

FROM

MICHAEL J. VAUDREUIL

TO

PITTSBURGH OFFICE

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
MICHAEL J. VAUDREUIL

MJV:mlf

Distribution:

Location Managers - Domestic & Caribbean
Location Managers - Subsidiaries & Allied Products
Safety Managers - Domestic & Caribbean
Safety Managers - Subsidiaries & Allied Products
Location Engineering Managers
Purchasing Agents

J. H. Sloane	- Pgh.
K. W. Perry	- Pgh.
R. W. Wrenn	- Pgh.
T. W. Callahan	- ATC
T. J. Sherman	- Pgh.
E. B. Perry	- Pgh.
L. C. Drapela	- Pgh.
R. N. Sater	- Pgh.
F. J. McGrath	- Pgh.
R. C. McCormack	- Pgh.
T. I. Stephenson	- Pgh.
G. F. Leveister	- Pgh.



PLAINTIFF'S
EXHIBIT
AL-1477

APC 003461

INDUSTRIAL HYGIENE CONTACTS -
DOMESTIC & FOREIGN
1980 August 14
Page 2

Distribution (con't):

Industrial Hygiene Mailing List Environmental Managers

E. L. Rooy - Pgh.
J. Z. Nelson - Pgh.
G. F. Stephens - Pgh.
D. D. McGregor - Pgh.
R. L. Graves - Pgh.
M. J. Caprio - Pgh.
J. M. McCollum - Pgh.
D. St. Jacques - ATC

cc: T. B. Bonney, Pittsburgh Office - 7
E. E. Rumberger, Pittsburgh Office - 7
V. L. Hammersmith, D-B
V. W. Rieke, Pittsburgh Office - 2
R. M. James, Pittsburgh Office - 7
R. W. Flanagan, Pittsburgh Office - 6
C. Dixon, Pittsburgh Office - 6
P. H. Scott, Pittsburgh Office - 6
B. L. Siceloff, Pittsburgh Office - 6

Attachments

APC 003462

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.



APC 003463

MEMORANDUM

Page 2

1980 August 14

Although GRC boards are not suitable for high temperatures ($>320^{\circ}\text{C}$) or molten metal contact, they can be used in fire resistant components, pipe work, furnace shells, etc. Physical properties are similar to transite except that GRC board has lower shear strength. However, proper engineering design can compensate for this deficiency.

4. Thermocouple Insulation

Finding a suitable replacement for asbestos-coated thermocouple wire has been particularly troublesome. Many substitutes have been rejected because of low abrasion resistance and/or friability at high temperatures.

A new ceramic fiber product from 3M, Nextel 312, purportedly exhibits excellent abrasion resistance and immunity to thermal shock. The attached brochure provides more complete product information. If physical properties of Nextel 312 are as claimed, it should prove to be a suitable substitute for asbestos coated wire.

Comments and additions to the information presented are encouraged.

APC 003464

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:mjf
80-08-05

APC 003465

Nextel[®] 312

3M

Ceramic Fiber Products

Product Bulletin

Thermocouple Insulation

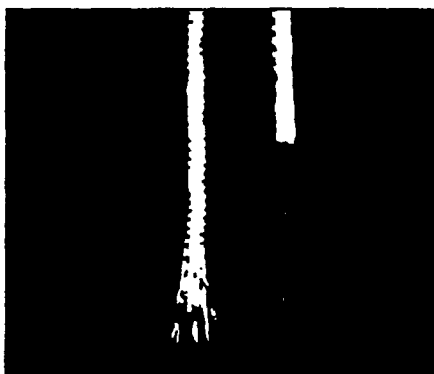
At last: a practical high-temperature insulating material that eliminates the two biggest causes of thermocouple failure.

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.

N-MST1-3(119,511)

APC 003466

LITHO U.S.A.

