis in the accompanying Annual Report and in "Sale of Herman's" and "Acquisitions, Divestments and Restructurings" below.

Sale of Herman's. On March 19, 1986, the Company and Herman's Sporting Goods, Inc. ("Herman's"), a publicly held subsidiary included in Grace's Retail Group, entered into agreements pursuant to which The Dee Corporation PLC ("Dee"), a United Kingdom company, would acquire all of Herman's outstanding capital stock (including 6,440,000 common and common equivalent shares owned by the Company) for \$35.25 per share, in cash. The acquisition is being made initially through a tender offer that commenced on March 21, 1986, to be followed by a merger; the Company has agreed to tender its Herman's shares in the tender offer.

The Company expects to report an after-tax gain of approximately \$110 million from the sale of its Herman's shares to Dee and to use the proceeds from such sale to partially repay the borrowings incurred to finance the purchase of the Shares. In addition, a portion of the proceeds may be used to make open market purchases of up to 2.4 million shares of the Company's Common Stock. It is anticipated that the sale of the Company's Herman's shares to Dee will be completed in April 1986. However, the sale is subject to a number of conditions, including approval by Dee's shareholders; consequently, no assurance can be given with respect thereto.

Industry Segments

Information concerning the sales, pretax operating profit and identifiable assets of Grace's industry and geographic segments for 1983, 1984 and 1985 is contained in Note 16 to Grace's Consolidated Financial Statements (see the Index to Financial Statements and Schedules on page F-1).

Certain of Grace's businesses are seasonal in nature. See the "Quarterly Summary" on page 40 of the accompanying Annual Report.

SPECIALTY CHEMICALS

Grace's specialty chemical operations consist of the manufacture and sale of approximately 90 separate product lines in seven broad market groups. The following table shows these market groups and the principal products Grace manufactures and sells in each.

<u>Market Group</u>	<u>Principal Products</u>
Packaging	Plastic packaging products, foam trays and related application equipment; can and other closure sealing compounds and equipment; metal working lubricants
Energy and Automotive	Petroleum cracking catalysts; adsorbent molecular sieves; flotation and buoyancy modules for deep-sea drilling; emission control catalysts; battery separators; sound deadening and corrosion control materials; specialty adhesives and coatings
Construction	Concrete admixtures; fireproofing and insulating materials; specialty sealants; roofing and waterproofing materials; horticultural products
General Industry	Industrial catalysts; adsorbents and dehydrating, flattening and thickening agents; industrial cleaning compounds; paper industry chemicals; tape backings; water and waste treatment and pollution control chemicals
New Technologies	Coatings for printed circuit board fabrication; conductive and dielectric polymers; specialty electronic ceramic packages; adhesives for semiconductor circuit packaging; microwave absorbers and electromagnetic interference shielding; laboratory and commercial-scale ultra-filtration membranes and equipment; chromatographic systems; membrane equipment for medical applications; technical industrial ceramics, anti-ballistic composites and other molded parts
Graphic Arts	Letterflex and Newsflex processes for making plastic printing plates using photosensitive polymers and related equipment; specialty drying equipment and printing blankets
Chemical Intermediates	Hydrogen cyanide derivatives; emulsion polymers; dispersing agents; pharmaceutical and herbicidal intermediates; organic sulfur compounds

In addition, in the New Technologies market group, a plant to manufacture nitroparaffins began intermittent operations in 1985, and production is expected to begin in the second quarter of 1986. See "Acquisitions, Divestments and Restructurings" below for information concerning a 1985 acquisition in the New Technologies market group and "Specialty Chemicals—Sales by End Market" on page 30 of the accompanying Annual Report for information concerning the sales of each of the above market groups.

Grace's specialty chemical products typically represent a relatively small portion of the cost of the end products in which they are used. Accordingly, competition is based primarily on technological capability, customer service and product quality.

Specialty chemical products are produced in approximately 140 plants worldwide (a majority of which are located in the United States) and are sold primarily through direct sales organizations.

