

FROM E. E. RUMBERGER

PITTSBURGH OFFICE - 6

TO ~~DR. H. B. DINMAN~~ - PGH. 6

MR. J. R. ARCHIBALD - PGH. 6

1981 February 18

RE: ASBESTOS

During recent conversations, there seemed to be some doubt as to what has been said to plants on asbestos and, especially, finding suitable replacement materials. The six attached references will provide you with a chronological overview. (The attachments are arranged in reverse order, with the latest information on top.)

1. 1971 DEC. 23 -- R. P. Carter alerted Industrial Hygienists and Safety Directors on a proposed OSHA emergency standard for exposure to asbestos dust.
2. 1975 JULY 22 -- R. P. Carter issued an "Industrial Hygiene Newsletter" to hygienists and Environmental Committee Chairmen, with copies to R. H. Watson and B. D. Dinman advising on new proposed OSHA standard with tighter restrictions on asbestos exposures. He suggested that "... further effort should be devoted to finding non-asbestos alternates..." in lieu of the cost of the control measures required.
3. 1975 NOV. 19 -- R. P. Carter issued an "Industrial Hygiene Newsletter" to hygienists, with copies to physicians, Environmental Committee Managers and Committee Chairmen, R. H. Watson, and B. D. Dinman. This was a specific discussion of the new OSHA limit of 0.5 fibers per milliliter to be effective 1976 July 01. On Page 5, he states that this new regulation offers "... further incentive for every location to discontinue the use of asbestos of all forms to the fullest extent functionally feasible...".
4. 1976 MARCH 30 - R. P. Carter and M. J. Caprio issued a letter to hygienists and Purchasing Agents, with copies to R. H. Watson and B. D. Dinman. This letter promotes the change to non-asbestos containing replacements and recommends sources of information.

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Dr. B. D. Dinman
Mr. J. R. Archibald
1981 February 18
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5. 1978 JULY 28 -- T. B. Bonney issued a letter to hygienists, with copies to J. R. Archibald and B. D. Dinman. He acknowledged that the plants were making progress in eliminating unnecessary asbestos usage, but allowed that there were still many asbestos products being used. This letter initiated a plant survey of various categories of uses and replacements that had been found suitable.
6. 1979 AUG. 27 -- E. E. Rumberger issued a cover letter to Location Managers, with copies to Safety Managers, Purchasing Agents, hygienists, Environmental Managers, and J. R. Archibald and B. D. Dinman. This letter discussed "Alcoa's Asbestos Replacement Program" and provided company technical references for finding replacements. It served as a cover letter to extend the distribution of Haig Sakoian's report on "Asbestos Substitution" dated 1979 July 30. This was a comprehensive report that summarized the progress of different plants on finding replacements for specific end uses. The second part of the report specifically discussed potroom uses. This was the culmination of the plant surveys started by T. B. Bonney in 1978.

In August of 1980, we felt it desirable to update the progress on asbestos replacements and M. J. Vaudreuil canvassed the plants for their reports, which came in during September, October, and November of 1980. During that time, Mr. Vaudreuil left Alcoa's employ and the asbestos responsibility has now been recently assigned to R. W. Flanagan. He now has the task of putting the feedback from last fall into a new status report to be distributed to the plants.

This letter and attachments should give you a picture of Alcoa's activities through the past ten years but, more importantly, the communication efforts we have brought about within the past two years to continue to foster replacement efforts. While progress continues, there are some locations which have been slow to act in finding substitutes. This was the reason why I suggested that we give some consideration to an "Alcoa Health Guideline" or "Objective" that clearly delineates for location management the Company's goal to eliminate asbestos insofar as is practicable.

E. E. RUMBERGER

EER/eds

Attachments (6)

412769 0083

FROM E. E. RUMBERGER
PITTSBURGH OFFICE

TO LOCATION MGRS. - DOMESTIC &
CARIBBEAN
LOCATION MGRS. - SUBSIDIARIES &
ALLIED PRODUCTS

1979 August 27

RE: ASBESTOS

The attached memorandum on the status of Alcoa's asbestos replacement program was recently released to all location Industrial Hygienists. Because of the impact of asbestos use on each of our locations, I felt it important that you be aware of this information. Works Safety, Environmental, and Purchasing Managers are included in the distribution of this letter.

The asbestos problem, from a health hazard and governmental regulation standpoint, has not diminished in the least. In fact, implications are that asbestos control regulations will become even more stringent in the future. For these reasons, we are currently stepping up our coordination of this program to find substitute materials wherever possible.

The corporate Industrial Hygiene staff will monitor feedback on the testing of replacement materials and maintain the continuity of the program. Technical expertise on asbestos substitutes will be provided by each of the following personnel in the areas indicated:

<u>H. G. Sakoian</u> (Pgh.-Ind. Hygiene)	-- Overall Coordinator
<u>M. J. Caprio</u> (Pgh. Office-Purchasing)	-- General Insulation; Molten Metal Marinite
<u>J. M. McCollum</u> (Pgh. Office-Mechanical Engineering)	-- Potroom Replacements
<u>D. St. Jacques</u> (ATC-Safety)	-- Personal Protective Equipment

Please distribute this information to other appropriate personnel on your staff as you see fit.

E. E. RUMBERGER
EER/eds
Attachment

Distribution: See Page 2 on Reverse Side



412769 0084

FROM HAIG G. SAKOIAN
PITTSBURGH OFFICE

TO M E M O R A N D U M

1979 July 30

RE: ASBESTOS SUBSTITUTION

Attached is a summation of asbestos materials currently in use at Alcoa locations. Included in the listing are:

- The material and its use
- The number of plants using the material
- Whether or not there is a potential for employee exposure
- Potential replacements, if available -- and manufacturers (Page 10)

Much effort has been extended to reduce and eliminate asbestos uses in most locations. However, as can be seen by this report, many uses still exist. Because the continued use of asbestos products may result in unnecessary health hazards and concerns to our employees, as well as additional costs to Alcoa to comply with specific provisions of the OSHA Standard, we believe it is in Alcoa's best interest to continue eliminating the use of asbestos products wherever possible. This does not mean that all existing asbestos should be removed immediately which, as in the case of sprayed-on insulation, could create unnecessary exposure potentials. Rather, a systematic effort should be made to discontinue uses, when feasible and practical, by substitution or elimination. By creating this listing and maintaining frequent updating via feedback from all locations, each plant can be provided with the information necessary to attain this goal.

Mr. J. M. McCollum, Pittsburgh Office Mechanical Engineering, has been coordinating such an effort for asbestos replacements in potrooms. A list illustrating Alcoa's experience with potroom replacements is shown on Pages 7, 8, and 9.

It is hoped that this type of registry will be extended to cover all asbestos uses for all locations. To achieve this, it is asked that each location copy this office on all efforts made towards asbestos replacement... whether positive or negative. This information will then be disseminated to all locations on a periodic basis so that each plant can profit from the experience of the others in the Company.

Any questions, comments, or additions to the attached would be appreciated.

HAIG G. SAKOIAN

HGS/eds
Attachments
Distribution: See Page 2



412769 0086

M E M O R A N D U M
1979 July 30
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Distribution:

Industrial Hygiene Newsletter

R. G. Labar	- ATC
N. Kloap	- Arkansas Works
R. C. Hinkle	- Badin Works
R. Karstensen	- Mosal Aluminum, Mosjoen, Norway
J. Rob	- Mosal Aluminum, Farsund, Norway
M. J. Caprio	- Pittsburgh
J. M. McCollum	- Pittsburgh
J. Z. Nelson	- Pittsburgh
E. L. Rooy	- Pittsburgh
G. F. Stephens	- Pittsburgh
D. D. McGregor	- Pittsburgh

ASBESTOS REPLACEMENT SUMMARY -- BY USE

<u>MATERIAL/USE</u>	<u>POTENTIAL EXPOSURE</u>	<u>REPLACEMENTS AVAILABLE</u>
<u>Belting/Drip Casting</u> Conveyors	Potential for exposure during maintenance and removal. * (2 plants: 3, 7)	UNTESTED. Potential candidate: Fiberseal Fabric (NOTE: Must determine operating temperatures and strength/durability requirements for engineering.)
<u>Block or brick/Furnaces</u>	Potential for exposure during installation, and especially during removal, even though this is infrequent. * (1 plant: 23)	Ceramic refractory block and brick.
<u>Brakes/Vehicles & Equipment</u>	Recent studies indicate some asbestos fibers survive from brake use and are not destroyed, as presumed previously. However, the percentage of fibers not degraded by heat and friction is unknown. * (All plants)	NONE. Should reemphasize requirement of not using air to blow out brake drums and linings. Vacuum systems are available and should be used. (NOTE: Recommend air sampling for asbestos to document and confirm LOW or NO exposures: 1. Vehicle brake mechanics 2. Extruder brake, mechanical presses, or other equipment brake changers)
<u>Cement Patch/Boiler Maintenance</u>	Potential employee exposure. * (2 plants: 18, 24)	Two grades: 1. <u>Hydraulic-setting cement</u> -- Contains mineral wool and Portland cement; temperature range up to 1,000°F. Suppliers: Johns-Manville - "375" Keene Corp. - "Super Powerhouse" 48 Insulation - "Quick-Set Cement" 2. <u>High-Temperature Grade</u> -- Contains mineral wool; temp. range: 1,000°F to 1,900°F. Suppliers: Johns-Manville - "360" Keene Corp. - "Super 1900" 48 Insulation - "Super 48"

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
Cloth/Insulation, Welding Blankets	Plants indicate NO potential or unknown exposures. In many cases, the cloth is used wet and would, indeed, pose little potential for dust inhalation. However, as several plants indicated, there may be some cases where the exposure is unknown. * (6 plants: 12, 13, 16, 17, 20, & 24)	Pyrotek Fabrics (used in Warrick) PyrotexTM Refrasil Nor.Fab Keller Gloves Kelnit Welding Blankets
Personal Protec- tion/Gloves, Mittens, Pads, Coats, & Pants	There may or may not be a potential for exposure depending on the type of material, i.e., whether it is aluminized or coated; lined or unlined; and the frequency of use. In general, lined, aluminized protective equipment should not generate a potential for dust inhalation. However, noncoated, unlined materials may pose a problem and should be replaced, preferably with a nonasbestos substitute. * (All plants)	These apply for some applications, not all. Many times asbestos gloves are used in cases where the temperatures encountered do not warrant the need for asbestos. For example, flame-resistant terrycloth gloves can often be effective replacements where up to 700°F temperatures are encountered. For temperatures up to 1,000°F, gloves made of duPont's Kevlar fiber may be acceptable. However, past Alcoa experience indicates that in certain applications the seams of these gloves do not hold up. For this reason, each case should be treated separately. Please keep us advised of your results. "Kelnit 29" Keller Gloves PyrotexTM

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* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
Marinite and Marinite Floats/ Molten Metal Casting	Because of the special problems associated with Marinite in ingot casting, it is being treated separately. * (11 plants: 1, 7, 9, 13, 16, 17, 19, 20, 21, 22, & 24)	Alcoa Research Laboratories and our suppliers, in conjunction with plant personnel and Primary Products, have been working for some time to find replacements for molten metal Marinite. Due to this effort, replacements are now available for many -- but not all -- of its uses. Many plants are now using these replacements; however, for one reason or another, many plants continue to use Marinite even in those cases with potential replacements. These reasons include initial cost factors, and increased costs associated with lost or decreased production in ingot casting. Considering the increased costs associated with compliance requirements, i.e., medical exams, protective clothing, disposal requirements, ventilation controls, etc. -- in addition to the less tangible, but more serious costs of potential impairment of employee health -- every effort should be made to institute the replacements now available and to continue the search for those uses not yet replaceable. If it is still considered that the costs associated with replacement remain prohibitive to the location, continue the control program and continue the search for a more feasible replacement. This decision must be arrived at only after careful examination by both management and Medical.

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
Packing/ General pump packing	In most cases, pump packing materials are bonded in rubber or some other coating compound. As indicated by the plants, these generate little potential for fiber exposure. However, some packings, such as uncoated, noncompressed, braided asbestos may offer a potential for exposure and should be replaced. * (All plants)	Since specific needs and equipment types vary dramatically, pump packing and general packing materials are purchased at the plant level. Suitable replacements should be handled by plant Purchasing by direct contact with manufacturers and suppliers.
Paper/Welding protection, electrical insulation	Should be replaced. * (6 plants: 1, 3, 7, 13, 17, & 20)	Johns-Manville - Cerawool Paper (NOTE: Asbestos paper should not be used for welding protection. Substitutes available for this application can be found in the section dealing with "Cloth".)
Rope/Furnace insulation	Plants are divided on the extent of potential dust hazards. Uncoated material may pose a problem during removal and disposal and should be replaced. * (15 plants: 1, 3, 6, 8, 12, 13, 15, 16, 17, 18, 19, 20, 21, 23, & 24) Pre-cut compressed gaskets should pose little potential for employee exposure, especially if they are resin or rubber bonded. Sheet gaskets which must be cut out at the plant may create a dust hazard during cutting, installation, removal, and disposal. Since the requirements for gasketing material vary depending on the	MUST BE TESTED. Johns-Manville - Ceraform Rope (used in Warrick) Pyrotek - Fiberseal Rope + Others
Sheet Gasketing/ General	* Number of plants using material. (Cont.)	