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

3M

FROM E. E. RUMBERGER
PITTSBURGH OFFICE

TO

1982 February 16

RE: ASBESTOS REPLACEMENT

The attached Asbestos Replacement Report is being distributed to plant Department Managers and Superintendents for Engineering, Procurement, Safety, Environmental Control and Industrial Hygiene. It comments on successful and unsuccessful substitutes for asbestos.

Considerable progress has been made in the plants over the past two years in implementing safer substitute materials. This report should be helpful to you in knowing the results of the experiences at the other plants. It might also serve as a useful guide to be used in your next staff meeting to explore your success in making your plant as free from asbestos-containing materials as possible.

We are asking that plant Engineering and Procurement Managers keep us advised of their results in seeking safer substitute materials. This will permit us to share the information throughout the plants. The very worthwhile efforts being made in the plants are much appreciated.

E. E. RUMBERGER

EER:mlf

Distribution:
Operations and Works Managers

cc: Engineering Managers
Procurement Managers
Safety Managers - Domestic and International
Environmental Control Contacts
Industrial Hygienists - Domestic and International

J. H. Sloane, Pittsburgh Office - 20
T. J. Sherman, Pittsburgh Office - 20
F. J. McGrath, Pittsburgh Office - 20
P. R. Atkins, Pittsburgh Office - 7
J. C. Fussell, 4th Floor - William Penn Hotel
P. A. Haas, Pittsburgh Office - 20
J. M. Mc Collum, 3rd Floor - William Penn Hotel
G. F. Leymeister, Pittsburgh Office - 19
C. E. Rhodes, Pittsburgh Office - 19
R. E. Edgington, Pittsburgh Office - 19



APC 003467

Distribution: (Con't)

M. J. Caprio, Pittsburgh Office - 19
V. R. Scorsone, Pittsburgh Office - 27
G. B. Scott, Pittsburgh Office - 23
E. B. Perry, Pittsburgh Office - 23
H. G. Reavis, Pittsburgh Office - 23
J. R. Clark, Pittsburgh Office - 23
R. J. Hosfeld, Pittsburgh Office - 23
R. D. Hornbeck, Pittsburgh Office - 30
K. W. Perry, Pittsburgh Office - 24
R. R. Hoffman, Pittsburgh Office - 30
E. M. Kasody, Pittsburgh Office - 28
W. Turbeville, Pittsburgh Office - 28
C. R. Gillespie, Cleveland Works
R. C. Rawe, Lafayette Works
R. A. G. Vines, Massena Operations
W. C. Keith, Corona Works
J. W. Martin, Lancaster Works
N. W. Nielsen, Pittsburgh Office - 18
J. B. Geshay, Pittsburgh Office - 23
H. S. Evans, Pittsburgh Office - 24
P. L. Abernnethy, Jr., Pittsburgh Office - 17
R. Banks Smith, Pittsburgh Office - 29
H. L. Johnson, Pittsburgh Office - 14
C. P. Fletcher, ATC-C
L. K. Hudson, ATC-C
N. Jarrett, ATC-C
P. R. Bridenbaugh, ATC-C
J. D. Dowd, ATC-C
R. E. Spear, ATC-C



Industrial Hygiene Technical Bulletin

NO. 82-3

Date: 1982 February 16

RE: ASBESTOS REPLACEMENT

The Asbestos Replacement Program was initiated a number of years ago as a result of the health hazards associated with handling asbestos and asbestos-containing materials. The program is a cooperative effort between Production, Engineering, Procurement, Research, Safety and Industrial Hygiene at the plant and corporate levels. It continues to be Alcoa's objective to replace all asbestos with safer substitutes whenever possible.

The only exception is that we do not encourage the immediate removal of affixed asbestos insulation so long as it is in good condition. When it does become necessary to replace worn asbestos-containing materials, safer substitutes should be used. When asbestos is being removed, proper precautions must be taken to protect employees from inhaling asbestos fibers.