Most of the raw materials used in the manufacture of Grace's specialty chemical products are available from multiple suppliers (see "Materials and Energy" below). In addition, Grace supplies certain of its own raw materials, including vermiculite from Grace mining operations in Montana and South Carolina which provide its vermiculite requirements for construction and other products. These operations yielded approximately 253,000 tons of vermiculite concentrate in 1985, and Grace estimates that its proved vermiculite reserves (excluding those currently without mining facilities) are sufficient to sustain production at this rate for at least 40 years (see Note 15 to Grace's Consolidated Financial Statements). Consequently, Grace does not presently anticipate the need to construct additional vermiculite mining facilities. Various governmental agencies have expressed concern regarding the levels of naturally occurring tremolite asbestos contamination associated with the mining and processing of vermiculite. However, Grace is in compliance with current tremolite asbestos exposure standards and believes that the implementation of proposed stricter federal exposure standards would not adversely affect its vermiculite business. Vermiculite and products using vermiculite account for less than 5% of Grace's specialty chemical sales.

See Item 3, "Legal Proceedings," for information concerning asbestos litigation to which Grace is a party.

AGRICULTURAL CHEMICALS

Grace produces and markets ammonia, phosphate rock and fertilizers, as well as livestock feed and feed supplements (see "Agricultural Chemicals—Sales by End Market" on page 31 of the accompanying Annual Report). Fertilizer products include diammonium and other phosphates, anhydrous ammonia, urea, nitrogen solutions, ammonium nitrate and a variety of granular mixed, blended and fluid fertilizers sold for direct application or for use in the production of compound fertilizers. Grace's agricultural chemical products are primarily sold in the United States; however, its phosphate rock and nitrogen and phosphate fertilizers are also marketed abroad. Grace also has a 51% interest in a partnership with Cetus Corporation to develop, manufacture and market biotechnology-based products for agricultural use.

Grace produces ammonia and other fertilizers in 20 facilities in the United States and Puerto Rico, two in Trinidad (one of which is 49%-owned) and one in Jamaica. The following table shows the estimated 1985 annual production capacities of Grace's agricultural chemical plants and actual 1985 production (including Grace's share of partnership and other partly owned plants). Production was limited in 1985, primarily due to continuing worldwide oversupplies.

Location	Product	Estimated Annual Production Capacity (a)	1985 Production
United States	Ammonia	621,000 tons	490,338 tons(b)
	Urea	400,000 tons	322,117 tons
	Mixed/blended/fluid fertilizers	1,280,000 tons	603,555 tons
	Converted phosphates	1,900,000 tons	1,226,254 tons
	Phosphoric acid 100% P ₂ O ₅	752,000 tons	559,716 tons
	Nitrogen solutions	330,000 tons	242,441 tons
	Ammonium nitrate	120,000 tons	100,094 tons
Puerto Rico	Mixed/blended fertilizers	135,000 tons	57,580 tons
Trinidad	Ammonia (c)	663,000 tons	593,317 tons
Jamaica	Mixed/blended fertilizers	50,000 tons	29,980 tons

(a) Notes on following page

PB 258 869

OCCUPATIONAL EXPOSURE TO FIBROUS GLASS

A SYMPOSIUM

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE / Public Health Service
Center for Disease Control / National Institute for Occupational Safety and Health

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demonstrate no adverse health effects in terms of chronic bronchitis or pulmonary fibrosis.

Gross et al. [1971] reported autopsy examinations on 20 fibrous glass workers whose exposure history ranged from 16 to 32 years. The autopsies failed to show evidence of fibrotic disease attributable to such exposure. In contrast to this experience, populations exposed to other dusts causing disease, for example, free crystalline silica or asbestos, show discernable evidences of pulmonary abnormalities well within 10 to 20 years. One would expect, that if fibrous glass is a potent cause of chronic bronchitis or pulmonary fibrosis, some evidence of an excess of these abnormalities should be observable by now.

No study thus far referred to has been designed to investigate the full post-employment period and the possible carcinogenic effect of the exposure experienced by workers in fibrous glass manufacturing. A study of the mortality pattern of employees of the oldest USA glass wool plant has been carried out by NIOSH and will be reported at this symposium. A preliminary report of this study by Wagoner [1974] indicated that no excess of malignancy of any kind was observed. The only category of disease showing a possibly significant excess was in "other respiratory diseases of a non-malignant nature exclusive of influenza and pneumonia." Of the 17 cases in this category, the majority were said to be emphysema or cor pulmonale. Only 5 of the 17 had any mention of fibrosis on the death certificate. In none of these could the likelihood of exposure to free crystalline silica or coal dust be excluded. The importance here is the absence of an excess of bronchogenic or GI cancer or mesothelioma.