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
Sheet Gasketing (Cont.)	application, each use should be carefully considered. Care should be taken to insure that maintenance personnel do not have on hand and use indiscriminantly such sheet gasket material. Storerooms and users should be carefully monitored to: 1. Determine and document exposures. 2. Evaluate housekeeping. 3. Insure proper disposal of waste material. * (All plants)	
Tape; Tubing/ Furnace seals, general insulation	Majority of plants do not consider this to be a potential dust hazard. However, certain uses may generate free fibers. * (10 plants: 1, 3, 6, 9, 13, 16, 17, 18, 20, & 23)	Tape Replacements: PyrotexTM Refrasil Fiberfrax NorFab
Thermocouple Wire	Due to deterioration and fraying of the asbestos insulation on thermocouple wire, potential fiber exposure may exist. * (7 plants: 1, 6, 7, 9, 15, & 19; probably more)	Sleeves made of Refrasil or Fiberfrax material may be used in place of asbestos-coated wire in some cases; otherwise, no replacements available.

* Number of plants using material.

KEY TO ALCOA LOCATIONS

1 - ATC	13 - MASSENA
2 - ARKANSAS	14 - MOBILE
3 - BADIN	15 - NORTHWEST ALLOYS (ADDY)
4 - CHILLICOTHE (Wear-Ever Aluminum)	16 - PT. COMFORT
5 - CLEVELAND	17 - REA MAGNET WIRE
6 - CORONA	18 - RICHMOND, INDIANA
7 - DAVENPORT	19 - ROCKDALE
8 - FT. MEADE	20 - TENNESSEE
9 - LAFAYETTE	21 - TIFTON
10 - LANCASTER	22 - VANCOUVER
11 - LEBANON	23 - VERNON
12 - MARSHALL (ACPC)	24 - WARRICK

ASBESTOS -- POTROOM USES

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Cradle to Pot Shell Insulation</u>	Quarry tile	Wenatchee	Tested; proved to be good replacement.
	Cem-Fil GRC Sheet	Warrick	Installed and seems okay; will get back with update.
	Cem-Fil GRC	Massena	Currently testing (just started).
<u>Superstructure Fort Insulation</u>	Cem-Fil GRC - 9" x 7" x 1"	Massena	Received material to be tested.
	Marinite-P -- 1/4" sheet	Massena	Received material to be tested.
<u>Pot Cover Insulation</u>	Almac Plastics Inc.'s- High-Temp Glass	Massena	Testing.
	Marinite-P -- 1/4" sheet	Massena	To be tested.
	Pyrotek's Fiberseal H-3 Fabric	Massena	To be tested for P-75 pot covers.
	(Same as above)	Badin	Double the material; works well.
	(Same as above)	Warrick	Works well; now standard; also works for side shield insulation.
	Amatex - Thermoglass #G-36P752	Wenatchee	Satisfactory.
<u>Walkway Grating Insulation</u>	M-50 Pyrotherm Dense Board	Massena	Tested; unsuccessful; it crumbles.
	GRC Cem-Fil - 1/4" and 3/8"	Massena	To be tested on P-225.
	Marinite-P -- 1/4" sheet	Massena	To be tested on P-225.
	Marinite-P -- 1" board	Badin	Currently testing; not optimistic.
	Pyrotherm G-5 Insulating Board	Badin	To be tested.
	Kaowool M	Warrick	Does not stand up (no good).
	Penn Hi-Temp 270	Warrick	Looks good in preliminary tests; to be tested further; limitation might be that it's too expensive.

(Cont.)

ASBESTOS -- POTROOM USES

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Bus Insulation</u>	Marinite-P -- 1" sheet Cem-Fil GRC - 1/4" and 1/2" Marinite-P -- 1/2" sheet	Badin Massena Massena	Currently testing (but it crumbles) To be tested. To be tested.
<u>Exhaust Duct Insulator</u>	Pyrotek Pipe	Warrick	Looks good in preliminary tests; now have 8 in use with a 1/4" wall; have ordered 8 more 3/8" and 8 more 1/2" for testing.
	Hetron 197	Wenatchee	Fiber glass pipe with antimony and dynel liners have failed and have been replaced with normal transite.
	Hetron 92	Wenatchee	Fiber glass pipe with antimony and asbestos linings -- satisfactory.
	Fiberfrax laminate tubes by Carborundum, Inc.	ATC	
<u>Exhaust Duct Gaskets</u>	Pyrotek's Fiberseal Felt T-1	Massena	No plans.
<u>Siphon Gaskets</u>	Pyrotek's Fiberseal Felt G-1 - 1/4" and Fiberseal Felt T-1 - 1/4" (Same as above)	Badin	Tested and proved okay.
	Fiberseal M-13 - 1/8" Compressible board	Massena	Tested on P-225 siphon gasket and crucible cover plate gaskets; found unsatisfactory To be tested on P-225 siphon gasket and crucible cover plate gaskets.
	J-M Ceraform Heat Seal	Rockdale	Not as stable as asbestos; needs replaced more often.

(Cont.)

ASBESTOS -- POTROOM USES

Application

Ladle & Ladle Lid
Seal

Silicon Red rubber air hose - 3/4"	Warrick	Standard (but different seal from other plants).
Refrasil - wrapped around rubber hose	Badin	No good; rubber melts; seal breaks.
1-1/4" Fiberseal rope - F-10	Badin & Massena	On order.
1" Fiberseal rope - D-1	Anaconda	Uses 600 ft./mo. of D-1
1-1/4" Fiberseal rope - F-10	Pt. Henry	

ASBESTOS REPLACEMENT MANUFACTURERS

<u>PRODUCT</u>	<u>SUPPLIER</u>	<u>TELEPHONE</u>
<u>PyrotexTM</u>	Newtex Industries, Inc. Railroad Ave. P.O. Box 25 Victor, NY 14564	716/924-9135
<u>Fiberseal Products</u>	Pyrotek Incorporated East 9601 Montgomery Ave. Spokane, WA 99206 - or - Box 77 - R.D. #1 Claremont Rd. Carlisle, PA 17013 - or - Santa Fe Springs, CA	509/926-6211 717/249-2075
<u>Refrasil</u>	HITCO Division of Armco Steel Middletown, OH 45042	
<u>Nor•Fab Yarns; Fabrics</u>	Amatex 1032 Stanbridge St. Norristown, PA 19404	215/277-6100
<u>Fiberfrax</u>	The Carborundum Company Insulation Division P.O. Box 808 Niagara Falls, NY 14302	716/278-6221
<u>Hi-Temp 270</u>	Penn Compression Moulding, Inc. Burton Street Pittsburgh, PA 15218	412/351-4004
<u>Ceramic Fiber Products</u>	Kaowool Babcock & Wilcox Cem-Fil Corporation Two International Plaza Drive Nashville, TN 37217 Keller Glove Mfg. Co. Plumsteadville, PA 18949	615/361-4664 215/766-8818

HAIG G. SAKOIAN
1979 July 20/eds

412769 0097

FROM THOMAS B. BONNEY
PITTSBURGH OFFICE

TO

1978 July 28

RE: ELIMINATION OF UNNECESSARY USE OF ASBESTOS-CONTAINING MATERIALS

Over the past six years, primarily by means of Industrial Hygiene Newsletters, we have attempted to discourage the use of asbestos at all of our operating locations. We have taken this position for two reasons. First, excessive exposure to asbestos represents a real hazard. Second, compliance with the applicable OSHA standard costs us money which we would not have to spend if substitute materials were used (e.g., for air sampling, medical surveillance, disposal procedures, etc.). Although our plants have made impressive headway, it appears that our goal of eliminating unnecessary asbestos usage is not yet at hand.

As we visit our plants, we still see asbestos products being used. We suspect that for many of them there are asbestos-free, functionally acceptable alternates. Because continued use of asbestos products may result in unnecessary health hazards and concerns to our employees as well as additional costs to Alcoa to comply with specific provisions of the OSHA standard, we believe that it is in Alcoa's best interest to eliminate the use of asbestos products wherever possible. To accomplish this objective requires that first we know for what specific applications it is presently being used. Therefore, we request that you survey your location to provide us with information about your plant's use of asbestos. The attached form indicates the data that is required and can be used for submitting your survey results. We ask that you submit the results of your survey by 1978 September 01.

Upon receipt we will compile a listing of current usage throughout Alcoa. With the assistance of appropriate plant and Pittsburgh personnel, we will place each usage into one of four categories:

- (1) No foreseeable employee exposures; substitutes available.
- (2) No foreseeable employee exposures; no viable substitutes available.
- (3) Potential employee exposures; substitutes available.
- (4) Potential employee exposures; no viable substitutes available.

Following classification, with the aid of appropriate Pittsburgh and plant personnel, we will work toward a prompt and orderly replacement of all items in category "3". Jointly, we will further consider if there is merit to taking the same action for any or all of those materials in category "1".



412769 0098

This, of course, will require a determination of whether the economic consequences would justify such action. Our ultimate aim is to provide the plants with the information necessary to attain effective control over their use of asbestos. To help accomplish this, we will provide you with information about substitute materials. Eventually, we will publish a list of "approved" asbestos products and applications (i.e., those for which there are no currently viable substitutes) to offer guidance for purchasing, production, industrial hygiene, and other interested plant personnel. We ask your cooperation in collecting the information needed to make this possible.

THOMAS B. BONNEY

TBB:lmn

Attachment

Letter sent to Industrial Hygienists

Copies sent to:

M. J. Caprio, Pittsburgh 19AB
J. Z. Nelson, Pittsburgh 3WPH
N. Klop, Arkansas Works
R. C. Hinkle, Badin Works
J. D. Breazeal, Davenport Works
H. E. Chandler, Tifton
R. K. Morrow, Massena Works
E. B. Parker, Rockdale Works
W. S. Stroud, Tennessee Works
J. A. Blessinger, Vancouver Works

G. H. Farrah, EHL, Alcoa Technical Center
W. W. Williams, Fort Meade, Fla.
J. B. Dolan, Lafayette Works
G. R. Hartnett/Albert Lee, HC Products Co.,
Princeville, Ill.
J. R. Archibald, Pittsburgh 7AB
P. R. Atkins, Pittsburgh 7AB
B. D. Dinman, Pittsburgh 7AB
W. B. Garyotis, Pittsburgh 2AB
R. V. Newsome, Mobile Works

Works

Date

ASBESTOS SURVEY

Item	Product Description ¹	Specific Application	Dept.	Dust Generated? ²	
				yes	no
1					Don't Know
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Note 1: List should include specifications for all asbestos products currently being purchased and used. It should not include previously installed asbestos materials that are still in place but for which non-asbestos replacements are currently being used.

Note 2: Should be answered in light of currently available information. A product will be considered capable of generating significant airborne concentrations of asbestos fibers if the measured or estimated fiber concentrations are in excess of 0.1 fiber per cc (eight-hour time-weighted average). In responding to this question, it will be necessary to consider the possibility of dust being generated not only during installation, but also during use and, where applicable, dismantling.

Letter 1978 July 28 re eliminating asbestos went to the following industrial hygienists:

D. E. Thompson, Addy, Washington
O. E. Wilkinson, Anderson County Works
J. M. Plunkett, ATC
J. F. Dey, Arkansas Works
Earl M. Morgan, Badin Works
V. Locke, Jr., Wear-Ever, Chillicothe
L. L. Grubb, Cleveland
J. V. Muncie, Corona
K. W. Williams, Davenport
S. Huey, Rea Magnet, Fort Wayne
W. D. Coker, Lafayette
L. M. Crivaro, Lancaster
R. Andrew, Lebanon
W. D. Helmick, Logans Ferry
T. V. Byerley, Marshall
G. D. Hicks, Massena
W. J. Boutreis, Mobile
R. E. Podhora, Point Comfort
J. D. Gibbs, Richmond
A. G. Clayton, Rockdale
J. C. Vergho, Tennessee
L. L. Haisch, Vancouver
D. P. Hooghkirk, Vernon
R. L. Parsons, Warrick

ROBERT P. CARTER
HEALTH & ENVIRONMENT DEPARTMENT
PITTSBURGH OFFICE, 7AB

TC

&

M. J. CAPRIO
PURCHASING DEPARTMENT
PITTSBURGH, 19AB

30Mar76

RE: ALTERNATES FOR ASBESTOS AND ASBESTOS-CONTAINING MATERIALS

In October, 1975, the Occupational Safety and Health Administration (OSHA) published a proposed revision to its standard for worker exposure to asbestos which will drastically reduce the permissible time-weighted average (TWA) permissible fiber count and also reduce the permissible ceiling or short term exposure for 15-minute periods. In the Industrial Hygiene Newsletter dated 19Nov75, which went to all works Industrial Hygienists, the possible impact of the proposed changes was reviewed on a paragraph-by-paragraph basis.