Considerable progress has been made in the past two years toward making Alcoa plants asbestos free. The attached report summarizes plant experiences and identifies successful substitutes. It also identifies unsuccessful products that have been tested and failed. The report contains sections on General Applications, Potroom Use, Carbon Bake Use, Wire, Rod and Bar Use, and a List of Asbestos Replacement Manufacturers. This report should benefit each plant based on the experience in other plants.

To continue to coordinate these efforts, it is important that Engineering and Procurement at each plant copy the Corporate Industrial Hygiene Division on all efforts made towards asbestos replacement . . . whether positive or negative results occur.

Please review this present status report and advise us of any new experiences at your location. If we can be of any further assistance, please let us know.

SCOTT M. ANDERSON

SMA:mlf

Distribution: See Page 2

INDUSTRIAL HYGIENE TECHNICAL BULLETIN 82-3

Page 2

1982 February 16

Distribution:

Operations and Works Managers

Engineering Managers

Procurement Managers

Safety Managers - Domestic and International

Environmental Control Contacts

Industrial Hygienists - Domestic and International

Industrial Hygienists - Other

Industrial Hygienists - Pittsburgh Office and ATC

Attachment

APC 003470

ASBESTOS REPLACEMENT PROGRAM

Contents

<u>General Applications</u>	<u>Page</u>
Belting --Block or Brick -- Brake Linings	1
Cement Patch	1
Cloth and Paper -- Gloves -- Marinite	2
Pump Packing	3
Rope -- Tubing Tape	4
Thermocouple Wire	5
<u>Potroom Use</u>	
Cradle to Pot Shell Insulation	6
Superstructure Foot Insulation	6
Pot Cover Insulation	7
Walkway Grating Insulation	8
Bus Insulation -- Pot Exhaust Duct	9
Exhaust Duct Gaskets -- Siphon Gaskets	10
Ladle and Ladle Lid Seal -- Insulated Electrical Wire	11
<u>Carbon Bake Use</u>	
Exhaust Duct Manifold Gaskets	12
<u>Wire, Rod and Bar</u>	
Jarke Rack Liners	12
<u>Asbestos Replacement Manufacturers</u>	13

**PRIVILEGED AND
CONFIDENTIAL**

APC 003471

1982 February 16

ASBESTOS REPLACEMENT PROGRAM

GENERAL APPLICATIONS

Material & Use

Belting for Drip
Casting

Replacement Status

Fiberseal Fabric was tested and found to be inadequate.

Block or Brick
for furnaces

Ceramic fiber refractory block is an acceptable substitute. There are no asbestos products currently being installed in melting furnaces, holding furnaces, or heat-treat furnaces.

Brake Linings

A possible (but untested) replacement for asbestos brake linings is RF-28-3D Truck Blocks (4602-FF) from Limpco Manufacturing in Greensville, PA.

Cement Patch for
Boiler Maintenance

Two grades:

1. Hydraulic-setting cement - contains mineral wool and Portland Cement; temperature range up to 1000°F.

Suppliers:

- a) Johns-Manville "375"
- b) Keene Corporation "Super Powerhouse"
- c) 48 Insulation "Quick-Set Cement"

2. High-Temperature Grade - contains mineral wool; temperature range 1000°F to 1900°F.

Suppliers:

- a) Johns-Manville "360"
- b) Keene Corporation "Super 1900"
- c) 48 Insulation Super "48"

PRIVATE AND
CONFIDENTIAL

APC 003472

ASBESTOS REPLACEMENT PROGRAM

(Page 2)

Material & Use

Cloth and Paper
for Insulation
and Welding
Protection

Replacement Status

Cloth substitutes include: Pyrotek Fabrics, Refrasil, Nor-Fab, Kelnit Welding Blankets

Paper Substitute: Johns-Manville - Cerawool Paper
(Note: Paper should not be used for welding protection.)

Gloves

Flame-resistant terrycloth gloves can be used for temperatures up to 700°F. Some substitutes successfully used at ATC include Kevlar Mittens (up to 400°F) and Kevlar Gloves (up to 900°F). These products are available from Kranso Glove & Mitten, Milwaukee, or A-Best Products, Cleveland. Other products are Kelnit 29, Keller Gloves, Pyrotex, Textoglass Gloves, and Pre-ox Gloves.