It is clear that the health experience of those exposed for long periods of time to airborne fibers in the manufacturing of glass wool for insulation or other purposes is not in the same category as those employees exposed to another fibrous material, namely, asbestos. There are several possible explanations for this difference of human experience.

There is evidence that fibrous glass introduced directly into the lungs of experimental animals does not evoke the same severity of inflammatory and fibrogenic response characteristic of asbestos fibers even though comparable amounts of the same sizes of fiber are used. [Kuschner, 1974 and Gross, 1974] The reason for this is not clear but may be related to the fact that glass is amorphous while asbestos is crystalline. They are of different chemical composition even though both are silicates. Hence, their surfaces might behave differently when in contact with living cells.

Measurements of the concentration of respirable size fiber in the work-place where glass insulation is made or used, demonstrates the level is far lower for glass than for asbestos which has been produced or used. In the period of exposure responsible for the disease now occurring, asbestos fibers of comparable respirable sizes were 10 or more times as numerous as glass fibers. [Johnson et al, 1969] The lung residue of employees manufacturing fibrous glass shows many times fewer fibers per gram of lung tissue than is observed in the lung residue of persons occupationally exposed to asbestos. [Gross et al 1971 and 1974] This may be due to the lower concentration of respirable fibers in the fibrous glass

gram-of-dry tissue basis was somewhat higher in fiber glass workers than in the control population. However, the average mineral fiber content (optically visible as well as E-M size) of the satellite lymph nodes was larger in the control group than in the fiber glass group.

In addition to this data, study of the mineral sediment remaining after digestion of the lung tissue showed that some fibers had irregular contours [Gross et al, 1970a] and some fibers were apparently derived from diatom fragments. [Gross et al, 1971b] Other work had suggested that many fibers may be phytoliths, derived from the ashes or smoke of burning plant products such as leaves, paper, wood, or coal. [Gross et al, 1971b]

Comments

It should be immediately apparent that the identity of the fibers counted and measured is unknown. Some of them are doubtlessly glass. Some may be of other vitreous material such as rock wool and more than a few may be asbestos fibers, inclusive of tremolite from cosmetic talc. Some of the E-M size fibers may also be diatom fragments. It is probable that a large proportion of the fibers are derived from the skeletons of plants (phytoliths). These have been demonstrated in the ashes of paper and wood. [Gross et al, 1971b]

In view of the fact that the dimensions of the fibers isolated from the lungs of the two population groups and the distribution of the dimensions are so similar, one is tempted to conclude that the bulk of the fibers in the two groups are therefore probably composed of the same material and derived from the same basic source. This conclusion could be flawed by the fact that the lung is an excellent size-selector and therefore, although the size range of the fibers is similar, they may be composed of different materials. An indication of this is seen in the wide variety and irregularity of shape of the fibers seen in the sediment of lung digestion. [Gross et al, 1970a]

Two conclusions seem inescapable, and these are: Whatever the composition of the fibers in the lungs of the fiber glass workers, their presence evoked no recognizable tissue response. A tissue response may have been present; but if it was present, it was so mild as to be unrecognizable. Fiber glass workers, exposed to fiber glass dust for 16 to 32 years, harbor fibers in their lungs similar to findings in the lungs of the control population with regard to quantity and dimensions.

It is interesting to consider that the quantity of mineral fibers found in the lungs from Pittsburgh, most of which were women, represents a "background" quantity, an amount that is (or has been) inherent in urban living and that has produced no discernable tissue reaction. Since fiber glass workers have no more than this "background" quantity of mineral fibers in their lungs even after 16 to 32 years of exposure to the dust of glass fibers, it would seem that either the fiber glass dust to which the workers had been exposed was not respirable or, as seems more likely, if it was respirable and had been deposited in the lungs, it was promptly removed by the pulmonary clearance mechanism, leaving only a "background" quantity of fibers.

The data obtained from studies of the lungs of long-term fiber glass workers are in agreement with the conclusions derived from previous animal experiments [Gross et al, 1970b] that: Fiber glass dust inhaled and deposited in the lungs causes no harmful tissue reaction. Fiber glass dust deposited in the lungs is readily removed from the lung tissue by the pulmonary clearance mechanism.