As stated near the end of that Newsletter, this proposed revision, which may not become final until late 1976, makes it highly desirable for us to replace the use of asbestos and asbestos-containing materials with non-asbestos material in every situation where the use of asbestos can result in worker exposure to airborne fiber. This, of course, has to be based upon functional suitability of the non-asbestos containing replacement material. This replacement, however, should not be based on strict cost equivalence since the costs of medical surveillance, air sampling and analysis, and training as required by the proposed standard are very considerable.

In order to facilitate this conversion, Mr. A. E. Kean of the Pittsburgh Purchasing Department has agreed that Mr. M. J. Caprio of his group will serve as a clearing house, or contact person, for plant locations seeking alternate non-asbestos materials with satisfactory functional performance. In order for this to be as effective as possible, Mr. Caprio will need to know what physical and chemical properties are required for the application, defined as fully as practicable. As necessary, he will consult with Dr. R. G. LaBar of Alcoa Technical Center for assistance.

According to Mr. J. A. Dunbar of the Ingot, Pigment, Powder and Paste Division, satisfactory non-asbestos alternates have been established for all significant melting and casting applications, except for some applications of Molten Metal Marinite (MMM). Extensive plant evaluation of the alternate material developed for MMM is actively underway. If significant problems are encountered with any of these established alternates, Mr. Dunbar or Dr. LaBar should be made aware of these promptly.

ALCOA

412769 0102

50-47-3 (REV 11-66)

30Mar76
Page 2

If you have already discovered a satisfactory replacement for asbestos in an application which may be involved at another works location, it would be very helpful if you could make Mr. Caprio aware of enough of the particulars so that he could recommend evaluation of such a material where appropriate in similar situations.

Please contact Mr. Robert P. Carter if he can be of any help with respect to whether the proposed asbestos standard would apply to a particular use situation and thereby make seeking an alternate material desirable.

ROBERT P. CARTER
M. J. CAPRIO

MJC:RPC:lmn

Letter to: Industrial Hygienists and District Purchasing Agents

Note: Information relative to health standards proposed or promulgated under authority of the U. S. Occupational Safety and Health Act is sent to overseas locations for informational purposes only.

cc:
Works Physicians
Works Engineering Managers and Works Chief Engineers
Environmental Health Steering Committee
Chairmen & Environmental Managers
G. H. Farrah, ATC, Alcoa Center, Pa.
Dr. R. G. LaBar, ATC, Alcoa Center, Pa.
L. W. Ortlip, EHL, Alcoa Center, Pa.
J. M. Plunkett, ATC, Alcoa Center, Pa.
Duckworth Daley, Jamaica
G. R. Hartnett/Albert Lee - HC Products Co.
W. W. Williams, Fort Meade, Florida
J. M. Cohen, Pittsburgh 7AB
M. O. Colwell, Pittsburgh 29AB
H. W. Cooley/J. Z. Nelson, Pittsburgh 3WPH
B. D. Dinman, M.D., Pittsburgh 7AB
J. A. Dunbar, Pittsburgh 23AB
W. B. Garyotis, Pittsburgh 2AB
F.J. McGrath/P.A. Haas, Pittsburgh 20AB
A. E. Kean, Pittsburgh 19AB
S. I. Roth, Pittsburgh 9AB
V. W. Rieke, Pittsburgh 2AB
R. H. Watson, Pittsburgh 7AB
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412769 0103

FROM: ROBERT P. CARTER
HEALTH & ENVIRONMENT DEPARTMENT
PITTSBURGH OFFICE, 7 AB

TO: INDUSTRIAL HYGIENISTS

19Nov75

RE: INDUSTRIAL HYGIENE NEWSLETTER
Proposed Revision to OSHA Worker Exposure to Asbestos

In the FEDERAL REGISTER for Thursday, October 9, 1975, OSHA published a proposed revision to its standard for worker exposure to asbestos, Regulation 1910.1001. We recommend strongly that all locations obtain a copy of this proposed standard to determine its effect on their operations. If you are unable to obtain a copy of the proposed standard from your subscription to the FEDERAL REGISTER, please contact our office. The proposed standard is found on pages 47652 - 47665 of the October 9, 1975 FEDERAL REGISTER.

The Worker Exposure Standard for Asbestos currently in effect which was issued on June 7, 1972, established an 8-hour TWA worker exposure limit of 5 fibers per milliliter of air effective July 7, 1972, with that TWA limit to drop to 2 fibers per milliliter effective July 1, 1976. The new OSHA proposal will change that TWA limit to 0.5 fibers per milliliter, to become effective with the promulgation of the final revised standard.

There are many other changes in the proposed standard, the most important of which are covered in the following paragraph-by-paragraph analysis of the October 9, 1975 proposal:

- (a) Scope and application. This section is entirely new. The exclusion of construction work will probably be the only significant effect on Alcoa. However, until a separate asbestos standard for construction is issued, we recommend that the general industry standard be applied to Alcoa construction people. Also, since the definition of construction under Regulation 1910.12 is not clear with respect to its application to our repair and maintenance people, we should apply that standard to their work which provides the greater degree of protection.
- (b) Definitions. No significant changes.
- (c) Permissible exposure to airborne concentrations of asbestos fibers. As stated in our introduction, this contains important changes. The standard presently in effect specifies that, as of July 1, 1976, the 8-hour TWA worker exposure drops from 5 fibers per milliliter to 2 fibers per milliliter. The proposed standard would reduce the 8-hour TWA to 0.5 fibers per milliliter.

The present standard calls for a ceiling concentration of 10 fibers per milliliter measured for 15 minutes. The proposed standard would reduce this to 5 fibers per milliliter for a period of "up to 15 minutes (emphasis ours)." Even the preamble or background material published with this standard does not clarify the meaning of the "up to." It is our intention to seek clarification of this so that it can be clearly defined in the final revised standard. As the proposal is presently written, it appears to allow for the interpretation that a worker exposure in excess of 5 fibers per milliliter for any period less than 15 minutes would be considered a violation even if the worker's exposure averaged over the worst 15-minute period did not exceed 5 fibers per milliliter.

- (d) Regulated areas. This section is new with "regulated area" being defined as one where a person may be exposed to an airborne asbestos fiber concentration in excess of either the TWA or ceiling limit. A daily roster of all persons entering a regulated area is to be made and retained.
- (e) Monitoring. This paragraph is expanded and revised. It allows for the selection of representative employees for monitoring to determine the exposures of a particular job occupation group. Area monitoring has been eliminated.

If either the TWA or ceiling exposure limit is exceeded, a compliance program and monthly monitoring survey are to be undertaken. If neither exposure limit is exceeded for two surveys at least 5 days apart, but not more than three months apart, no further monitoring is required unless there is reason to believe that an employee's exposure has increased. Each employee is to be notified within 5 working days of the results of tests representing the exposures of his job classification even if another worker was actually monitored. If either exposure limit is exceeded, each affected employee is also to be notified what corrective action is being taken.

- (f) Method of compliance. Where worker exposures exceed either the TWA or ceiling limit, feasible engineering controls are to be used to reduce the exposures with appropriate respirators being worn until exposures are brought within limits. If needed to meet the exposure limits, work practice controls are also to be used. If airborne fiber levels after the institution of feasible engineering and work practice controls still exceed either exposure limit, respirators must be used to protect the employees.

A new provision requires measurements such as capture velocity, duct velocity or static pressure every three months in each exhaust system used for fiber level control to demonstrate continued exhaust effectiveness.

Another new requirement when any employee's exposure exceeds either limit is the establishment and implementation of a detailed written program to reduce the fiber levels within limits "solely by means of engineering and work practice controls." This, to us, implies that control of fiber levels to less than the exposure limits by engineering and work practice controls will always be interpreted by OSHA as feasible. We intend to comment to OSHA on this provision also since, in our judgment, reduction of fiber levels to 0.5 fibers per milliliter may not always be feasible by engineering and work practice controls.

- (g) Respiratory Protection. This is new as a separate paragraph of the standard and has been expanded from the coverage in the present standard with the only major change for us being in the permissible type of respirator in the fiber range of 10 - 50X the exposure limits.
- (h) Personal protective clothing. A major change has been made in this paragraph, requiring the providing by the employer daily of clean full-body protective clothing for all employees whose exposures exceed either the ceiling or TWA limit. The present standard requires such clothing only if the ceiling limit is exceeded.
- (i) Hygiene facilities and practices. This is a new paragraph containing a considerably expanded requirement. The major change involved is the requirement for "clean change rooms" and showers for all workers wearing protective clothing. Another new requirement is that lavatory and toilet facilities located in regulated areas shall not be accessible from uncontaminated areas.

The effect of this for us is that, if we have any workers with exposures exceeding either limit, thus requiring wearing of protective clothing, two locker rooms will be required, separated by the showers, with the "contaminated" locker room not to be used by any workers not exposed to asbestos. It would also mean that these employees having excessive exposures would have to be provided separate lavatory and toilet facilities from those used by employees not exposed to asbestos.

- (j) Medical surveillance. A major change in this requirement provides for informing an employee who refuses a medical examination of the possible health consequences and obtaining a signed statement from him that he has been so informed and refuses to be examined. A serious defect in this proposed revision is that it fails to correct a problem inherent in the present standard; namely, the failure to establish some lower limit of fiber exposure below which medical surveillance will not be required.

Another major change in the medical surveillance is the requirement to obtain from the examining physician a written opinion, a copy of which is to be given to the employee, containing the physician's judgment "as to whether the examined employee has any medical conditions which would place the employee at increased risk of impairment of his health from exposure to asbestos fibers, or which would, directly or indirectly, be aggravated by such exposure." The written opinion also is to contain a physician's recommendation as to any "limitations upon the employee's exposure to asbestos fibers or upon the use of protective clothing and equipment such as respirators." It is also to include a statement that the employee has been informed by the physician of any medical conditions which require further examination or treatment, but with the written opinion not revealing special findings or diagnoses unrelated to occupational exposure to asbestos fibers.

The medical surveillance paragraph also stipulates that no employee shall be exposed to asbestos fibers in such a way as would put the employee at increased risk of material impairment of his health from such exposure and that this determination may be based on the physician's written opinion.

(k) Employee information and training. This is a new paragraph which requires detailed training for employees assigned to regulated areas including:

- (1) The nature of operations causing fiber exposures and the necessary protective steps;
- (2) The engineering controls and work practices associated with the job assignment;
- (3) Full instructions for appropriate respirators;
- (4) The purpose for and description of the medical surveillance program; and
- (5) A review of the standard.

Copies of the standard and appendices A, B, and C are to be readily available to these employees.

- (1) Danger signs and labels. This section was formerly titled "Caution signs and labels." The changes proposed would require the use of the words "Cancer Hazard" to replace "Dust Hazard" on signs for regulated areas and "Danger - Cancer Hazard" to replace "Caution - Breathing asbestos dust may cause serious bodily harm" on labels for raw materials and scrap materials.

- (m) Housekeeping. This paragraph is essentially unchanged.
- (n) Recordkeeping. This paragraph has been greatly expanded to require specific details of monitoring tests, employee exposures and rosters, employee training, ventilation measurements, and medical records, with the ventilation measurement and employee training records to be maintained three years and all others for at least 40 years or for the duration of employment plus 20 years, whichever is longer.
- (o) Observation of monitoring. This is a new paragraph expanding the content of (f)(4) of the present regulation to require the employer to provide the necessary personal protective equipment, where required, for observers and to require explanation of the methods of measurement, including sampling and analysis, as well as allowing the observer to record the results obtained.
- (p) Appendices. This is a new paragraph which provides the material which is to be used for the training of employees and to be maintained accessible to exposed employees.

