[illegible] CORRESPONDENCE
(Rev. 1-68)

Case : [illegible]

FROM:	S. C. Streater - Engineering
TO:	Mr. W. B. Campbell - Engineering Manager
COPY:	Messr. G. H. Prigge, E. J. Gates, J. E. Holland, W. B. Taylor, T. N. Bishop, P. Coburn, J. C. Newton, E. K. Hornbeck, File
DATE & SUBJECT:	1981 August 06 ASBESTOS INVESTIGATION

Attached are copies of reports related to asbestos replacement. Investigation findings show that all asbestos uses now in the plant can be replaced with non-asbestos products except for the brake shoes.

S. C. Streater

PLAINTIFF'S EXHIBIT

SCS/kjk

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ASBESTOS REPLACEMENT

General:

Several years ago many of the asbestos products used in our plant were changed to non-asbestos substitutes that was suggested by vendors. Most of this program failed because these materials had not been properly field tested as to durability and cost feasibility. For about two years there has been exotic products on the market that would replace most of the asbestos products in our plant but the price is prohibitive.

OSHA has concentrated their enforcement of regulations for asbestos, not on industry, but on the asbestos product manufacturers. Many cannot meet these requirements and continue to make a profit, hence they have developed suitable replacement products at a price comparable with asbestos. The only product that we have not found a suitable replacement for is asbestos-free brake linings.

Substitute Materials for Asbestos:

Possible materials to replace asbestos are ceramic fiber, aramid fiber, mineral wool, silicate fiber, glass fiber, calcium-silicate fiber, carbon fiber, graphite fiber, silicon rubber, and acrylics. In addition to the common products there are organic polymer fibers from the second generation of man=made materials trademarked: nylon, orlon, kevlar, etc. The better substitutes usually are a composite of two or more of the available materials. In many cases, combination of materials

gives desirable characteristics in regard to strength, temperature, wearability, and resistance to chemical attack.

Fiberglass, fabric, and fibers meet most requirements in cloth, tape, tubing, rope, and special gaskets. The material temperature limits are equal to asbestos and abrasive fatigue is better than asbestos.

Sheet gasket materials that field tested to be satisfactory are acrylics and other man-made fibers usually bonded with nitrile rubber. Several of these products proved to be chemical stable, heat resistant, creep resistant, and excellent sealing characteristics. These materials can be used as pot duct insulators, pipe flange gaskets and machine gaskets.

We have two manufacturers of insulating blocks that test suitable to replace the present asbestos transite anode support insulators.

Hydrous calcium silicate, high density fiberglass, and other mineral wools can be used for insulating piping, boilers, duct work and the carbon mixers. The K-factor in most cases is equal to asbestos, and the installation usually requires less labor. The cost of these materials are only slightly higher than asbestos.

We have tested eighteen types of pump and valve packing that range from pure graphite fiber to a synthetic fiber impregnated with graphite. The prices on substitute packings range from $14/lb. to $125/lb. Packing has proven very satisfactory in most applications for general service at the $14/lb. price.

The asbestos piston cup on the crustbreaker can be replaced with a viton cup. We have one in service that is still in excellent condition after six and one-half (6½) months of service. The life of the asbestos cup is about two one-half (2½) months.

We have worked with the Casthouse personnel to find suitable asbestos replacement for syphon spout gaskets, pouring spout gaskets, and lid gaskets. We have materials in use that have proven very satisfactory at comparable cost. If we adopt the asbestos replacement program as outlined our only usage of asbestos contained material would be brake linings and clutch facings. We would stock fewer items with the replacements and realize a savings in purchasing, maintenance labor, and usage.

All insulation materials have been lab tested for electrical resistivity and temperature limitations.

Details of the replacements are attached.

