INTERNAL CORRESPONDENCE

PLAINTIFF'S EXHIBIT UC-1027

MINING AND METALS DIVISION

P. O BOX 579, NIAGARA FALLS, NEW YORK 14302

To (Name) Mr. J. W. Rawlings
Division Mining & Metals Division
Location Union Carbide Corporation
270 Park Avenue
New York, New York 10017

Date September 24, 1971

Originating Dept. Research and Development Department

Answering letter date CALIDRIA Asbestos
9/10/71

Subject "Information Package on Asbestos Safety and Control"

Copy to Messrs. E. Epremian
R. J. Klotzback
P. W. McDaniel
P. T. Morgan
J. L. Myers
H. B. Rhodes
R. E. Byrne/G. L. Dickson

Dear Mr. Rawlings:

Per your request, attached is the draft of my assigned portion of the above subject. Excerpts of Reference are appended.

Very truly yours,

B. L. Ingalls

B. L. Ingalls

BLI/bsn
Attach.

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C. ASBESTOS USERS

1. Procedures for Handling Asbestos

(a) Unloading, Storing, and Moving Asbestos

CALIDRIA asbestos products are available as a dry highly liberated fiber or in a more densified and low dust form of pellets or cracked pellets.* The pellets are cylindrical, approximately 1/4" dia. by 1/2" long. Cracked pellets have been reduced to a minus 3 mesh.

CALIDRIA asbestos is packaged in 10 to 100-lb. quantities depending upon the bulk density of the product used. All bags are of a minimum 3-ply kraft paper construction. Resin Grade products RG-144 and RG-244 have the added protection of a sealed polyethylene overwrap. A 3-ply non-wet strength bleached kraft "beater bag" with water soluble glue-pasted valve and water dispersible ink is also available. Pallets of bagged product are made up of interlocking layers of bags with glue applied between layers to minimize load shifting. Wood pallets are used for transportation and storage convenience. Full pallets can be covered with shrink film or waxed cardboard shrouds.

CALIDRIA pellets are particularly suitable for bulk shipping and automatic in-plant handling. Most conventional feeding and conveying equipment are applicable with pelletized product. Pellets can be transferred from pneumatic hopper car to process in a dustless sealed system under automatic control. Five manufacturers of pneumatic conveying equipment have tested and certified CALIDRIA asbestos pellets for use with their systems.

Carter-Day Co.
Spencer Turbine Co.
Daffin Co.
Schick Tube-Veyor Co.
Sprout-Waldron Co.

(b) Unpacking, Mixing, and Blending

Any generation of dust during the above operations should be controlled in compliance with the recommended TLV by exhaust ventilation and/or the use of respiratory protective devices.

(Dry Opened Asbestos)

Discharging asbestos from the bag by dumping should be performed under an exhaust hood or in an area with appropriate ventilation and filtration systems. The opened asbestos may also be removed and transferred to blending or mixing equipment by a vacuum exhaust system. In some applications, beater bags may be charged directly to blending equipment without opening of the bags.

*RG-244 available in open liberated form only.

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(Pelletized Asbestos)

Storing and feeding pellets are simplified by their free-flowing, non-abrasive nature. Cone-bottom bins or hoppers with a 90° included angle are self-emptying. For accurate feeding, a screw feeder or weigh-belt feeder is preferred, rather than vibrating types. The pellets can be air conveyed, but due to their granular nature, high air to solids ratios are required and some dust will be generated. Pellets are available in bulk hopper cars holding up to 90 tons, and in 50 lb. or 100-lb. multiwall paper bags. Arrangements can be made for other containers to suit customer requirements.

The pelletized products contain no binders; however, there is sufficient integrity that a moderate amount of energy is required for fiber liberation. Some end use processes incorporate equipment with sufficient shear energy to liberate the fiber from the pellets. Examples of this capability in a liquid medium are the Banbury mixer and differential rolls in plastics processing and the hydrapulper and pulp refiners that are used in papermaking. Dry processes using impact mills will also permit the direct addition of pelletized asbestos to the process. Low energy rate equipment such as ribbon blenders, hammer mills, and agitator mixers will not effectively liberate the asbestos fiber and the higher performance efficiency provided by the CALIDRIA refining process will not be realized.

When high shear equipment is not readily available, the pellets may be dry or wet opened with grinding equipment. For size analysis of the ground products, wet screening is recommended by either the Bauer-McNett method or by hand jigging. Some operator training is necessary in the latter method to obtain reproducible results, particularly in the finer mesh sizes.