Pathological examination of the lungs of long-term fiber glass workers as well as determinations of the pulmonary mineral fiber content disclosed that no discernable tissue reaction to fiber glass dust was present and that the average quantity and dimensions of the mineral fibers in the lungs of fiber glass workers were very similar to those of the mineral fibers in the lungs of a control population. Two conclusions are drawn:

Fiber glass dust, inhaled and deposited in the lungs, causes no harmful tissue reaction.

Fiber glass dust, deposited in the lungs, is readily removed from the lung tissue by the pulmonary clearance mechanism.

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EXPOSURE

The Monthly Journal of The Waste and Toxic Substances Project
Environmental Action Foundation, Washington, D.C.

HAZARDOUS BEDFELLOWS: The VERMICULITE- ASBESTOS CONNECTION

Since 1971, government and industry have known that virtually all vermiculite produced in this country is contaminated with asbestos.

Why don't the 4 million people who live in homes insulated with vermiculite know this? *See page 5*

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Just When You Thought It Was Safe To:

- Insulate Your Attic
- Repot Your Plants
- Change Your Kitty Litter

result from lawn treatment and gardening, respectively." The report goes on to estimate that 188,000 people a year are exposed to levels of asbestos as high as 10,000 $\mu\text{g}/\text{m}^3$ during the installation of vermiculite attic insulation. 421,000 people live in homes insulated with vermiculite.

Additionally, there are at least 3,000 owners of hobby greenhouses whose exposure to vermiculite should be comparable to that of a greenhouse employer occupationally exposed. Anyone repotting their houseplants with potting soil containing vermiculite would be exposed to a small amount of asbestos fiber, as would people who handle kitty litter, barbecue base, or who put up their own drywall, plaster, etc.

The consumer has no idea what's being handled. None of these products, from attic insulation to kitty litter is labeled CPSC apparently not being sure how to proceed. After the strong stand taken in respect to artificial embers and sparkplug compound, i.e., no safe exposure level, this reaction is incomprehensible.

The EPA has done extensive research into the problems associated with asbestos contamination of vermiculite, compiling a wealth of information on the subject. As yet they've done nothing with it, issuing no regulations or warnings. It appears that since a safe lower limit for asbestos exposure cannot be found, the problem is being covered up. How else can one explain that at least three government agencies have been studying a known toxic substance, occurring in the marketplace, for at least five years, and not doing so much as require that it be labeled? Another EPA report, also obtained through FOIA, frames the problem.

"Although the quantities of asbestos released during end-use of vermiculite are small in comparison to the mine and workplace, the aggregate risk to the consumer of product end user may be large in

Whistleblower Blues

"An independent group has found that my constitutional right to freedom of speech has been violated and that top officials in the EPA conspired to discredit me and tried to stop me from informing the public and Congress about the failure of these officials to protect the public

"EPA has a wealth of information on the asbestos contamination of vermiculite, but has done nothing with it, issuing no regulations or warnings."

view of the large number of people exposed. Moreover, users may be particularly vulnerable and unprotected due to ignorance of the potential hazard."

Using vermiculite in an enclosed area, such as an attic, greatly increases the exposure level to asbestos fibers in the air. Or a garage. Or a basement. The point is clear, workers and consumers are being exposed to a known hazard without

the information to handle it safely, or to avoid it altogether. As the EPA report points out, "There are adequate substitutes for most of the uses of vermiculite. If vermiculite were not available, perlite, cellular concrete and fiberglass would be the most common substitutes."

There the matter now stands. The tragic consequences of asbestos exposure are well established. Vermiculite is a known carrier of

asbestos fibers. These microscopic fibers are released into the atmosphere from the time vermiculite is mined through its end use as a consumer product. Yet only the mining and processing of vermiculite have come under any kind of regulation. Upon leaving the processing plant, vermiculite is unregulated, and those handling it are exposed to a toxic substance with no warning as to its presence.

Our thanks to Dr. Arthur Kohn, of the Environmental Sciences Laboratory at Mount Sinai School of Medicine in New York, for providing us with critical data and recent studies on the asbestos contamination of vermiculite.

What and Where is Vermiculite?