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ASBESTOS REPLACEMENT

Item No.	Description
1	Gasket, oval shape, rectangular cross-section, no bolt holes, 12" - 16" I.D. x 14" - 18" O.D., fiberglass woven cloth; rubber impregnated, folded and formed, temperture limit of 500°F/260°C steam
2	Gasket, ring, 2" I.D. x 4-1/8" O.D. x 1/16" thick, rectangular cross-section, no bolt holes, acrylic fiber with rubber binders, or equal synthetics, no asbestos, temperature limit of 700°F/370°C, pH 2-11, pressure 250 psi, for pipe flange gaskets
3	Same as Item No. 2, except 2-1/2" I.D. x 4-7/8" O.D. x 1/16" thick.
4	Same as Item No. 2, except 3" I.D. x 5-3/8" O.D. x 1/16" thick.
5	Same as Item No. 2, except 4" I.D. x 6-7/8" O.D. x 1/16" thick.
6	Same as Item No. 2, except 5" I.D. x 7-3/4" O.D. x 1/16" thick.
7	Same as Item No. 2, except 6" I.D. x 8-3/4" O.D. x 1/16" thick.
8	Same as Item No. 2, except 8" I.D. x 11" O.D. x 1/16" thick.
9	Same as Item No. 2, except 10" I.D. x 13-3/8" O.D. x 1/16" thick.
10	Same as Item No. 2, except 12" I.D. x 16-1/8" O.D. x 1/16" thick.
11	Gasket, sheet 1/64" x 60" x 60", acrylic fiber with rubber binder or equal synthetics, no asbestos, temperature limit of 700°F/370°C steam w.p. 150 psi, pH 2-11.
12	Same as Item No. 11, except 1/32" x 60" x 60".
13	Same as Item No. 11, except 1/16" x 60" x 60".
14	Same as Item No. 11, except 1/8" x 60" x 60".
15	Same as Item No. 11, except ~~1~~ 3/16" x 36" x 60". For Duct 3/32

Asbestos Replacement

Item No.	Description
16	Gasket Sheet, 1/8" x 36" x RL, neoprene 60 durometer.
17	Gasket Sheet, 1/16" x 36" x RL, red rubber.
18	Gasket Sheet, 1/8" x 36" x RL, red rubber.
19	Gasket Sheet, 1/16" x 36" x RL, gum rubber.
20	Gasket Sheet, 3/16" x 36" x RL, Buna N Rubber 80 durometer.
21	Gasket Sheet, 1/8" x 36" x RL, rubber with duck inserted.
22	Gasket Sheet, 1/16" x 12" x 12", teflon for AHF acid.
23	Oakum Spun Jute with tar in 5 pound box.
24	Packing, 1/4" square, lattice braid, non-asbestos yarns, shaft speeds to 1,900 fpm, temperature limit of 500°F, pH 3-11.
25	Same as Item No. 24, except 5/16" square.
26	Same as Item No. 24, except 3/8" square.
27	Same as Item No. 24, except 1/2" square.
28	Same as Item No. 24, except 3/4" square.
29	Same as Item No. 24, except 7/8" square.
30	Packing, 1/2" square, lattice braid, aramid synthetic fiber trade marked "Kevlar", treated with the coating and oils, speeds to 1,900 fpm, temperature limit of 500°F/260°C, pH range 3-11.
31	Same as Item No. 30, except 7/8" square.
32	Packing, 5/16" lattice braid carbon graphite, pH 1-14, temperature limit of 1,200°F/650°C, shaft speeds to 2,000 fpm.
33	Same as Item No. 32, except 3/8".
34	Packing, 3/8", laminated graphite foil for boiler feed water, sleeve 1-3/4" O.D.