Marinite and Marinite
Floats for Molten
Metal Casting

For most HDC and FDC ingot operations, Johns-Manville's (J.M.) asbestos-free Marinite-C board should replace the asbestos Molten Metal Marinite. The applications for Marinite-C include molten metal transfer troughs, baffles, basins and floating skimmers. In certain applications, an acceptable alternate for Marinite-C is Pyrotek's asbestos-free Pyrotherm B-3 manufactured by Cape Boards of England. Johns-Manville's asbestos-free Marinite-I is not recommended for molten aluminum operations.

PRIVILEGED AND
CONFIDENTIAL

(Marinite is continued on Page 3.)

1982 February 16

ASBESTOS REPLACEMENT PROGRAM

(Page 3)

Material & Use

Replacement Status

An asbestos-free material for the critical HDC and FDC header applications (sheet ingot headers at Tennessee South Plant and Warrick, Hunter caster tips at Badin, small round HDC headers at Badin, and tool and jib plate headers at Vernon) has yet to be developed for commercial use. Until this product is available, we will continue to use asbestos header grade molten metal Marinite.

Almost all asbestos uses in FDC ingot operations can be replaced by Alcoa's R-680.

Pump Packing

In most cases, pump packing materials are bonded in rubber or some other coating compound. These usually generate little potential for fiber exposure and need not be substituted. However, some packings, such as uncoated, noncompressed, braised asbestos may offer a potential for exposure and should be replaced. The plant industrial hygienist should be consulted when there is a question of whether or not a material should be replaced.

Since specific needs and equipment types vary dramatically, pump packing and general packing materials are purchased at the plant level. Suitable replacements should be sought by plant Purchasing by direct contact with manufacturers and suppliers.

PRIVILEGED AND
CONFIDENTIAL

APC 003474

PRIVILEGED AND
CONFIDENTIAL

ASBESTOS REPLACEMENT PROGRAM

(Page 4)

Material & Use

Rope for packing
and sealing

Replacement Status

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.

Fiberseal K-2 (Pyrotek, Inc.) has been used successfully by Massena as a replacement for the asbestos rope which was used to pack bottom blocks.

Another alternative is Thermo-Ceram Rope by Carlock.

Tubing Tape for
furnace seals
and general
insulation

Tape replacements include Pyrotex, Refrasil, Fiberfrax, and Nor-Fab.

1982 February 16

ASBESTOS REPLACEMENT PROGRAM

(Page 5)

Material & Use

Thermocouple Wire

Replacement Status

Sleeves made of Refrasil or Fiberfrax material may be used in place of asbestos-coated wire in some cases. Tennessee has successfully used a fiberglass-coated, braided, and wrapped thermocouple wire from Thermoelectric Co., Saddlebrook, N.J. - P/N Q/Q/20-J (Standard Grade) in their ingot preheat and a two conductor 20 gauge premium grade thermocouple wire - Q/TW-20-JJ in their annealing furnace.

Warrick has found two thermocouple wire substitutes:

1. J type lead wire 6Al6 gauge by Thermoelectric.
2. K type 16 gauge wire made of fused teflon, polyvinyl and fiberglass by Claud S. Gordon Co.

A ceramic fiber product from 3M, Nextel 312, has been tried, but it has not held up during use.

PRIVILEGED AND
CONFIDENTIAL

APC 003476

1982 February 16

ASBESTOS - POTROOM USE SUBSTITUTES

(Page 6)

Specific Application

Cradle to Pot Shell
Insulation

Substitute

Location

Comments

Quarry Tile

Wenatchee

Good replacement

Curit Fiberglass Fill Board

Warrick

Seems OK

Cerawool Fill Board

Warrick

Will test

Cem-Fil GRC Sheet

Warrick

Didn't hold up

Cem-Fil GRC

Massena

Not successful

J-M Asbestos-Free Millboard

Massena

Installed on some pots and appears OK. Will be used on all future pot rebuilds.