Vermiculite is a naturally occurring mineral of the mica family. It occurs in thin flakes packed together in plate-like layers. Tiny droplets of water are trapped between the layers, providing the mechanism by which vermiculite achieves its versatility. Heating vermiculite to between 1,000-2,000 degrees Fahrenheit causes the droplets to evaporate, allowing the mica to expand into small, lightweight, low-density pieces. Pure vermiculite can expand up to thirty times its original volume. Expanded vermiculite is known as exfoliated and the heating process as exfoliation.

The majority of vermiculite's uses fall into three general categories:

lightweight aggregates used in construction, agricultural and horticultural products, and insulation. The building industry uses vermiculite in concrete, plaster, wallboard, and similar material. Vermiculite concrete weighs much less than regular sand-based concrete and has excellent insulating properties. One inch of vermiculite concrete has the same insulating capacity as twenty inches of regular concrete. Mixed into plaster or wallboard, vermiculite adds sound deadening and fire resistant properties.

As insulation, vermiculite is poured loose between attic joists and into hollow cement block. It's also used as a packaging agent to prevent break-

age during shipping.

Because of its large surface area and ability to absorb water and gas, vermiculite is used extensively in agriculture and horticulture. Though most familiar as a soil conditioning agent for house plants and in greenhouses, vermiculite is also used as a plant growing medium, chemical fertilizer carrier, packing material for nursery stock, and carrier and extender for pesticides and herbicides.

Vermiculite's other "minor" uses include use as a filler in paints, plastics and rubber, in kitty litter, and in barbecue base to retain and reflect heat.

Payday for Environmentalists

With every passing public opinion poll environmentalists are getting their much deserved payout for years and years of rallies, teach-ins, press releases, conferences, broadsheets, day-in-day-out meetings, etc. etc.

A recent poll, conducted for the Continental Group Inc., of Stamford, Conn., a major energy, forest products and packaging company is significant because, unlike other polls, it required participants to weigh their support for environmental protection against such possible alternatives as slower eco-

Based on interviews with 1,310 people selected to mirror the national population, plus 263 corporate executives and 343 members of environmental groups, the survey found:

- 55 percent of those interviewed favor maintaining present air pollution standards "even if some factories close as a result."
- 50 percent favor keeping current environmental regulations "even if it slows the production of more energy."
- 60 percent favor giving priority to environmental cleanup "even if companies have to charge more for

interviewed, 59 percent from small companies and 51 percent from "Fortune 500" companies said there should be emphasis on cleaning up the environment, even if that required them to raise their prices for goods and services.

The above findings reinforce earlier polls by Louis Harris Associates, which found 83 percent of Americans favor keeping the Clean Air Act intact or stiffening it, in the face of administration proposals to relax standards.

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The Vermiculite Asbestos Connection

By Dave Pontzer with Alice Cave

It's a thoroughly modern product for the lifestyle we've grown accustomed to. Vermiculite is light-weight and non-combustible. It's free-flowing and insoluble, chemically inert, resilient and non-abrasive.

This impressive array of attributes enables vermiculite to insulate, fireproof, extend, lighten, and aerate products ranging from potting soil to concrete, plaster board to kitty litter.

In our training consumer role we've scattered free-flowing vermiculite about our attic, and we've spread vermiculite-loaded fertilizer onto our lawn. Unfortunately, in our all too frequent *winter* consumer role, we've handled vermiculite without knowing that it's contaminated with asbestos, a proven carcinogen.

Contamination Revealed

The vermiculite-asbestos connection went public in 1971. That's when W.R. Grace and Co., the largest domestic supplier of vermiculite, revealed the results of tests confirming asbestos contamination in the ore mined at their Libby, Montana site, producer of 80% of the nation's vermiculite ore.

In 1976, both the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration got involved when workers in the vermiculite industry came under regulatory protection from asbestos dust. Prior to this involvement vermiculite workers were exposed to asbestos dust concentrations as high as 245 fibers per cubic centimeter (f/cc). The new OSHA standard of 2 f/cc is even recognized as too high.

In 1979 the Consumer Product Safety Commission (CPSC) acknowledged the contamination problem when they ordered a general study of the use of asbestos in consumer products and included "potting material" (vermiculite) among the products to be tested. However, the scope of the study was later narrowed to include only products in which asbestos is intentionally added.

Dave Pontzer, a recent graduate of Georgetown University, just completed an internship with the WATS Project. Alice Cave is a researcher with an environmental consulting firm.