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~~Asbestos~~ Replacement

Item No.	Description
35	Gasket Sheet, 1/4" x 36" x 36", cork with neoprene binder, compatible with oil.
36	Same as Item No. 35, except 3/8" x 36" x 36".
37	Packing Cup, Buna N Rubber, 2" x 1-1/8" x 3/8".
38	Packing Cup, Viton 4-1/6" x 2-23/32" x 1/2" height x 1/8" thi
39	Packing Cup, leather 2" x 1-1/16" x 3/8" height x 1/8" thick.
40	Packing Cup, leather 3" x 1-3/16" x 7/8" height x x 3/16" thick.
41	Packing Cup, leather 4" x 1/2" x 5/8" height x 5/32" thick.
42	Packing Cup, leather 7" x 1-1/4" x 1" height x 3/16" thick.
43	Packing Cup, leather 14-1/4" x 3/4" x 1-1/4" height x 1/4" thick.
44	Packing Cup, neoprene 6" x 3" x 3/4" height x 1/4" thick.
45	Packing Cup, neoprene 10" x 7-5/8" x 3/4" height x 3/16" thick.
46	Packing, 1/2" round rope, ceramic fiber.
47	Packing, curcible lid, 7/8" O.D. hose with single braid fiberglass jacket, 1-3/8" O.D. round.
48	Gasket, pouring spout, oval shape, rectangular cross-section, fiberglass woven cloth, rubber impregnated, formed, 10-3/4" — 16-1/2" x 8-1/4" — 14-1/2", Reynolds Metals Company Drawing A-4376.
49	Gasket ring, siphon spout, 10-1/2" x 6" x 1/4" per Reynolds Metals Company Drawing No. C-3918-10, material to be asbestos free.
50	Gasket, top support churn insulator WESP, 1/4" x 14-1/8" x 16-3/4" fiberglass cloth, rubber impregnated.

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Asbestos Replacement

Item No.	Description
51	Furnace Door Hose, 1-1/2" I.D., 125 psi with two layers of woven fabric to withstand 650°F, no asbestos, fiberglass or Nomex.
52	Same as Item No. 51, except 1-1/4" I.D.
53	Furnace Hose, 3-1/4" I.D. x 4-1/16" O.D., with two plies of non-asbestos covering to withstand temperature to 650°F, fiberglass rubber impregnated or Nomex.
54	Cloth, woven fiberglass, 1/16" x 40" WD x RL, temperature to 1,000°F, untreated.
55	Anode Insulation Blocks, 2" x 2" x 9" non-asbestos, with an ultimate compressive strength of 10,000 psi, non-conductive electrically.
56	Heat gloves and protective clothing, Kevlar.
57	Blocks, cathode cradle insulation, 9" x 9" x 1/2", non-asbestos millboard.
58	Insulation, non-asbestos, of various types such as high density fiberglass, hydrous calcium silicate, urethane, mineral wools, and ceramic wools. These materials are available in all preformed shapes and selection depends upon the application. Insulating cements are available in most of the above materials for use on irregular surfaces.
59	Millboard, 1/2" x 40" x 40", non-asbestos, density about 60 lb/ft3.

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COMPARATIVE PRODUCTS TO ASBESTOS

Vendor's products that field tested to be equal to or better than asbestos products now in use are as listed below:

PRODUCT	NON-ASBESTOS RECOMMENDATION
Gasket Sheet, Pipe Gaskets, and Equipment Gaskets	Klingersil -- C-4400 Tenn-Val -- G.S. Garlock -- Blue Gard-Nitrile Rubber Binder Garlock -- Blue Gard-Styrene Butyloine Rubber Binder SBR3100 Sepco -- No/ASB Style 6234
Gasket Sheet for Pot Insulation	Klingersil -- C-4400 Tenn-Val -- G.S. Garlock -- SBR3100 Blue Gard Sepco -- No/ASB 6234
Square Mechanical Packing General Service	Sepco -- ML 6402 Garlock -- 8909 Chesterson -- I774
Boiler Feedwater Pumps	Sepco -- Grafoil Garlock -- Garfoil Chesterson -- Grafoil G.T.F. Diform
Pitch Pumps and North Plant Sump Pumps	Chesterson -- 370 Sepco -- 4460 Garlock -- 9E
Anode Insulation Block	Brunswick Fabricators -- Non-Asbestos Monobestos Pyrotek -- N2 Johns-Mansville N/A Transite
Textured Fiberglass Cloth, Tubing, Tape, and Rope	Garlock -- Thermo-Sil Sepco -- Fiberglass Products
Millboard - Non-asbestos	Tenn-Val -- TV500NA Pyrotek -- U-1 Fiberseal CGR Products -- CGR 2150 Marionite -- XL Type C