At this time it is impossible to predict when this revised standard will be promulgated or what it will look like in final form. However, we feel that the likelihood of any major changes from what is proposed is very small. Therefore, the provisions of this proposed revision to the standard and their related cost impact should serve as a further incentive for every location to discontinue the use of asbestos of all forms to the fullest extent functionally feasible even at somewhat higher cost for the replacement material.

A major development effort is underway to try to replace completely the use of molten metal marinite in ingot operations with non-asbestos-containing alternates. The complete success of this program for all such applications, particularly the very large ingot sizes, is by no means certain. Your regular monitoring of the marinite cutting operations will be invaluable in establishing whether present practices and control equipment are capable of meeting the proposed 0.5 fiber/ml standard.

Another area that probably warrants attention by all locations is that of pipe lagging. The Construction Engineering Division has developed Alcoa Engineering Standards for non-asbestos-containing pipe lagging which are functionally equivalent to asbestos. These, of course, will now be specified on all major construction projects, but also should be required on all local construction projects and for all repair and maintenance activity.

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Shortly after the institution of the asbestos standard in 1972, we recommended that all locations having furnaces of any kind or melting pots in which asbestos had been used as a backing material to any significant extent begin records of the repair and replacement of the linings of these vessels with non-asbestos backing material so that they would know when all of the old asbestos-containing lining had been removed. This was for the purpose of establishing an end point to the necessity of the required provisions of the asbestos standard for the maintenance people involved. These records for any vessels for which this transition has not been completed should certainly be continued till this has been accomplished.

If we can be of any help in interpreting the provisions of this proposed standard or any related matter, please do not hesitate to contact us.

ROBERT P. CARTER

RPC:lms

cc:
Company Physicians
Environmental Steering Committee Chairmen &
Environmental Managers

Note: Information relative to health standards proposed or promulgated under authority of the U.S. Occupational Safety and Health Act is sent to overseas locations for informational purposes only.

412769 0109

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FROM ROBERT P. CARTER
HEALTH & ENVIRONMENT DEPARTMENT
PITTSBURGH OFFICE, 7

TO

IN NEWSLETTER

July 22, 1975

RE: OSHA ASBESTOS STANDARD - REGULATION 1910.1001 (FORMERLY 1910.93a)

At the time when the OSHA permanent standard for worker exposure to asbestos was promulgated in June of 1972, it established an 8-hour, time-weighted average airborne concentration of asbestos fiber of 5 fibers, longer than 5 micrometers, per cubic centimeter of air effective July 7, 1972, with this value to be reduced to 2 fibers per cubic centimeter effective July 1, 1976. There is a good probability that the reduction in permissible employee exposure level to 2 fibers per cubic centimeter will be proposed by OSHA to become effective well before the original date of July 1, 1976. In the light of this situation, all locations making any use of asbestos products, particularly our refining, smelting and ingot locations, should review their situations with respect to their capability of meeting the 2 fiber per cubic centimeter limit by a much earlier date, which could be as soon as December 1, 1975 or January 1, 1976.

We believe that it is essential that each location review very carefully the materials which it is presently using for insulation and refractory purposes, including possible uses of asbestos paper and board which can give rise to airborne asbestos fiber. There have been several instances recently where asbestos products have been found to be still in use in such a way that would give detectable airborne fiber concentrations in routine production operations. While the airborne fiber concentration determined at these operations was not excessive, it was measurable and, as such, will require medical examinations for the exposed employees. Of course, all scrap and waste material containing asbestos must be disposed of in accordance with the requirements of the standard.

The cost impact of these required medical examinations and the waste material disposal practices may well be such that further effort should be devoted to finding non-asbestos alternates to eliminate the problem altogether.

For those ingot locations which are still sawing and machining marinite for headers where there is the expectation of replacing this usage with ceramic headers as outlined in Mr. J. A. Dunbar's letter of June 10, 1975 re "Pilot Production of Ceramic Headers," it appears that there is a good probability that such a change-over to ceramic headers will not be completed before any advanced effective date of the two asbestos fiber per milliliter OSHA standard, and perhaps not even by the presently mandated date of July 1, 1976. As soon as sufficient manufacturing and casting experience with ceramic headers has been realized, these locations



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July 22, 1975
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should develop as definite a program as possible for their complete conversion to ceramic headers, including estimated dates for the completion of the various phases of this change-over. The development of this definite written program can then be used as the basis for the use of appropriate respirators for any workers having asbestos exposures in excess of the two fiber per milliliter limit until the change-over to ceramic headers has been completed and the use of marinite discontinued altogether.

At the present time we do not know whether there will be any other changed requirements in the standard than the earlier effective date for the two fiber per cubic centimeter limit. However, if there are any additional or changed provisions, we will advise you of these and their possible impact promptly.

ROBERT P. CARTER

RPC:lms

Letter to: Industrial Hygienists

Copies to: Environmental Steering Committee Chairmen

cc:

V. W. Rieke, Pittsburgh 2

J. A. Dunbar, Pittsburgh 23

G. R. Swany, Pittsburgh 23

G. H. Farrah, ATC

J. M. Plunkett, ATC

J. D. Breazeal, Davenport

R. H. Watson, Pgh. 7

M. O. Colwell/B. D. Dinman, Pgh.

412769 0112

FROM ROBERT P. CARTER
PITTSBURGH OFFICE

#1
TO

Mr. Thomas B. Bonney
Pittsburgh Office

3

December 23, 1971

RE: EMERGENCY STANDARD FOR EXPOSURE TO ASBESTOS DUST

In the Federal Register of Tuesday, December 7, 1971, the Occupational Safety and Health Administration, Department of Labor, published a notice of the issuance, effective immediately, of an emergency standard for exposure to asbestos dust. A copy is enclosed for those who have not yet seen it. This emergency standard, which will be effective until further notice, establishes lower permissible employee exposure levels than those which had been made effective with the notification in the Federal Register of Friday, August 13, 1971. We are, therefore, notifying all of our operating locations of this emergency standard so that they may take appropriate cognizance of this with respect to any of their operations involving the handling, cutting, fabricating or other work involving the use of asbestos or asbestos-containing products such as the Marinite which is used extensively in our ingot casting operations. Where there is any question about the present levels of worker exposure meeting these emergency standards, the use of appropriate respirators should be instituted.

Shown on the attachment are all the respirators which have been approved as of February 1, 1971, by the U.S. Bureau of Mines under their Schedule 21B which is the required type protection as defined in Part 1910.93a, paragraph (c) (2) and (3). A list of approved equipment under Bureau of Mines Schedule 19B as specified in paragraph (4) is also attached.

Your attention is also called to paragraph (c) subparagraphs (5) and (6) which require the establishment of a respirator maintenance program and the proper inspection, cleaning, repairing and storing of respirators. It should also be noted that under paragraph (d) cutting or machining operations such as those which are used at many works for the cutting of Marinite or other asbestos products must be provided with local exhaust ventilation and dust collectors in accordance with American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2 - 1971, and also that employees whose exposure results from the spraying of asbestos or the demolition of pipes, structures or equipment covered or insulated with asbestos shall be provided with respirators of the type C positive pressure supplied-air category approved under Bureau of Mines Schedule 19B. Paragraphs (e), (f) and (g) deal with the mixing of asbestos mortar, grout and plaster, the disposal of asbestos waste, and the cleanup of asbestos dust.

For your further information, we are attaching a copy of Volume 3, No. 4, Winter, 1971, of the leaflet "Insulations Hygiene Progress Reports" which contain some very helpful recommendations for minimizing and preventing asbestos dust from becoming airborne in various types of industrial operations. Additional copies of this leaflet may be obtained by contacting directly the source of this publication.



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Industrial Hygienists
December 23, 1971
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If you have any questions concerning this important matter, please do not hesitate to contact us.

ROBERT P. CARTER

RPC:lel

TO: INDUSTRIAL HYGIENISTS

cc: T. M. Brown, Pittsburgh - 2
E. C. Collins, Pittsburgh - 21
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H. J. Goodyear, Pittsburgh - 7 O.P.
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H. C. Sperry, Pittsburgh - 21
G. H. Farrah, EHL, ATC

cc (letter only):
Safety Directors (d)

To be a valid assay, the percent column recovery should be 100 ± 2 percent.

(5) *Identity*. Proceed as directed in § 141.521 of this chapter, using a 0.5 percent potassium bromide disc prepared as described in paragraph (b) (1) of that section.

(7) *Crystallinity*. Proceed as directed in § 141.504(a) of this chapter.

§ 150g.11 Minocycline hydrochloride capsules.

(a) *Requirements for certification—*

(1) *Standards of identity, strength, quality, and purity*. Minocycline hydrochloride capsules are composed of minocycline hydrochloride and one or more suitable and harmless lubricants and diluents enclosed in a gelatin capsule. Each capsule contains minocycline hydrochloride equivalent to 100 milligrams of minocycline. Its potency is satisfactory if it is not less than 90 percent and not more than 115 percent of the number of milligrams of minocycline that it is represented to contain. Its moisture content is not more than 12 percent. The minocycline hydrochloride used conforms to the standards prescribed by § 150g.1(a) (1).

(2) *Labeling*. It shall be labeled in accordance with the requirements of § 148.3 of this chapter.

(3) *Requests for certification; samples*. In addition to complying with the requirements of § 146.2 of this chapter, each such request shall contain:

(i) Results of tests and assays on:

(a) The minocycline hydrochloride used in making the batch for potency, safety, moisture, pH, minocycline content, identity, and crystallinity.

(b) The batch for potency and moisture.

(ii) Samples required:

(a) The minocycline hydrochloride used in making the batch: 10 packages, each containing approximately 300 milligrams.

(b) The batch: A minimum of 30 capsules.

(b) *Tests and methods of assay—*(1) *Potency*. Proceed as directed in § 141.111 of this chapter, preparing the sample for assay as follows: Place a representative number of capsules into a high-speed glass blender jar with sufficient 0.1N hydrochloric acid to give a stock solution of convenient concentration containing not less than 150 micrograms of minocycline per milliliter (estimated). Blend for 3 to 5 minutes. Remove an aliquot and further dilute with 0.1M potassium phosphate buffer, pH 4.5 (solution 4), to the reference concentration of 0.100 microgram of minocycline per milliliter (estimated).

(2) *Moisture*. Proceed as directed in § 141.502 of this chapter.

Data supplied by the manufacturer concerning the subject antibiotic have been evaluated. Since the conditions pre-

requisite to providing for its certification have been complied with and since not delaying in so providing is in the public interest, notice and public procedure and delayed effective date are not prerequisites to this promulgation.

Effective date. This order shall be effective upon publication in the *FEDERAL REGISTER* (12-7-71).

(Sec. 507, 59 Stat. 463, as amended; 21 U.S.C. 357)

Dated: November 21, 1971.

H. E. SIMMONS,
Director, Bureau of Drugs.

[FR Doc.71-17773 Filed 12-6-71; 8:45 am]

Title 29—LABOR

Chapter XIII—Bureau of Labor Standards, Department of Labor

PART 1518—SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

Standard for Exposure to Asbestos Dust

Pursuant to section 4(b) (2) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1592, 29 U.S.C. 653), § 1518.55 of Title 29, Code of Federal Regulations, is hereby amended in the manner indicated below in order to prescribe a new standard limiting the exposure of workers to asbestos dust. The new standard limiting the exposure of employees to asbestos dust is that adopted under section 6(c) of the Williams-Steiger Occupational Safety and Health Act of 1970 and published in the *FEDERAL REGISTER* on this date. The standard is hereby determined to be more effective than that presently provided under § 1518.55 to the extent that it prescribes minimum levels of exposure to asbestos dust. Therefore, by operation of section 4(b) (2) of the Act the new standard issued under section 6(c) supersedes the construction safety standard relating to exposure to asbestos dust.

Section 1518.55 is hereby amended by adding a new paragraph (c) thereto. As amended § 1518.55 reads as follows:

§ 1518.55 Gases, vapors, fumes, dusts, and mists.

(c) Paragraphs (a) and (b) of this section do not apply to the exposure of employees to airborne asbestos dust. Whenever any employee is exposed to airborne asbestos dust, the requirements of § 1910.93a of this title shall apply.

Effective date. This amendment shall become effective upon publication in the *FEDERAL REGISTER* (12-7-71).

(Sec. 4(b) (2), 84 Stat. 1592, 29 U.S.C. 653; Secretary's Order No. 12-71, 36 F.R. 8764)

Signed at Washington, D.C., this 2d day of December 1971.

G. C. GUENTHER,
Assistant Secretary of Labor.

[FR Doc.71-17835 Filed 12-6-71; 8:47 am]

Chapter XVII—Occupational Safety and Health Administration, Department of Labor

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

Emergency Standard for Exposure to Asbestos Dust

Pursuant to section 6(c) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1596, 29 U.S.C. 655), Part 1910 of Title 29, Code of Federal Regulations (36 F.R. 10466, May 29, 1971) is hereby amended in the manner indicated below in order to provide an emergency standard dealing with the exposure of employees to asbestos dust.