"In 1971, the producer of 80% of the nation's vermiculite announced that virtually all of their ore was contaminated with asbestos."

EPA Releases Documents

Through Freedom of Information requests Environmental Action Foundation has been able to examine EPA documents on asbestos contamination of vermiculite. These reports date back to 1977.

Although vermiculite has been mined in the United States since 1929, no studies on the health effects of exposure to the mineral have been located. The effects of exposure to asbestos, on the other hand, is well documented.

By 1918 there was enough evidence on asbestos hazards to cause American and Canadian insurance companies to stop selling life insurance to asbestos workers. The cancer-causing potential of asbestos was suspected as early as the 1930's, although the first standard for occupational exposure to asbestos wasn't set until 1971 by OSHA.

Regulatory Options

OSHA, under their broad mandate to provide a safe environment for workers, has two regulatory options with regards to vermiculite. The first is an exposure standard and the second a labeling requirement. Theoretically, OSHA's current exposure standards protect workers even after the vermiculite has left the processing plant. But as an EPA report notes, "Realistically, however, it is difficult to imagine the standard being enforced at many of these later sites. For example, it is doubtful that employers at greenhouses where vermiculite is used as a soil conditioner run their businesses with the asbestos standard in mind. Few employers besides those involved in the initial stages of vermiculite processing know that vermiculite is often contaminated with asbestos." This is the case with many other

"32 of the 221 vermiculite workers tested had lung disorders normally associated with asbestos exposure."

One of the first reported incidences of asbestos-like health problems appearing among vermiculite workers was in 1978 by O.M. Scott and Sons Co., a manufacturer of agricultural chemicals. Workers at their Maryland fertilizer plant developed lung disorders normally associated with asbestos exposure. Of 221 tested, 32 had disorders ranging from fibers in the lungs to bloody pleural effusions, with symptoms ranging from coughing, fatigue and chest pain to hypertension.

The crucial point is that research on asbestos-caused cancer in laboratory animals has shown that there is no threshold level below which exposure causes no effect. Therefore, since no safe levels for atmospheric concentrations of asbestos exist, any exposure will produce a percentage of cancers in those exposed.

industries using vermiculite as well, including construction workers, drywall installers, brick and stone masons, plasterers, insulation workers, and anyone involved in commercial agriculture.

Why are employers and employees largely unaware of vermiculite's contamination with asbestos? OSHA's labeling regulations for asbestos, "... all asbestos-containing raw materials, mixtures, containers, ... covers vermiculite, but the regulation is self-service. Compliance is voluntary as long as ... a manufacturer believes that the use (handling, storage, etc.) of a product will not create fiber levels above the OSHA standard." Even this is ultimately a moot point, since OSHA stated in April of 1980 that this exposure standard is insufficient to protect workers' health.

Vermiculite next finds its way into the home, where it is "regulated" by CPSC. The Federal Hazardous Substances Act gives CPSC the mandate to regulate hazards presented by the presence or use of toxic and other hazardous substances in the home. Like OSHA, they have the authority to ban, regulate, or require labels on products.

CPSC has already exercised this authority with respect to asbestos banning two consumer products containing asbestos fiber, artificial embers and spackling compound. Neither is associated with the vermiculite industry. At that time CPSC went so far as to say that there is no safe level of exposure to asbestos in consumer products, and that, "only banning these products can adequately protect the public from unreasonable risks of injury associated with them." As was mentioned earlier, CPSC began a study of asbestos in consumer products over three years ago, excluding products like vermiculite which contained asbestos as a contaminant. To date, nothing has been reported.

CPSC also has the authority to require content labeling of products. In view of EPA reports concerning the significant levels of consumer exposure to vermiculite, this action, at the very least, should have been taken some years ago. A study prepared for EPA by an independent Virginia-based consulting firm makes this quite clear. The report states that, "Over 74 million persons use lawn and garden fertilizers each year. If the fertilizer is vermiculite-based, estimated exposure levels to asbestos of 4.4 $\mu\text{g}/\text{m}^3$ and 25 $\mu\text{g}/\text{m}^3$ could