Comparative Products to Asbestos
Page Two

PRODUCT	NON-ASBESTOS RECOMMENDATION
Furnace Hoses, Carolina Hose, Tenn-Val	Caroflex EPDM Hose Reinforced with synthetic yarns, and covered with two braids of fiberglass.

TEMPERATURE LIMITS:

Fiberglass Untreated	1200°F
Fiberglass Rubber Impregnated	500°F
Glass Filled Teflon	500°F
Red Rubber	250°F
Neoprene	250°F
Ceramic Filled Teflon	500°F
Kevlar (Aramid Fiber)	500°F
Metalic Foil	450°F
Acrylic Fiber Board	700°F
Silicon Rubber	400°F
Ceramic Fiber	2300°F
Mineral Wool	1000°F
Graphite Fiber	2400°F
Carbon Fiber	1200°F
Calcium - Silicate Board	1200°F
Silicate - Fiber Board	1500°F
Flax	220°F
EPDM Rubber	350°F

NON-ASBESTOS MILL BOARD

Construction	Non-Asbestos Fibers and Inert Binders
Density	60 lb/ft³ approximately
Tensile Strength @ 500°C	150 psi
Flexual Strength	80 psi
Compression	30 percent
Thermal Conductivity @ 400°C	1.20 BTU in/ft/#
Heat Resistance	1500°F
Electrically Non-Conductive	

NON-ASBESTOS CLOTH, TAPE, TUBING, ROPE, SPECIAL GASKETS, AND PACKINGS

Construction	Woven Fiberglass 1/16" thick
Temperature Limits:	
Untreated	1000°F/538°C
Treated	500°F/260°C
Pressure (treated)	500 psi

SQUARE BRAIDED PACKINGS

General Service Packing:
For general service on rotary pumps and valves. To be non-asbestos synthetic fibers impregnated with graphite, speeds to 3,600 rpm/1,885 fpm, temperatures to 500°F/260°C, pH 3-11.

Boiler Feedwater Pumps:
Preformed graphite foil laminated packing rings, 3/8" square for 1-3/4" O.D. sleeve, speed 3,600 rpm, temperatures to 500°F/260°C.

North Plant Sump Pumps and Pitch Pumps:
Carbon-graphite fibers, ph 1-14, 2,000 fpm, temperatures 650°F/345°C.

COMPRESSED NON-ASBESTOS SHEET GASKET

Electrically non-conductive

MAX. OPERATING CONDITIONS Temperature Pressure	400°C (750°F) 100 Bar (1450 psi)
COMPRESSIBILITY ASTM F36A RECOVERY ASTM F36A	7%-17% Min. 50%
HOT COMPRESSION TEST Thickness decrease 23°C(73°F) Thickness decrease 300°C(572°F)	 10% 8%
TENSILE STRENGTH ASTM F152 across grain	15 Bar (2200 psi)
CHANGE IN TENSILE STRENGTH ASTM F152 after immersion in ASTM-Oil 3, 5h 150°C(300°F)	 -25%
WT. INCREASE ASTM F146 after immersion in Fuel B 5h 23°C(73°F)	Max. 15%
THICKNESS INCREASE ASTM F146 after immersion in ASTM Oil 1 5h 150°C(300°F) ASTM Oil 3 5h 150°C(300°F) ASTM Fuel A 5h 23°C(73°F) ASTM Fuel B 5h 23°C(73°F)	 0-5% 0-5% 0-5% 0-5%
SEALABILITY ASTM F37 (0.8mm material) (1/32)	.6 ML/hour
SPECIFIC GRAVITY	1.5
STANDARD SHEET THICKNESS	1/32-1/16 3/32-1/8
SHEET SIZE	60 x 60
COLOR	Off-White

All data are typical values and refer to a sheet thickness of 1.6mm (1/16"), UNLESS OTHERWISE NOTED.