In light of increasing information on the results of exposure of employees to airborne asbestos dust, including recent studies by the National Institute for Occupational Safety and Health and others, and recommendations by the American Conference of Governmental Industrial Hygienists (ACGIH), it is hereby determined that (1) exposure under the present standard for asbestos dust in Table G-3, § 1910.93, of 12 fibers per milliliter greater than 5 microns in length or 2 million particles per cubic foot of air, which is derived from an established Federal standard promulgated under the Walsh-Healey Public Contracts Act on May 20, 1969, constitutes a grave danger to employees exposed to this 8-hour time-weighted average concentration; and that (2) an emergency standard is necessary to protect employees from this excessive exposure. The National Institute for Occupational Safety and Health concurs that the proposed change in the asbestos dust standard recommended by the American Conference of Governmental Industrial Hygienists should be the substantial base for the emergency standard.

Action concerning the standard will be commenced under section 6(b) in the immediate future. Any notice of proposed rulemaking under section 6(b) will give notice of the emergency standard as a proposed rule and also of any appropriate subsidiary proposals which may be required under subparagraphs (5) and (7) of section 6(b) relating to the exposure of employees to toxic substances.

Part 1910 is amended as follows:

1. Table G-3 following § 1910.93 (36 F.R. 15104, Aug. 13, 1971) is hereby amended by deleting the following:

Asbestos—12 fibers per milliliter greater than 5 microns in length or	2 Mppcf.
Tremolite	5 Mppcf. 20mg./M ³
	% SiO ₂

As amended, Table G-3 reads as follows:

TABLE G-3—MINERAL DUSTS

Substance	Mppcf*	Mg/M ³
Silica:		
Crystalline:		
Quartz (respirable).....	250	10mg/M ³ =
	%SiO ₂ +8	%SiO ₂ +2
Quartz (total dust).....		30mg/M ³
		%SiO ₂ +2
Cristobalite: Use 1/4 the value calculated from the count or mass formulae for quartz.		
Tridymite: Use 1/4 the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth.....	20	80mg/M ³
		%SiO ₂
Silicates (less than 1% crystalline silica):		
Mica.....	20	
Soapstone.....	20	
Talc.....	20	
Portland cement.....	20	
Graphite (natural).....	15	
Coal dust (respirable fraction less than 6% SiO ₂).....		2.4mg/M ³ or 10mg/M ³
For more than 6% SiO ₂		%SiO ₂ +2
Inert or Nuisance Dust:		
Respirable fraction.....	15	5mg/M ³
Total dust.....	50	15mg/M ³

Note: Conversion factors—
mppcf/35.2=million particles per cubic meter
=particles per c.c.

* Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

† The percentage of crystalline silica in the formula is the amount determined from air-borne samples, except in those instances in which other methods have been shown to be applicable.

‡ As determined by the membrane filter method at 430X phase contrast magnification.

§ Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of 2.4 Mg/M³ in the table for coal dust is 4.5 Mg/M³.

2. A new § 1910.93a is added to Part 1910. The new § 1910.93a reads as follows:

§ 1910.93a Asbestos dust.

(a) The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 5 fibers per milliliter greater than 5 microns in length, as determined by the membrane filter method at 400-450X magnification (4 millimeter objective) phase contrast illumination. Concentrations above 5 fibers per milliliter but, not to exceed 10 fibers per milliliter, may be permitted up to a total of 15 minutes in an hour for up to 5 hours in an 8-hour day.

(b) Engineering methods, such as but not limited to, enclosure, vacuum sweeping, and local exhaust ventilation, shall

be used to meet the exposure limits prescribed in paragraph (a) of this section. Where such engineering methods are not feasible, or do not otherwise reduce the concentrations below those prescribed in paragraph (a) of this section, respiratory protective devices shall be provided and used in accordance with paragraph (c) of this section.

(c) (1) (i) When the limits of exposure to asbestos dust prescribed in paragraph (a) of this section are exceeded and when engineering controls required by paragraph (b) of this section are not feasible or do not otherwise reduce the concentration of asbestos dust below those prescribed in paragraph (a) of this section, the employer shall require the use of respiratory protective devices. The selection of respiratory protective devices shall be limited to those specified in the remaining subparagraphs of this paragraph (c).

(ii) The employer shall require that each employee test his respiratory protective device before each use in order to insure a proper fit according to the manufacturer's instructions. The employer shall further provide for effective training or supervision of employees in the testing of respiratory protective devices for fit before their use.

(2) For an atmosphere containing not more than 25 fibers per milliliter greater than 5 microns in length over an 8-hour average, or more than 50 fibers per milliliter over any period of 15 minutes, a reusable or single-use filter type respirator, operating with negative pressure during the inhalation phase of breathing, approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 14 (Bureau of Mines Schedule 21B), or a valveless respirator providing equivalent protection, shall be used.

(3) For an atmosphere containing not more than 250 fibers per milliliter greater than 5 microns in length over an 8-hour average, or more than 500 fibers per milliliter over any period of 15 minutes, a powered filter positive pressure respirator approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 14 (Bureau of Mines Schedule 21B) shall be used.

(4) For an atmosphere containing more than 250 fibers per milliliter greater than 5 microns in length over an 8-hour average a type C positive pressure supplied-air respirator approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 12 (Bureau of Mines Schedule 19B) shall be used.

(5) The employer shall establish a respirator program in accordance with the requirements of American National Standard Practice for Respiratory Protection Z88.2-1969.

(6) The respirators provided each employee shall be properly inspected, cleaned, repaired and stored.

(d) (1) When an employer has employees who are exposed to asbestos dust exceeding the limits prescribed in paragraph (a) of this section and the exposure results from the operations described in the remaining subparagraphs of this paragraph (d), the employer shall

comply with the requirements of these subparagraphs relating to the operations involved. The requirements of this paragraph are in addition to those prescribed in paragraph (b) of this section.

(2) All hand- or power-operated tools which produce asbestos dust such as, but not limited to, saws, scorers, abrasive wheels, and drills shall be provided with local exhaust ventilation and dust collectors in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems; ANSI Z9.2-1971.

(3) Employees exposed to the spraying of asbestos or the demolition of pipes, structures, or equipment covered or insulated with asbestos shall be provided with respiratory protective devices in accordance with paragraph (c) (4) of this section.

(e) Asbestos cement, mortar, coatings, grout, and plaster shall be mixed in closed bags or other containers.

(f) Asbestos waste and scrap shall be collected and disposed of in sealed bags or other containers.

(g) All cleanup of asbestos dust and blowing shall be performed by vacuum cleaners. No dry sweeping shall be performed.

3. Section 1910.12 is amended by changing paragraph (a) in order to apply the emergency standard prescribed in the new § 1910.93a, which is published in this document, to construction work which is subject to the Act. The amendment is necessary in light of the rule of regulatory construction set forth in § 1910.5(c). As amended, § 1910.12 reads as follows:

§ 1910.12 Construction work.

(a) (1) Adoption and extension of established safety and health standards for construction. The standards prescribed by Part 1518 of this title and in effect on April 28, 1971, are adopted as occupational safety or health standards under section 6(a) of the Act and shall apply, according to the provisions thereof, to every employment and place of employment of every employee engaged in construction work. Each employer shall protect the employment and places of employment of each of his employees engaged in construction work by complying with the appropriate standards prescribed by this paragraph.

(2) The standards prescribed in § 1518.55(c) of this title shall apply in the case of the exposure of any employee in construction work to airborne asbestos dust.

Effective date. These amendments shall become effective immediately upon publication in the FEDERAL REGISTER (12-7-71).

(Sec. 6(c), 84 Stat. 1596, 29 U.S.C. 655; Secretary's Order No. 12-71, 36 F.R. 8764)

Signed at Washington, D.C., this 2d day of December 1971.

G. C. GUENTHER,
Assistant Secretary of Labor.

[FR Doc. 71-17863 Filed 12-6-71; 8:47 am]



INSULATION HYGIENE PROGRESS REPORTS

FROM THE INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM

Irving J. Selikoff, M.D., Program Director

Vol. 3, No. 4

Winter 1971



Dust produced by use of an unventilated band saw. Without the back lighting used here, much of the dust would not be visible.



Cutting pipe with band saw equipped with high-velocity, low-volume exhaust system. Compare absence of any airborne dust with that shown in uncontrolled cutting (picture left.)

Shipyard Procedures Guide Helps All Insulation Men

The Winter 1970 issue of Insulation Hygiene Progress Reports announced a joint effort by the Insulation Industry Hygiene Research Program, the U.S. Navy, the Department of Labor, and insulation manufacturers and contractors to control shipyard asbestos dust exposures.

As part of that effort, Duncan A. Holaday and William B. Reitze of the IIHRP prepared a procedures guide for shipyard insulation application and removal. Because of its relevance to all insulation work, portions of it are given in this issue of Insulation Hygiene Progress Reports.

A complete report was presented by the authors at the International Symposium on Safety and Health in Shipbuilding and Ship Repairing, at Helsinki, Finland, on August 30, 1971.

by Duncan A. Holaday
and William B. Reitze

The general goal in all insulation work should be to maintain a clean environment.

Measurements of concentrations of asbestos fibers ("dust counts") in the atmosphere can be used to identify sources of contamination and to point out deficiencies in control methods. Primary reliance for control of exposures, however, must be placed on faithful observance of operating rules.

Control of Asbestos-Containing Dusts by Use of Substitute Materials

Substitution of materials containing reduced proportions of asbestos or no asbestos at all, is becoming more common in ship construction. Before a material is substituted for asbestos, however, two questions must be carefully considered:

- a. Has the substitute material been tested? If not, it may turn out to be of the same or greater hazard than the material of known hazard. This sort of thing has hap-

Here Are Some of Many Ways to Reduce Dust

pened in other environmental situations.

- b. Does the new material meet engineering specifications and will it perform adequately under conditions of use?

Materials containing reduced amounts of asbestos have been used in the following applications:

a. Blanket and pad filling

Substitution of the proper types of other pad fillers not only reduces asbestos dust during fabrication and installation but also tends to lessen the problems during subsequent "rip-out". Additionally, asbestos cloth which has been treated with a dust suppressant is available and its use should also be encouraged. There are reports that much less dust will be produced.

b. Pipe covering and block

Serious consideration should be given to those products containing lower amounts of asbestos fiber. Several British firms have introduced asbestos-free calcium silicate block and pipe covering. To date, however, this material has not been adequately evaluated in the United States to determine how it will perform in use.

Reduction of Dust by Changes in Work Methods

a. Mixing Asbestos Mortar

This operation has usually been done at the job site. While the time spent in mixing is quite short, considerable dust is produced. A tested method of control is to mix the mortar dockside under controlled conditions and package the mixed mortar in several containers for transportation to the job site.

Mortar is also available packaged
(Continued on second page)

Insulation Hygiene Progress Reports

Vol. 2, No. 4

Winter 1971

from the

Insulation Industry Hygiene Research Program

Editor: W. J. Nicholson, Ph.D.,
Published at the Environmental
Sciences Laboratory (Irving J. Selikoff, M.D., Director), Mount Sinai
School of Medicine of the City University of New York, New York,
N.Y. 10029

Advisory Council of IIHRP

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Research and Development,
Johns-Manville Corporation, New
York, N.Y.

PURPOSES OF THE INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM

1. To develop improved methods for minimizing exposure of insulation workers to dusts and fumes encountered in their work.
2. To disseminate knowledge of these improved methods of dust control wherever they may be applied advantageously and to offer cooperation, advice and assistance toward their universal adoption.

Procedures Used at Puget Sound Naval Shipyard

(Continued from first page)

in several sizes of plastic bags which have a spout through which water is introduced. Sufficient water is added to moisten the mortar; after premixing, the bag is opened and the remaining water added. The carton in which the bag is packaged may serve as a mixing box and waste container.

b. Pre-cutting pipe covering and block in the fabrication shop

Hand-cutting of pipe covering and block should be kept to an absolute minimum. Bend sections, pipe cover lengths, and blocks, should be cut in the fabrication shop on exhaust-ventilated equipment.