This weight method of measuring asbestos exposure (i.e., milligrams per cubic meter) contrasts with the earlier *volume* method (fibers per cubic centimeter) in the same way that a pound of eggs contrasts with a dozen eggs. Unfortunately, the Virginia study we refer to only used this weight method, and it's virtually impossible for us to correlate the two different systems with the information we have on hand. Further, OSHA only uses the volume method in its asbestos standard. Suffice to say, however, that as the general "rule of thumb" regarding asbestos, there is no safe exposure level, indicates these latter figures using the weight method are all to be considered extremely hazardous.

standardized reference method has not been developed to quantitatively determine the content of asbestos in a material, there are acceptable methods available, based on electron microscopy, which independent laboratories have developed. Determining the asbestos content of a material with these methods costs approximately \$300, and the results are accurate within plus or minus 50 percent; these limits on accuracy were taken into account in establishing the 1-percent limitation.

The proposed standard would have prohibited the surfacing of any roadway with asbestos tailings. The promulgated standard applies to all roadways except those on ore deposits; these roadways are temporary, and control measures taken to comply with the Bureau of Mines regulations prevent them from being a major source which must be covered by the standard promulgated herein. At this time, the application of asbestos tailings to public roadways is not widely practiced, but because of the close proximity of roads to the public, a ban on using asbestos tailings on roadways is included in the promulgated standard to avoid a future problem and stop the practice where it is followed. The term "surfacing" is defined to include the deposit of asbestos tailings on roadways covered with snow or ice; therefore, this practice is prohibited.

Consideration was given to including provisions in the standard requiring proper disposal of the asbestos material generated during demolition and collected in control devices used to comply with the requirements of this standard. It was decided that this was not necessary because the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) include house-keeping and waste disposal requirements. These regulations require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers.

The potential environmental impact of the promulgated standard was evaluated, and it was concluded that the standard will not cause any adverse effects. The potentially adverse environmental effects of the standard are:

(1) The asbestos-materials which will be collected in control devices and generated during demolition will have to be disposed of or recycled.

(2) Materials, such as mineral wool, ceramic wool, and fiberglass, will be substituted for asbestos presently contained in spray-applied fireproofing and insulating materials.

In some manufacturing operations, a major portion of the asbestos-material collected by fabric filters is either recycled to the process or is marketed for other uses. For example, one asbestos textile mill recycles large quantities of longer-fiber asbestos for process use and sells more than 90 percent of the remaining collected materials to a brake lining manufacturer. Consequently, a significant portion of the increased quantities of "waste" asbestos materials which will result from the implementation of the

standard will not require disposal. Where disposal is required, the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. The contamination of ground water supplies with asbestos from landfill disposal is not considered a potential problem.

The substitution of ceramic wool, mineral wool, and fiberglass for asbestos is not now known to be a problem. There is no evidence that these materials cause health effects in the concentrations found in occupational or ambient environments.

Although the standard was not based on economic considerations, EPA is aware of the impact (55) and considers it to be reasonable. Costs among the various sources covered by the standard are quite variable. Although the standard may adversely affect some individual plants or companies which are marginal operations, it appears that such effects will be minimal and the impact to the asbestos industries as a whole will not be large.

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March 28, 1988

RETURN RECEIPT REQUESTED
CERTIFIED

Mr. Bill Grimes
Dallas County Commissioner Court
411 Elm St.
Dallas, TX 75201

RE: Dallas County Criminal Court Project.

Dear Mr. Grimes:

We are the manufacturers of SprayDon, a mineral fibre based fireproofing used to fire protect structural steel.

SprayDon has been used over the past 11 years on thousands of projects both in the Government, public, and in the private sector.

Some of our contractor customers have notified us that they were told by a Mr. Pidgeon, the job architect on the above referenced project, that he was not going to accept any material other than Monokote, a proprietary, competitive material.

Since this is a publicly funded project we question whether the restriction to a single product is permissible.

Our product has all the necessary UL required fire tests. It is accepted and listed by the three major governing code bodies in the United States. In short, we meet all the required specifications for this project.

We don't mind losing a project in a fair competitive manner. Competition is the backbone of our American System.

We do however strongly object to being ruled out of even bidding on a project that has been funded by tax dollars.

We respectfully request that you provide us with the reason as to why our product cannot be bid on this job.

15192847

I have enclosed brochures and technical data on our SprayDon product along with a signed statement and Corporate Seal that our product is asbestos free.