Mechanical Engineering Division, Pittsburgh, specifies Johns-Manville Cerawool Millboard as a substitute for JM-106 Millboard. Compressive strength and insulating quality are comparable. Cost for Cerawool Millboard is \$1.50 each for 1/4" x 3" x 48" pieces in lots of 250, or \$1.25 each in lots of 500. This is less than the \$5.00 per piece you are paying for Chem-Fil board.

Superstructure Foot
Insulation

Cem-Fil GRC 9"x7"x1"

Badin

Product was not even and resulted in rocking of the superstructure.

Marinite P - 1/2" sheet

Massena

To be tested

Crushed

R-680

Badin

Currently testing

Mechanical Engineering Division, Pittsburgh, presently specifies ebonite asbestos for this item. Tests on other materials have not been successful.

PRIVILEGED AND
CONFIDENTIAL

APC 003477

1982 February 16

ASBESTOS - POTROOM USE SUBSTITUTES

(Page 7)

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Pot Cover Insulation</u>	Almac Plastic Industries' High-Temp. Glass	Massena	To be tested
	Marinite P - 1/2" sheet	Massena	Not successful
	Pyrotek Fiberseal H-3 Fabric	Badin	Double the fabric; works well for repairs.
		Massena	Not successful
		Warrick	Works well; now standard; also works for sideshield insulation.
	Amatex-Thermoglass #G-36P752	Wenatchee	Satisfactory
		Badin	Will use in all new pot covers.

Mechanical Engineering Division, Pittsburgh, has eliminated use of asbestos by wrapping Amatex-Thermoglass #G-36P752 around an aluminum bar. In other installations, fiberglass fabrics have been used as the insulating material.

PRIVILEGED AND
CONFIDENTIAL

APC 003478

1982 February 16

ASBESTOS - POTROOM USE SUBSTITUTES

(Page 8)

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Walkway Grating</u>	Pyrotek E-40	Badin	Crumbled
<u>Insulation</u>	Pyrotek Phenolic Paper	Badin	Currently testing; easy to work with but expensive.
	Pyrotherm G-5 Insulating Board	Badin	To be tested
	Marinite P - 1" Board	Badin	Not satisfactory .
	Marinite P - 1/2" Board	Badin	Not satisfactory
	GRC Cem-Fil 1/4" & 3/8"	Massena	Not successful
	M-50 Pyrotherm Dense Board	Massena	Not successful
	Chem-Fil Fiberboard by Louisville Insulation	Massena	Unsuccessful; it crumbles.
		Warrick	Currently trying this cement-fiberglass product

Mechanical Engineering Division, Pittsburgh, specified Chem-Fil fiber reinforced cement for the new Badin and Noranda potlines. Previously specified Koppers NCX (fire-retardant) treated wood. The disadvantage of wood is that it still chars when exposed to molten bath. The cost of Chem-Fil and treated wood are comparable.

PRIVILEGED AND
CONFIDENTIAL

APC 003479

1982 February 16

ASBESTOS - POTENTIAL USE SUBSTITUTES

(Page 9)

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Bus Insulation</u>			
	Marinite P - 1" sheet	Badin	Crumbles
	Marinite P - 1/2" sheet	Massena	Not successful
	Cem-Fill GRC 1/4" & 1/2"	Massena	Not successful
			Mechanical Engineering Division, Pittsburgh, eliminated use of transite by substituting an aluminum bar with a 1/16" layer of glass fabric epoxy, NEMA Grade G-11, taped to each side of the bar.
<u>Pot Exhaust Duct</u>			
	Pyrotek Pipe	Warrick	Looked good in preliminary testing; continuing testing with interior coatings to prevent corrosion.
	Hetron 197	Badin	Looks good on 9 pots; changing to this product.
		Wenatchee	Fiberglass pipe with antimony and dynel liners failed, and replaced by normal transite.
	Hetron 92	Wenatchee	Fiberglass pipe with antimony and asbestos linings - satisfactory.
	Fiberfrax Laminate Tubes by Carborundum, Inc.	ATC	Currently testing
			Mechanical Engineering Division, Pittsburgh, has conducted extensive tests on Hetron 197 at Wenatchee and Warrick. This material is quite expensive and may not be as durable as transite.