How the Navy Does It

At the Puget Sound Naval Shipyard, cut sections are dipped in water and then packed in plastic bags which are labeled to identify the location where they are to be used. The cut sections are still damp and relatively dust-free when they are applied and the plastic bags are available for use in collecting wastes.

c. Pre-scoring blocks

Insulation blocks should not be scored at the job site. Blocks which have been pre-scored by the manufacturer can be purchased, or standard blocks can be scored in the fabrication shop by



High temperature mortar packed in plastic bag. Water is added to bag through spout and mortar moistened before opening. The moistened mortar is removed as required and mixing completed in shipping container. All wastes are placed in container and sent to disposal at end of shift.

using an exhaust-ventilated gang saw.

d. Insulating pipe assemblies in the shop

Some pipe assemblies are quite intricate and are troublesome to lag while in place. A satisfactory method of doing these jobs, particularly during ship repair, which is employed by the Puget Sound Naval Shipyard, is to remove the assembly in conveniently sized sections and transport them to the shop. Here the old insulation is removed, any necessary repair of the pipes performed, and the assembled section re-lagged.

Relag in the Shop

Not only is dust dispersion reduced, but it is much more convenient to re-lag the section in the shop than when it is in place shipboard. Any insulation which is damaged during transport and fitting is repaired after the sections are in place.

e. Hand-cutting at job sites

Some hand-cutting at job sites is unavoidable. However, dispersion of dusts by these operations can be minimized. A portable down-draft table is used by the Puget Sound Naval Shipyard. This table has folding legs so that it can be carried down companionways and set up conveniently to the work. A small industrial vacuum cleaner is the source of exhaust. Scrap is dropped into a plastic bag and a
(Continued on third page)



Procedure used at Puget Sound Naval Shipyard for handling bend sections. Sections are cut in fabrication shop, dipped in water and placed in plastic bag. The bag is then labelled with the job-site description.



Dampening fibrous glass blanket filler before cutting. Note lateral draft hood in which fabrication is done.

(Continued from second page)

dropcloth is placed on the deck under the equipment.

f. Fabrication of Pads and Blankets

Pads for valves and machinery should be fabricated in the shop whenever possible. Amosite has been largely replaced by fibrous glass filling with covers of an asbestos cloth which has been treated with dust suppressants. As an effective means for suppressing dust dispersion and collection, the fibrous glass blanket is unrolled, dampened and rerolled. This procedure insures that all the blanket will be dampened. The blanket and asbestos cloth shapes are cut in the lateral draft booth.

g. Housekeeping and Clean-up

Essential parts of a dust control program are housekeeping and clean-up procedures. Meticulous attention must be given to restricting the spread of dust and larger wastes. Use of a dropcloth under a work area vividly illustrates how much waste would be distributed over the general area or to lower decks if one were not used.

Areas should be cleaned up at the lunch break and the end of each shift, using an industrial vacuum cleaner to collect dust and small scrap.

In all possible instances, workmen should clean up their own areas. Where work rules prohibit this, the clean-up crew should be under the direction and supervision of the insulation foreman to insure that proper attention is given to this important subject.

Reduction of Dusts by Use of Local Exhaust Ventilation

a. Ventilation of Large Power Tools—Band Saws

Extensive use of band saws both in dockside fabrication shops and, on board larger ships such as aircraft carriers make emissions from band saws a major source of asbestos dust. Control devices for such saws have been known for years and are relatively simple. Conventional low-velocity, high-volume systems, using a negative pressure baghouse for air cleaning, are practical in a fixed installation fabrication shop.

Because some degree of portability is desirable in a temporary shipboard fabrication area, a high-velocity, low-volume dust collection unit is desirable for



Portable down-draft table developed by Puget Sound Naval Shipyard for use shipboard. Lightweight industrial vacuum cleaner is used as the air mover. Note plastic bag for scrap and dropcloth on deck.

such use; it may also be suitable for fixed installations. The air mover is an industrial vacuum cleaner which pulls about 50 cubic feet of air per minute past the saw blade at velocity of more than 10,000 feet per minute. This system is a very efficient dust collector. Units such as this can also be designed to control dusts produced by table saws and gang saws.

b. Ventilation of Hand Power Tools

High-velocity, low-volume collection systems control dust emissions from most small power tools adequately. Saber saws for cutting pipe covering and rotary

saws for cutting asbestos cement board are well controlled with these systems.

Control of Number of Workmen Exposed

a. Scheduling of Insulation Work

Standard industrial hygiene practices call for insulating operations which contaminate the atmosphere with toxic materials. Areas where insulation work is being done under conditions in which dust might be created should be isolated by non-flammable curtains or other means. Whenever possible, work should be scheduled to minimize the numbers of other tradesmen in the area. Ship construction operations are more readily scheduled than are ship repair or ship-breaking jobs. However, every effort should be made to keep the number of men exposed at a minimum. In particular, rip-out of old insulation should always be isolated and, if necessary, performed on an off-shift. Trained workmen supplied with proper protective equipment should always be used for rip-out work and it should be scheduled for rapid completion.

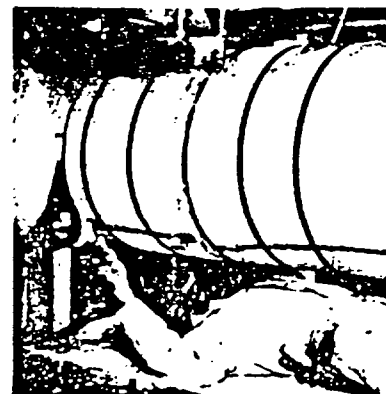
Personal Protective Equipment

In addition to dust suppression and dust control procedures, personal protective equipment is often necessary to reduce exposure and limit the spread of contamination. The equipment described below is used in control programs.

a. Protective Clothing

Protective clothing is required to keep contamination confined to the work areas. One method is to issue disposable coveralls which can be removed when leaving the

(Continued on fourth page)



Use of dropcloth to contain wastes and facilitate clean-up.



A small industrial vacuum cleaner being used by a Local 62 asbestos worker for clean-up.

(Continued from third page)

work area or some time prior to entering the locker room and placed in plastic bags for disposal.

Resin Impregnated Paper

A satisfactory type of protective clothing consists of resin impregnated paper coveralls. These are inexpensive and readily disposable. They prevent spreading contamination to laundries and eliminate pilferage. They are worn for one shift, then removed and placed in plastic bags for disposal with other asbestos-containing wastes.

b. Respiratory Protective Equipment

Occasionally some operations generate so much dust that it is virtually impossible to maintain satisfactory atmospheric concentrations of asbestos fibers and respiratory protection must be provided to the workers. A variety of respiratory protective equipment is available from which devices suitable for various situations can be selected. American National Standard Z88.3-1971, *Safety Guide for Respiratory Protection Against Asbestos-Containing Dusts* (obtainable from American National Standards Institute, 1430 Broadway, New York, N.Y. 10018) should be referred to for detailed information.

Invisible Dust

It is emphasized that unsatisfactory amounts of respirable dust can be present in the air even though conditions are not visibly dusty.

1. Air-supplied Respirators

Extremely dusty jobs, such as rip-out of old insulation where dust concentrations are very high, require use of air-supplied respirators which will deliver clean, dust-free air to a facepiece or hood. Two general types are available: air-line and self-



Saber saw equipped with high-velocity, low-volume exhaust system.

powered.

a) Air-line respirators in which air is supplied to a hood, helmet or facepiece give the greatest degree of protection. Air is fed to the facepiece from a compressed air-line. The air source must be located in an uncontaminated area and if the source is not specifically designed for breathing purposes, a temperature sensing alarm must be installed on the compressor or a carbon monoxide monitoring device must be installed in the air-line.

Disposable Hood

Anti-freeze compounds should not be used in the compressor system; water vapor must be removed by desiccant and oil mists removed by a filter.

A plastic, disposable hood has been developed by the Puget Sound Naval Shipyard for situations where a very high degree of protection is required. This hood and other similar ones are available commercially. The air-line should be fastened to the hood with a quick-disconnect fitting.

Self-powered Respirators

b) Air-line respirators connected to a compressed air supply limit movement, and this limitation can be troublesome. Self-powered respirators do not impose such limitations, but they do add to the equipment the workman must carry and they also require careful maintenance.

2. Particulate-filtering Respirators

There are several types of particulate-filtering respirators. Those with a half-mask facepiece are considered most suitable for use by insulators. Only those approved for protection against asbestos dust by the U. S. Bureau of Mines should be used. These devices are recommended for use in situations where the atmospheric concentration of asbestos fibers is at relatively low levels. All the recommendations for res-

pirator-fitting, training of workmen and maintenance, detailed in Z88.3-1971 should be followed.

a) Reusable particulate-filtering respirators

A variety of reusable particulate-filtering respirators are available. To insure proper fitting, several different makes should be available from which the workman can select one. No one model respirator facepiece will fit all faces. Routine maintenance is absolutely necessary to replace clogged filters and leaking inhalation or exhalation valves. Unmaintained respirators produce a false sense of security.

Maintenance Troublesome

b) Disposable particulate-filtering respirators

Operation of an adequate respirator maintenance program can be troublesome and, if only a few men are involved, impractical. Disposable respirators are available which are designed to be worn for no longer than one shift and then discarded.

Education and Training

No dust control program can be effective unless workmen and supervisors understand the hazards associated with the jobs, the sources of the hazards and the reasons for following recommended procedures carefully. Understanding is only obtained by education of personnel and training in correct operating procedures. For an education and training program to be successful, both management and labor must be concerned and participate. As with all safety programs, it is essential that first-line supervisors be interested in and cooperate in the work.

The harmful effects of neglect of procedures for controlling asbestos dust are not apparent for many years. Therefore, it is more difficult to convince workmen and supervisors of the necessity of following rules for working with insulating materials than if more obvious physical hazards were involved.

Education in hazards associated with use of insulating materials and instruction in correct work practices should be included in apprentice training programs.

PHOTO CREDITS: Pg. 1, I.I.H.R.P.; pg. 2, Ryder Industries and Puget Sound Naval Shipyards (P.S.N.S.); p. 3, P.S.N.S.; pg. 4, I.I.H.R.P. and P.S.N.S.

FROM

MICHAEL J. VAUDREUIL

PITTSBURGH OFFICE

TO

Dr. B. D. Dinman
Pittsburgh Office - 6

INDUSTRIAL HYGIENE CONTACTS -
DOMESTIC & FOREIGN

1980 August 14

RE: ASBESTOS REPLACEMENT PROGRAM

As part of Alcoa's asbestos replacement program, a listing of applications and substitutes for asbestos was compiled and distributed in August of 1979. Since that time, some headway has been made in the development of substitutes for several uses of asbestos. The progress to date is reviewed in the attached memorandum.

An updated version of the original master listing is in preparation. Distribution of the revised registry is planned for 1980 November 01. However, critical to this effort is additional input from all Alcoa locations. Information on current plant asbestos use, as well as any successes (or failures) with substitute materials is requested. In order to meet the November 01 target date for release of the updated list, replies should be received by 1980 October 01. This ongoing exchange of information is necessary for the continued success of the program.

With the assignment of Haig Sakoian as Senior Industrial Hygienist, Tennessee Operations, I have assumed the responsibility for overall coordination of the asbestos replacement program. Therefore, please direct all future correspondence to my attention.

MICHAEL J. VAUDREUIL

MJV:mlf

Distribution:

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FROM MICHAEL J. VAUDREUIL

TO MEMORANDUM

PITTSBURGH OFFICE

1980 August 14

RE: ASBESTOS REPLACEMENT UPDATE

The following sections summarize the progress made over the past year in the search for asbestos substitute materials. The discussions are organized by asbestos product, and within each section by specific application. A supplemental list of substitute material suppliers is included.

1. Molten Metal Marinite

There is presently only one necessary use for asbestos in ingot plant operations; that is, header applications. There are adequate replacements in Johns-Manville's Marinite I and Pyrotek's Pyrotherm B-2 board products and R-680 for all other melting and casting needs. Therefore, Molten Metal Marinite need not, and should not be used for dams, basins, troughs, etc. However, at present, the suitability of substitute materials for use as floats is questionable.

Some header-related applications of asbestos have also been eliminated. After header design modifications, R-680 can be used for all FDC headers 635 mm (25 in.) and smaller. With this substitution, Lafayette, Vancouver and Massena should be asbestos free.

Molten Metal Marinite must still be used for HDC and tool and jig headers. R&D programs at ATC will continue to address these areas.

2. Asbestos Rope

Fiberseal A-1 rope (Pyrotek, Inc.) can be used in place of asbestos rope for sealing the gap between the mold and bottom block in FDC casting operations. It prevents metal leakage and its good thermal stability allows it to be reused numerous times. It may also be used for sealing joints in pouring troughs.

Z-5 treated fiberglass rope (Pyrotek, Inc.) can be used successfully as a crucible lid gasket on vacuum-type potroom tapping crucibles. It replaces the presently used Johns-Manville 872 or 702 asbestos gasketing material. However, Z-5 will not replace gaskets made of twisted aluminum foil. Plants using foil gaskets will in all probability have to continue that practice.