I have also enclosed a copy from the Charlottesville Observer regarding a publicly funded project where only one product was accepted.

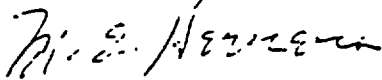
Thank you for your prompt attention to this matter.

If you desire additional information on our product, or if you feel our information regarding the above is not correct, we would be most happy to discuss it.

Awaiting your early reply.

Sincerely yours,

AMERICAN ENERGY PRODUCTS CORPORATION



M. E. Herrera
President

MEH/rw

encl: Sweets Brochures, Technical Manual for Architects (1),
and Asbestos Free letter.

cc: Mr. Don Olson
Assistant Project Architect
Henningson, Durham & Richardson
12700 Hillcrest Rd., No. 125
Dallas, TX 75230 (encl).

cc: Mr. Pidgeon
Job Architect
Henningson, Durham & Richardson
Box 15547, N.E. Station
Austin, TX 78761 (encl).

cc: Mr. Don Mills
Project Engineer
Clearwater Construction Co.
Box 15547, N.E. Station
Austin, TX 78761 (encl).

cc: Mr. Randy Barr
Project Manager
Box 15547, N.E. Station
Austin, TX 78761 (encl).

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RE: Federal Building
Miami, Florida
Job #87-116, Bldg. #FL-006122
Contract #GS 04P-86-EX-C0002

We have been informed that our product SPRAYDON has been rejected on the above referenced job because it is a rockwool mineral fiber based product. This rejection was said to be based on a report by the World Health Organization International Agency for Research on Cancer (IARC), which classifies man made mineral fibers as "Possibly carcinogenic to humans".

To exclude mineral fiber fireproofing on the basis of the above is contrary to GSA Specifications. GSA Specification AIA/SC/GSA: 07256 (3/84) lists two types of fireproofing materials under Part 2 Products. 2.01 A. Sprayed-On Mineral Fiber Fireproofing and 2.01 B. Sprayed-On Cementitious Aggregate Fireproofing.

We do not believe that any individual or group of individuals on a publicly funded project can arbitrarily refuse to accept a product which meets the requirements of the specifications of the pertinent government agency i.e. GSA project, GSA Specifications, and especially since the UL Designs listed in the specification is for a mineral fiber product. We strongly object to the reason given for the rejection and feel it is arbitrary.

The World Health Organization study on fiberglass showed an increase of lung cancer on mice, but only to those mice whose immune system was bypassed, and the fibers were mechanically implanted in the lungs of mice. Mice which were exposed to high fiber levels of airborne fibers showed no difference to lung cancer than those that were not exposed.

We also must point out that "Possibly Carcinogenic" is nebulous. Both NTP and OSHA regard man made mineral fibers as only a 'nuisance dust', not as a carcinogen.

On the other hand asbestos is a "known carcinogen", and we have been informed that the representative for the job architect, Mr. Jeff Savin has accepted 2 products by the same manufacturer. One of the products knowingly contains asbestos contaminated vermiculite

15192849

General Building
Miami, Florida
Job #87-116, Bldg. #FL-006122
Contract #GS 04P-86-EX-C0002

PAGE 2

The other product is not contaminated with asbestos however, their MSDS information on the product shows that it contains "Fiberglass", the ingredient that supposedly is of concern because of the WHO Report.

Please be advised that we are prepared to appeal this arbitrary decision to GSA Headquarters Office in Washington, DC, The Small Business Administration (SBA), and the Attorney Generals Office in Washington, DC.

Please inform us of your decision, or if you require additional information on this as soon as possible, so that we will know how to proceed.

Sincerely yours,

AMERICAN ENERGY PRODUCTS CORPORATION

M. E. Herrera / rw

M. E. Herrera
President

MEH/rw

encls: Hazardous Bedfellows: The Vermiculite Asbestos Connection,
W.R. Grace 10K Report, and ASBESTOS-Exploring the Options.

cc: Rubin Turner
Attorney at Law
Turner, Gerstenfeld, Wilk & Tigerman

cc: Phil Kaplan
Kaplan Insulation

Distribution: Jeff Savin
Office of Public Building & Real Property
Design Construction Division

Chris Hayward
Danville-Findorff

Jose Fieto
Fraga & Fieto Architects

Peter Gordo
Fraga & Fieto Architects

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