PRIVILEGED AND
CONFIDENTIAL

APC 003480

1982 February 16

ASBESTOS - POTROOM USE SUBSTITUTES

(Page 10)

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Exhaust Duct Gaskets</u>			
	Pyrotek Fiberseal Felt T-1	Massena	Not successful
	Pyrotek T-22 Fiberglass Cloth	Massena	Successful; replacing asbestos as pots are rebuilt. Mechanical Engineering Division, Pittsburgh, is specifying asbestos impregnated sheet material; however, Garlock's Gylon material would probably work for this application.
<u>Siphon Gaskets</u>			
	Pyrotek Fiberseal M-13 1/8" Compressible Board	Massena	Satisfactory
		Badin	Currently using this product.
	Fiberseal Felt G-1 - 1/2" & T-1 - 1/4"	Massena	Unsuccessful
		Badin	Tested and proved OK, but prefer Fiberseal M-13.
	J-M Asbestos-Free Millboard	Massena	Satisfactory, presently in use.
	J-M Ceraform Heat Seal	Rockdale	Not as stable as asbestos; needs to be replaced more often. Mechanical Engineering Division, Pittsburgh, presently specifying Pyrotek T-1 felt material for this application.

PRIVILEGED AND
CONFIDENTIAL

APC 003481

1982 February 16

ASBESTOS - POTROOM USE SUBSTITUTES

(Page 11)

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Ladle & Ladle Lid Seal</u>	Silicon Red Rubber Air Hose - 3/4"	Warrick	Standard usage (but different seal than other plants)
	Fiberseal Rope F-10, 1-1/2"	Massena	Unsuccessful
	Refrasil-wrapped around rubber hose	Badin	No good; rubber melts; seal breaks.
	1" Fiberseal Rope D-1	Anaconda	Uses 600 ft. per month of D-1
	Pyrotek Treated Z-5 Tape	Massena	Successful; presently in use. Mechanical Engineering Division, Pittsburg, presently specifying Pyrotek Z-5 material. Several layers of this material are used for one seal.
<u>High Temperature Exposure Insulated Electrical Wire P-75, P-225 Potwiring, P-225 Jackmotors, Calrod heaters</u>	High Temperature Silicon Braid Copper Conductor, 1000 V., 200°C	Massena	Satisfactory. Limited replacement practice.

PRIVILEGED AND
CONFIDENTIAL

APC 003482

1982 February 16

ASBESTOS - CARBON BAKE USE SUBSTITUTES

(Page 12)

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Exhaust Duct Manifold Gaskets</u>	Pyrotek Composition Boot V-5, M-6, H-3 Fabric	Massena	To be tested. Expect shipment October 1981.

ASBESTOS - WIRE, ROD AND BAR USE SUBSTITUTES

<u>Specific Application</u>	<u>Substitute</u>	<u>Location</u>	<u>Comments</u>
<u>Jarke Rack Liners</u>	Pyrotek 747 Cloth	Massena	Unsatisfactory; frays easily.
	Pyrotek F-1 Cloth	Massena	Unsatisfactory; frays easily.
	Pyrotek T-23 Tape	Massena	Unsatisfactory; frays easily.
	Pyrotek Glass and Kevlar Blend	Massena	Unsatisfactory; frays easily.
	Pyrotek T-22 Tape	Massena	Unsatisfactory; frays easily.
	Newtex Fabric Tape	Massena	Unsatisfactory; frays easily.
	Zetex 1200 Tape	Massena	Unsatisfactory; frays easily.
	Zetex 32500	Massena	Successful so far; encouraging.