3. Transite

Transite, a structural, fire-retardant asbestos/portland cement board, is used extensively in construction. ATC has tested glass-reinforced cement (GRC) sheet as a replacement for transite.



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SUPPLEMENTAL SUPPLIER LIST

<u>Product</u>	<u>Available Forms</u>	<u>Supplier</u>	<u>Phone No.</u>
Nextel 312 TM (ceramic fiber)	1. woven fabric and tape 2. braided sleeving 3. bulk fiber	Ceramic Fiber Products/3M 219-1 3M Center St. Paul, MN 55101	612/733-1558
Zetex TM (a.k.a. Pyrotex TM)	1. woven fabric	Newtex Industries Railroad Avenue P. O. Box 25 Victor, NY 14564	716/924-9135
Thermoglass TM (fiberglass)	1. twisted rope 2. braided sleeving 3. woven fabric and tape	Amatex Corp. 1032 Stanbridge St. Norristown, PA 19404	215/277-6100
HI Fibe ^R (coated polyethylene fibers)	1. fiber fillers for cement, caulkings, etc.	Hill Bros. Chemical Co. One City Boulevard Suite 1521 Orange, CA 92668	714/634-3322
Celiox Fibers (polyacrylonitrile)	1. fabrics *2. conversion to pure carbon fibers	Celanese Plastics & Specialities Co. 26 Main Street Chatham, NY 07928	201/635-2600
*heat treatment			
CER-WOOL (ceramic fiber)	1. blankets 2. vacuum-formed boards 3. bulk fiber	C. E. Refractories P. O. Box 828 Valley Forge, PA 19482	412/351-4409
Siltemp (fibrous glass)	1. cloth	Haveg Industries, Inc. 900 Greenback Road Wilmington, DE 19808	1-800-441-7777
GRC Sheet (fiberglass reinforced cement)	1. flat and corrugated board	GRC Products, Inc. 17051 I.H. 35N Schertz, TX 78154	512/651-6773
GRC Sheet (fiberglass reinforced cement)	1. flat and corrugated board	CEM-FIL Corporation 120 Spence Lane Nashville, TN 37210	615/883-7563
Preox TM (polyacrylonitrile fiber)	1. woven fabric	Gentex Corporation Carbondale, PA 18407	717/282-3550
Kelvar TM and Nomex TM (aramid fiber)	1. cloth 2. rope 3. pump packings 4. tapes and webbings 5. braided sleeving	E.I. duPont de Nemours & Co. Textile Fibers Department Wilmington, DE 19898	302/999-4693

MICHAEL J. VAUDREUIL:m1f
80-08-05

412769 0125

Nextel® 312

3M

Ceramic Fiber Products

Product Bulletin

Thermocouple Insulation

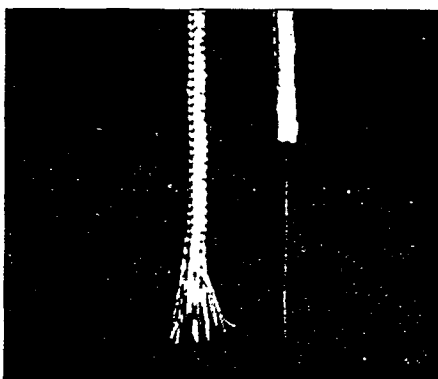
At last: a practical high-temperature insulating material that eliminates the two biggest causes of thermocouple failure.

Dimensional stability and abrasion resistance have always been big sources of trouble for high-temperature insulators. The most commonly used fibers—those made from vitreous silica—typically shrink, abrade, fray, or crumble to the point where wires become exposed. This obviously creates a potential for inaccurate temperature readings. The traditional alternative, ceramic beads, solves the problem of excessive shrinkage and abrasion—but only at a high cost for labor.

Now there's a better alternative. Nextel® 312 Ceramic Fiber from 3M. Nextel 312 withstands operating temperatures of 1000° F. to 2600° F. continuously. It shrinks less and resists the combined effects of abrasion, flexing, and high temperatures better than asbestos, quartz, and vitreous silica fibers. It also offers good chemical resistance and immunity to thermal shock.

Proven dimensional stability.

A recent test compared the dimensional stability of Nextel 312 and vitreous silica by heating sleeves braided around separate lengths of wire for ½ hour at 2000° F. When the samples were removed from the furnace, Nextel 312 still covered the wire completely, thanks to shrinkage of less than 1 per cent. The vitreous silica fiber had shrunk by roughly 12 per cent, leaving an inch of wire exposed at one end.



Nextel 312 braided around a thermocouple wire and heated at 2000° F. for ½ hour shrank 1%. Vitreous silica handled the same way shrank 12%.

Exceptional resistance to abrasion.

In another test, a Duplan "silk-testing machine" was used to compare filaments of Nextel 312 and vitreous silica. Blades were rubbed back and forth on the two products after they had been heated for ½ hour at 1000° F., 1500° F., and 2000° F. Results showed that Nextel 312 lasted 2½ to 5 times as long as the vitreous silica fiber. This means that at 1000° F. Nextel 312

performed 400 per cent better. The figures for 1500° F. and 2000° F. were 300 per cent and 166 per cent respectively.

No residual acids or chlorides to cause etching of wires.

Because Nextel 312 Ceramic Fibers contain no residual acids or chlorides, there's no chemical present to corrode or etch the wires. Even in a test involving exposure to 96 per cent relative humidity, no noticeable electrolytic corrosion was detected. The test consisted of putting Nextel 312 fibers in contact with two unconnected bare #32 copper wires. A 250-volt D.C. potential was applied across the wires. After 20 hours, corrosion was determined by calculating the ratio of anode wire tensile strength to cathode wire tensile strength. Three test runs produced ratios above 0.99; since the maximum ratio possible was 1.00, there was essentially no electrolytic corrosion.

Available from your local thermocouple supplier.

Nextel 312 is being manufactured in production quantities right now. For more information on how it can increase the service life of your thermocouples, contact your supplier. Or call 3M at 612-733-1558 (in Northeast locations call 201-575-2076) or write 3M at the address below.

412769 0126

N-MBTI-3(119,5)11

LITHO IN U.S.A.

Ceramic Fiber Products/3M
219-1 3M Center
St. Paul, Minnesota 55101

3M

FROM BERTRAM D. DINMAN, M.D.

TO

MEMO FOR FILE

*J. Dawsonite
8/1. asbestos*

1980 May 29

Re: DAWSONITE

Discussion with John Konzen on May 28, 1980.

John Konzen indicated several new developments:

1. Dupont has reported that potassium titanate given by inhalation to experimental animals has produced lung cancer and mesothelioma. However, it is very important to note that doses were the order of 40,000 fibers per cubic meter.
2. They have received an advance notice for rulemaking by EPA which states that "if fibers are longer than 10 micra and less than 1.5 micra in diameter, such are not to be considered as a substitute for asbestos". Clearly they are basing this position on the work of Merl Stanton; the fibers industry will be vigorously fighting this proposal.
3. An in-house epidemiologic study (Enterline?) which reviews mortality experience of 3,000 workers with 30 or more years interval since first exposure and 20 or more years work exposure! There is no excess of any tumors of any type except possibly for a small excess of rectal CA. It should be noted that these were workers exposed to glass fiber in the course of manufacture; the special facts of life as regards this exposure must be clearly understood (see below).
4. He also reviewed for me the fact that endotracheal insufflation of fibers of the critical size (as specified by Merl Stanton) has been carried out in experimental animals by Kuschner, by Gross, and by Gardner over the years, and in no cases have they succeeded in producing lung tumors.
5. Konzen feels that the Zeolite problem in Anatolia (central Turkey) is rather curious for several reasons:
 - a. People who live in the area are only spottily affected. They do move about from village to village in the course of living in the area and this complicates the understanding of what the pertinent risk factor may be.
 - b. The "mesotheliomas" which are produced there behave rather curiously, i.e., the people live 2, 3, 4 or more years with these tumors and did not die, which is quite contrary to the behavior of the tumor.

It is extremely important that one understands the aerodynamic properties of fibers to understand what human work exposures mean. The ordinary artificial fiber is 5-9 micra in diameter and of variable length.

412769 0127



Apparently because the aerodynamic properties are such configuration-- as compared with spherical particles?--repeated studies of dust concentrations in glass fiber forming and processing operations reveal that the concentration range is anywhere from 1-5 fibers per cubic meter. More often than not, the number of fibers approaches 1 or maybe less than 1. Clearly, fibers of the size associated with fibrous glass do not apparently suspend very well in air. Sampling studies have been reported by Corn and Esmon in the AIHA over the last several years and have confirmed this. It is also important to state that of the suspended fibers, 80% of the suspended fibers are 3-5 micra or less in diameter, and 20% are less than 1 micra. What we are saying, in effect, is that workers who are handling these fibers have been exposed to critical size fibers as defined by Stanton, but the absolute number of these fibers in their ambient air are extremely small, more often than not being fractions of fiber. (The bottom line of this issue is that the Stanton model, while interesting, represents the same old problem in carcinogenesis, that is, massive dosing. Stanton, during his lifetime, was very clear to state that this model was interesting for the use of study of carcinogenesis, but its relevance to the real world is one which he would not attempt to draw. Nevertheless, it seems that our friends the regulators are not going to be bothered by fine questions such as this and are vigorously attempting to restrict the use of any type of fibers. At the bottom of all this, I presume, is the same old question of the dose/response relationship in carcinogenesis and the role of massive dosing in production of neoplastic disease.

Ultimately this issue is going to be settled in Court since the regulators seem to be hell-bent for leather to regulate man-made fibers out of business.

If Alcoa wishes to reactivate the Dawsonite situation, I think that our people should be acutely aware of the problem since they are talking about fine fiber generation. If we are deadly serious, I suspect we are going to have to pay our dues with TIMA; they are the people who are generating all this information. I don't know how much longer we can, in good conscience, sponge off Owens Corning and/or Elkem and Guthe. It would be advantageous to review our insufflation experiments (Gross, see file) once more; these did indicate acute changes but which did not associate with tumors in any regard.

BERTRAM D. DINMAN, M.D.

BDD/db

copies to: T.B. Bonney
Robert James
Earl Rumberger

My file on Dawsonite is available for your perusal.

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of ~~fibers~~ ^{work} to understand what human exposures ~~has~~ meant. The ordinary ~~artificial~~

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Ultimately this issue is going to be settled in Court since the regulators

1980 May 29

MEMO FOR RECORD

Re: DAWSONITE

Discussion with John Konzen on May 28, 1980.

John Konzen indicated several new developments:

1. Dupont has reported that potassium titanate ^{given} by inhalation has produced (to experimental animals) lung cancer and mesothelioma. However, it is very important to note that doses were the order of 40,000 fibers per cubic meter.
2. They have received an advance notice for rulemaking by EPA which states ^{and} that "if fibers ^{such as} longer than 10 microns and less than 1.5 microns in diameter, ~~it is~~ not to be considered as a substitute for asbestos". Clearly they are basing this position on the work of Merl Stanton ^{fibers} and the industry will be vigorously fighting this proposal.
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4. He also reviewed for me the fact that insufflation of fibers of the critical size ^{and/or} (as ^{specified} enumerated by Merl Stanton) ^{by} have been carried out in experimental animals by Kushner, Gross, and Gardner over the years, and in no cases have they succeeded in producing lung tumors.

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to have to pay our dues with ^MWIA; they are the people who are generating
all this information. I don't know how much longer ^{we} I can, in good
conscience, sponge off Owens Corning and/or Elkem and Guthe. It would
be advantageous to review our insufflation experiments ^(cross-section) once more which ^{these}
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regard.

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is rather curious for several reasons:

A. People who live in the area are only spottily affected.

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i.e., the people live 2, 3, 4 or more years with these tumors
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the tumor.

BDD

FROM HAIG G. SAKOIAN
PITTSBURGH OFFICE

TO

B. D. Dinman
Pittsburgh 7AB

1979 July 30

f 8.1. Cwb
INDUSTRIAL HYGIENE
BDO
EER
VBB
RML
HGS
AUG 6 1979
JD
CCD
DB
LMN
EBS

RE: ASBESTOS SUBSTITUTION

Attached is a summation of asbestos materials currently in use at Alcoa locations. Included in the listing are:

- The material and its use
- The number of plants using the material
- Whether or not there is a potential for employee exposure
- Potential replacements, if available -- and manufacturers (Page 10)

Much effort has been extended to reduce and eliminate asbestos uses in most locations. However, as can be seen by this report, many uses still exist. Because the continued use of asbestos products may result in unnecessary health hazards and concerns to our employees, as well as additional costs to Alcoa to comply with specific provisions of the OSHA Standard, we believe it is in Alcoa's best interest to continue eliminating the use of asbestos products wherever possible. This does not mean that all existing asbestos should be removed immediately which, as in the case of sprayed-on insulation, could create unnecessary exposure potentials. Rather, a systematic effort should be made to discontinue uses, when feasible and practical, by substitution or elimination. By creating this listing and maintaining frequent updating via feedback from all locations, each plant can be provided with the information necessary to attain this goal.