Dry grinding may be done in a variety of equipment: disc mills, grate hammer mills, air-swept mills, etc. Disc mills are suited to coarser grinds and have the advantage of requiring a minimum of air cleaning equipment. Grate hammer mills, such as the Jeffrey and the Mikro-P, are versatile in application and produce a minimum of "tramp" oversize but screen maintenance can be a problem, particularly if an extremely fine grind is desired. Air-swept mills, such as the Raymond Vertical and the Bauer Hurricane, are well suited to medium and fine grinding in production operations. A dust collector should be employed with any dry grinding operation.

Asbestos can be ground wet with water or other process liquids. Choice of equipment will depend on the nature of the liquid and the consistency of the desired mixture. At 4-8% solids in water slurries, for instance, fully liberated asbestos has the consistency of mayonnaise. Below 4% solids, asbestos slurries can usually be moved by centrifugal pumps. Positive displacement pumps, such as Moynos, are recommended in the 4 to 8% solids range. Above 40% solids, asbestos-water mixtures are crumbly, somewhat plastic masses which can be kneaded or mulled, and conveyed in belt, auger, or flight conveyors.

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For pumpable consistencies, wet grinding can be done in screened hammer mills such as Fitzpatrick or Reitz, in Cowles dissolvers, or Hochmeyer mixers, and probably others, depending on the conditions and the results desired. Sonic dispersers can also be used, usually in series with a pre-disperser. At higher solids contents, mix Mullers, Banburys, or mixers of the Littleford-Lodige type will be required.

A particularly effective wet grinder for pumpable slurries consists of a high-speed (16,000 fpm tip speed) vertical hammer mill, such as a Reitz, with the grinding chamber enclosed by grooved hard alloy liner plates. Asbestos and process liquid are introduced at the bottom and overflow the top of the grinding chamber. Screen maintenance problems are eliminated, and the grind can be controlled by varying feed consistency, hammer spacing, and residence time.

(c) Disposal of Empty Bags

"Empty" bags can be a source of dust generation. Receptacles for disposition of the bags should be readily available and in an exhaust vented area. The bags should be bundled under a dust extraction hood for disposal, and then sealed in an air impermeable bag. The polyethylene overwrap furnished with some CALIDRIA products can be used for this purpose. The polyethylene sack should be twisted tightly, folded over, and the neck secured in the folded position by wire tie, adhesive tape, or other equally effective method(1).

Generation of dust can be significantly reduced by wetting the bags preferably with a fine mist spray. Disposition of the bags is usually via a refuge collector, by burial, as waste product, or incineration (chrysotile undergoes thermal decomposition to an amphorous silicate at 700°C). An incinerator should employ a dust filter system.

2. Equipment

(a) Exhaust and Filtration

Three types of dust collectors are generally used by the asbestos industry: fabric filters, dry centrifugal collectors, and wet collectors. Centrifugal collectors are often employed as pre-cleaners for fabric filters. Wet collectors such as spray chambers or scrubbers, although effective, are used to a lesser degree.

Fabric filters are used extensively by industry to control asbestos dust emission. Due to its fibrous nature, asbestos dust is relatively easy to collect. It conveys well in ducts and does not settle out or blind dust collector bags.

Most applications for CALIDRIA asbestos should fall in the category of low velocity dust generation. Indraft face velocities required for hoods enclosing operation or over zone of dust generation are usually in the range of 150-200 fpm for low velocity dust generation, such as low speed conveyor transfer points or bag

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dumping. Active generation of dust by grinding or dry tumbling mills may require indraft velocities of 500 fpm or greater. Conveying velocities in ducts approximate 3000 fpm.(2)

Union Carbide Corporation's asbestos plant facility at King City, CA. uses Mikro-Pulsaire Models 1-C-1 and 1-C-3 type fabric filters for grinding and bagging room dusts. This equipment safely handles the dust emission from the processing of several tons of asbestos product per hour. Operators are required to wear protective respirators.

(b) Respiratory Protective Devices

Proper selection and maintenance of respirators should be made in accordance with Federal Standards established by the Occupational Safety and Health Administration of the Department of Labor(3).

Union Carbide Corporation's asbestos plant facility at King City, CA. uses the Willson Mono Mask Number 600-A approved by the U.S. Bureau of Mines for asbestos dust(4).

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REFERENCES

(1) Recommended Code of Practice for the Handling and Disposal of Asbestos Waste Materials. The Asbestosis Research Council, Environmental Control Committee, 114 Park Street, London WiY4AB, England.

(2) Heating Ventilating Air Conditioning Guide Vol. 34 American Society of Heating and Ventilating Eng. Inc. (Waverly Press Inc., Baltimore, Md. 1956).

(3) Federal Register, Vol. 36, No. 105-Sat. May 29, 1971, Washington, D.C. Respiratory Protection, Subpart I, sec. 1910.134 (p. 10591).

(4) Bureau of Mines Information Circular 8436, Respiratory Protective Devices approved by the Bureau of Mines, U.S. Department of the Interior, Bureau of Mines, 1969.

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