PRIVILEGED AND
CONFIDENTIAL

APC 003483

ASBESTOS REPLACEMENT MANUFACTURERS

(Page 13)

<u>Product</u>	<u>Supplier</u>	<u>Telephone No.</u>
<u>Pyrotex</u>	Newtex Industries, Inc. Railroad Avenue P. O. Box 25 Victor, New York 14564	716/924-9135
<u>Fiberseal Products</u>	Pyrotek, Inc. East 9601 Montgomery Avenue Spokane, WA 99206 -OR- Box 77 - R.D. #1 Claremont Road Carlisle, PA 17013 -OR- Santa Fe Springs, CA	509/926-6211 717/249-2075
<u>Refrasil</u>	HITCO Division of Armco Steel Middletown, Ohio 45042	
<u>Nor-Fab Yarns; Fabrics</u>	Amatex 1032 Stanbridge Street 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
<u>Marinite and Other Products</u>	Johns-Manville The Manville Corporation Ken-Caryl Ranch Denver, CO 80217	303/978-2000

PRIVILEGED AND
CONFIDENTIAL

APC 003484

FROM HAIG G. SAKOIAN
PITTSBURGH OFFICE

TO

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

PRIVILEGED AND
CONFIDENTIAL



APC 003485

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: 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"

**PRIVILEGED AND
CONFIDENTIAL**

APC 003486

* 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) Pyrotex TM Refrasil Nor-Pab Keller Gloves Kelnit Welding Blankets
Personal Protection/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 Pyrotex TM

* Number of plants using material.
(Cont.)

PRIVILEGED AND
CONFIDENTIAL

APC 003487

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.

PRIVILEGED AND
CONFIDENTIAL

APC 003488

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

<u>MATERIAL/USE</u>	<u>POTENTIAL EXPOSURE</u>	<u>REPLACEMENTS AVAILABLE</u>
<u>Packing/ General pump packing</u>	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.
<u>Paper/Welding protection, electrical insulation</u>	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".)
<u>Rope/Furnace insulation</u>	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
<u>Sheet Gasketing/ General</u>		

PRIVILEGED AND
CONFIDENTIAL

APC 003489

* Number of plants using material.
(Cont.)

ASBESTOS REPLACEMENT SUMMARY -- BY USE

POTENTIAL EXPOSURE REPLACEMENTS AVAILABLE

MATERIAL/USE

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
Nor-Fab

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.

APC 003490

PRIVILEGED AND
CONFIDENTIAL

* 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

PRIVILEGE AND
CONFIDENTIAL

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.
	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 -- 1/2" 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.)

APC 003492

PRIVILEGED AND
CONFIDENTIAL

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 - $\frac{1}{4}$ " and $\frac{1}{4}$ " Marinite-P -- $\frac{1}{4}$ " 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 $\frac{1}{4}$ " wall; have ordered 8 more $\frac{3}{8}$ " and 8 more $\frac{1}{4}$ " 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 - $\frac{1}{4}$ " and Fiberseal Felt T-1 - $\frac{1}{4}$ " (Same as above)	Badin	Tested and proved okay.
	Fiberseal M-13 - 1/8" Compressible board	Massena	To be tested on P-225 siphon gasket and crucible cover plate gaskets.
	J-M Ceraform Heat Seal	Massena	To be tested on P-225 siphon gasket and crucible cover plate gaskets.
		Rockdale	Not as stable as asbestos; needs replaced more often.

(Cont.)

APC 003493

PROVIDED BY AND
MAINTAINED BY

ASBESTOS -- POTROOM USES

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

PRIVILEGED AND
CONFIDENTIAL

ASBESTOS REPLACEMENT MANUFACTURERS

<u>PRODUCT</u>	<u>SUPPLIER</u>	<u>TELEPHONE</u>
<u>Pyrotex™</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

PRIVILEGE AND
CONFIDENTIALHAIG G. SAKOIAN
1979 July 20/eds

APC 003495