Mr. J. M. McCollum, Pittsburgh Office Mechanical Engineering, has been coordinating such an effort for asbestos replacements in potrooms. A list illustrating Alcoa's experience with potroom replacements is shown on Pages 7, 8, and 9.

It is hoped that this type of registry will be extended to cover all asbestos uses for all locations. To achieve this, it is asked that each location copy this office on all efforts made towards asbestos replacement... whether positive or negative. This information will then be disseminated to all locations on a periodic basis so that each plant can profit from the experience of the others in the Company.

Any questions, comments, or additions to the attached would be appreciated.

HAIG G. SAKOIAN

HGS/eds

Attachments

Distribution: See Page 2



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ASBESTOS REPLACEMENT SUMMARY -- BY USE

<u>MATERIAL/USE</u>	<u>POTENTIAL EXPOSURE</u>	<u>REPLACEMENTS AVAILABLE</u>
<u>Belting/Drip Casting Conveyors</u>	Potential for exposure during maintenance and removal. * (2 plants: 3, 7)	UNTESTED. Potential candidate: Fiberseal Fabric (NOTE: Must determine operating temperatures and strength/durability requirements for engineering.)
<u>Block or brick/Furnaces</u>	Potential for exposure during installation, and especially during removal, even though this is infrequent. * (1 plant: 23)	Ceramic refractory block and brick.
<u>Brakes/Vehicles & Equipment</u>	Recent studies indicate some asbestos fibers survive from brake use and are not destroyed, as presumed previously. However, the percentage of fibers not degraded by heat and friction is unknown. * (All plants)	NONE. Should reemphasize requirement of not using air to blow out brake drums and linings. Vacuum systems are available and should be used. (NOTE: Recommend air sampling for asbestos to document and confirm LOW or NO exposures: 1. Vehicle brake mechanics 2. Extruder brake, mechanical presses, or other equipment brake changers)
<u>Cement Patch/Boiler Maintenance</u>	Potential employee exposure. * (2 plants: 18, 24)	Two grades: 1. <u>Hydraulic-setting cement</u> -- Contains mineral wool and Portland cement; temperature range up to 1,000°F. Suppliers: <u>Johns-Manville</u> - "375" Keene Corp. - "Super Powerhouse" 48 Insulation - "Quick-Set Cement" 2. <u>High-Temperature Grade</u> -- Contains mineral wool; temp. range: 1,000°F to 1,900°F. Suppliers: <u>Johns-Manville</u> - "360" Keene Corp. - "Super 1900" 48 Insulation - "Super 48"

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
Cloth/Insulation, Welding Blankets	Plants indicate NO potential or unknown exposures. In many cases, the cloth is used wet and would, indeed, pose little potential for dust inhalation. However, as several plants indicated, there may be some cases where the exposure is unknown. * (6 plants: 12, 13, 16, 17, 20, & 24)	Pyrotek TM Fabrics (used in Warrick) Pyrotek TM Refrasil Nor.Fab Keller Gloves Kelnit Welding Blankets
Personal Protec- tion/Gloves, Mittens, Pads, Coats, & Pants	There may or may not be a potential for exposure depending on the type of material, i.e., whether it is aluminized or coated; lined or unlined; and the frequency of use. In general, lined, aluminized protective equipment should not generate a potential for dust inhalation. However, noncoated, unlined materials may pose a problem and should be replaced, preferably with a nonasbestos substitute. * (All plants)	These apply for some applications, not all. Many times asbestos gloves are used in cases where the temperatures encountered do not warrant the need for asbestos. For example, flame-resistant terrycloth gloves can often be effective replacements where up to 700°F temperatures are encountered. For temperatures up to 1,000°F, gloves made of duPont's Kevlar fiber may be acceptable. However, past Alcoa experience indicates that in certain applications the seams of these gloves do not hold up. For this reason, each case should be treated separately. Please keep us advised of your results. "Kelnit 29" Keller Gloves Pyrotek TM

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

<u>MATERIAL/USE</u>	<u>POTENTIAL EXPOSURE</u>	<u>REPLACEMENTS AVAILABLE</u>
Marinite and Marinite Floats/ Molten Metal Casting	Because of the special problems associated with Marinite in ingot casting, it is being treated separately. * (11 plants: 1, 7, 9, 13, 16, 17, 19, 20, 21, 22, & 24)	Alcoa Research Laboratories and our suppliers, in conjunction with plant personnel and Primary Products, have been working for some time to find replacements for molten metal Marinite. Due to this effort, replacements are now available for many -- but not all -- of its uses. Many plants are now using these replacements; however, for one reason or another, many plants continue to use Marinite even in those cases with potential replacements. These reasons include initial cost factors, and increased costs associated with lost or decreased production in ingot casting. Considering the increased costs associated with compliance requirements, i.e., medical exams, protective clothing, disposal requirements, ventilation controls, etc. -- in addition to the less tangible, but more serious costs of potential impairment of employee health -- every effort should be made to institute the replacements now available and to continue the search for those uses not yet replaceable. If it is still considered that the costs associated with replacement remain prohibitive to the location, continue the control program and continue the search for a more feasible replacement. This decision must be arrived at only after careful examination by both management and Medical.

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
Packing/ General pump packing	In most cases, pump packing materials are bonded in rubber or some other coating compound. As indicated by the plants, these generate little potential for fiber exposure. However, some packings, such as uncoated, noncompressed, braided asbestos may offer a potential for exposure and should be replaced. * (All plants)	Since specific needs and equipment types vary dramatically, pump packing and general packing materials are purchased at the plant level. Suitable replacements should be handled by plant Purchasing by direct contact with manufacturers and suppliers.
Paper/Welding protection, electrical insulation	Should be replaced. * (6 plants: 1, 3, 7, 13, 17, & 20)	Johns-Manville - Cera wool Paper (NOTE: Asbestos paper should not be used for welding protection. Substitutes available for this application can be found in the section dealing with "Cloth".)
Rope/Furnace insulation	Plants are divided on the extent of potential dust hazards. Uncoated material may pose a problem during removal and disposal and should be replaced. * (15 plants: 1, 3, 6, 8, 12, 13, 15, 16, 17, 18, 19, 20, 21, 23, & 24) Pre-cut compressed gaskets should pose little potential for employee exposure, especially if they are resin or rubber bonded. Sheet gaskets which must be out at the plant may create a dust hazard during cutting, installation, removal, and disposal. Since the requirements for gasketing material vary depending on the	MUST BE TESTED. Johns-Manville - Ceraform Rope (used in Warrick) Pyrotek - Fiberseal Rope + Others
Sheet Gasketing/ General		
	* Number of plants using material.	(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

MATERIAL/USE	POTENTIAL EXPOSURE	REPLACEMENTS AVAILABLE
<u>Sheet Gasketing</u> (Cont.)	application, each use should be carefully considered. Care should be taken to insure that maintenance personnel do not have on hand and use indiscriminantly such sheet gasket material. Storerooms and users should be carefully monitored to: 1. Determine and document exposures. 2. Evaluate housekeeping. 3. Insure proper disposal of waste material. * (All plants)	Tape Replacements: PyrotexTM Refrasil Fiberfrax Nor.Fab
Tape; Tubing/ Furnace seals, general insulation	Majority of plants do not consider this to be a potential dust hazard. However, certain uses may generate free fibers. * (10 plants: 1, 3, 6, 9, 13, 16, 17, 18, 20, & 23)	Tape Replacements:
<u>Thermocouple Wire</u>	Due to deterioration and fraying of the asbestos insulation on thermocouple wire, potential fiber exposure may exist. * (7 plants: 1, 6, 7, 9, 15, & 19; probably more)	Sleeves made of Refrasil or Fiberfrax material may be used in place of asbestos-coated wire in some cases; otherwise, no replacements available.

* Number of plants using material.

KEY TO ALCOA LOCATIONS

1 - ATC	13 - MASSENA
2 - ARKANSAS	14 - MOBILE
3 - BADIN	15 - NORTHWEST ALLOYS (ADDY)
4 - CHILLICOTHE (Wear-Ever Aluminum)	16 - PT. COMFORT
5 - CLEVELAND	17 - REA MAGNET WIRE
6 - CORONA	18 - RICHMOND, INDIANA
7 - DAVENPORT	19 - ROCKDALE
8 - FT. MEADE	20 - TENNESSEE
9 - LAFAYETTE	21 - TIFTON
10 - LANCASTER	22 - VANCOUVER
11 - LEBANON	23 - VERNON
12 - MARSHALL (ACPC)	24 - WARRICK

ASBESTOS -- POTROOM USES

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Cradle to Pot Shell Insulation</u>	Quarry tile	Wenatchee	Tested; proved to be good replacement.
	Cem-Fil GRC Sheet	Warrick	Installed and seems okay; will get back with update.
	Cem-Fil GRC	Massena	Currently testing (just started).
<u>Superstructure Fort Insulation</u>	Cem-Fil GRC - 9" x 7" x 1"	Massena	Received material to be tested.
	Marinite-P -- 1/2" sheet	Massena	Received material to be tested.
<u>Pot Cover Insulation</u>	Almac Plastics Inc.'s- High-Temp Glass	Massena	Testing.
	Marinite-P -- 1/2" sheet	Massena	To be tested.
	Pyrotek's Fiberseal H-3 Fabric	Massena	To be tested for P-75 pot covers.
	(Same as above)	Badin	Double the material; works well.
	(Same as above)	Warrick	Works well; now standard; also works for side shield insulation.
<u>Walkway Grating Insulation</u>	Amatex - Thermoglass #G-36P752	Wenatchee	Satisfactory.
	M-50 Pyrotherm Dense Board	Massena	Tested; unsuccessful; it crumbles.
	GRC Cem-Fil - 1/2" and 3/8"	Massena	To be tested on P-225.
	Marinite-P -- 1/2" sheet	Massena	To be tested on P-225.
	Marinite-P -- 1" board	Badin	Currently testing; not optimistic.
	Pyrotherm G-5 Insulating Board	Badin	To be tested.
	Kaowool M	Warrick	Does not stand up (no good).
	Penn Hi-Temp 270	Warrick	Looks good in preliminary tests; to be tested further; limitation might be that it's too expensive.

(Cont.)

ASBESTOS -- POTROOM USES

Application

Ladle & Ladle Lid
Seal

Silicon Red rubber air
hose - 3/4"
Refrasil - wrapped around
rubber hose
1-1/2" Fiberseal rope - F-10
1" Fiberseal rope - D-1
1-1/2" Fiberseal rope - F-10

Warrick
Badin
Badin &
Massena
Anaconda
Pt. Henry

Standard (but different seal from
other plants).
No good; rubber melts; seal breaks.
On order.
Uses 600 ft./mo. of D-1

ASBESTOS REPLACEMENT MANUFACTURERS

<u>PRODUCT</u>	<u>SUPPLIER</u>	<u>TELEPHONE</u>
<u>PyrotexTM</u>	Newtex Industries, Inc. Railroad Ave. P.O. Box 25 Victor, NY 14564	716/924-9135
<u>Fiberseal Products</u>	Pyrotek Incorporated East 9601 Montgomery Ave. Spokane, WA 99206 - or - Box 77 - R.D. #1 Claremont Rd. Carlisle, PA 17013 - or - Santa Fe Springs, CA	509/926-6211 717/249-2075
<u>Refrasil</u>	HITCO Division of Armco Steel Middletown, OH 45042	
<u>Nor•Fab Yarns; Fabrics</u>	Amatex 1032 Stanbridge St. Norristown, PA 19404	215/277-6100
<u>Fiberfrax</u>	The Carborundum Company Insulation Division P.O. Box 808 Niagara Falls, NY 14302	716/278-6221
<u>Hi-Temp 270</u>	Penn Compression Moulding, Inc. Burton Street Pittsburgh, PA 15218	412/351-4004
<u>Ceramic Fiber Products</u>	Kaowool Babcock & Wilcox Cem-Fil Corporation Two International Plaza Drive Nashville, TN 37217 Keller Glove Mfg. Co. Plumsteadville, PA 18949	615/361-4664 215/766-8818

HAIG G. SAKOIAN
1979 July 20/eds

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