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DATA SHEET
NON-ASBESTOS MONOLITHIC

Density, lbs/ft.^{3}	110 (nominal)
Modulus of Rupture, psi	2,000 (nominal)
Water Absorption (48 hrs. @ R.T.) Weight increase, %	17 (nominal)

The following data is for information purposes only, and is not required for specification compliance.

	TYPICAL DATA
Brinell Hardness (500 kg/10 mm/30 sec.)	15 (nominal)
Thermal Conductivity, K $\left\{\frac{BTU/In_2}{hr\text{-}ft.^2 - {}^oF.}\right\}$	
(70° F.)	2.17
(400° F.)	7.20
Modulus of Elasticity, psi X 10^5	1.76
Maximum Service Temperature	800° F.

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Form Approved
OMB No. 2000-0478
Approval expires 6-30-85

REPORTING SECONDARY PROCESSING AND IMPORTATION OF ASBESTOS MIXTURES

When completed, send this form to:
US Environmental Protection Agency
PO Box 2070
Rockville, MD 20852

PART I – COMPANY INFORMATION

COMPANY NAME	FOR EPA USE ONLY
ADDRESS (Street, City, State & ZIP Code)	TECHNICAL CONTACT / TELEPHONE NO.
	IMPORTER ☐ PRINCIPAL ☐ AGENT

PART II – SECONDARY PROCESSOR END PRODUCT(S)

From the list in Section I, enter the asbestos end product produced. Opposite each product, list the asbestos mixture that you process, and the quantity of each mixture that you consumed in 1981.

END PRODUCT(S)		ASBESTOS MIXTURE(S)		QUANTITY OF ASBESTOS MIXTURE CONSUMED	
CODE	GENERIC NAME	CODE	GENERIC NAME	QUANTITY	UNIT OF MEASURE

PART III – IMPORTERS OF ASBESTOS MIXTURE(S) OR ARTICLE(S) CONTAINING ASBESTOS COMPONENTS

List the asbestos mixture(s) or article(s) that you import and the quantity of each item that you imported in 1981. Opposite each item, enter a description of the asbestos component in the mixture or article.

ASBESTOS MIXTURE(S) OR ARTICLE(S)		QUANTITY OF ASBESTOS MIXTURE(S) OR ARTICLE(S) IMPORTED		DESCRIPTION OF ASBESTOS COMPONENT(S) IN ARTICLE
CODE	GENERIC NAME	QUANTITY	UNIT OF MEASURE	

CERTIFICATION FOR CLAIMS OF CONFIDENTIAL BUSINESS INFORMATION

An authorized company official may claim any information reported on this form as confidential business information. To do this, the confidential information must be clearly circled with a red marker. In addition, an authorized company official must sign below to certify the truth and accuracy of the following four statements, which apply to all information that is claimed.

1. My company has taken measures to protect the confidentiality of the information, and it will continue to take these measures.
2. The information is not, and has not been, reasonably obtainable by other persons (other than governmental bodies) by using legitimate means (other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding) without my company's consent.
3. The information is not publicly available elsewhere.
4. Disclosure of the information claimed as confidential would cause substantial harm to my company's competitive position.

SIGNATURE OF AUTHORIZED OFFICIAL	DATE

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REPORTING SECONDARY PROCESSING AND IMPORTATION OF ASBESTOS MIXTURES

INSTRUCTIONS

This form is to be completed by persons who, in 1981, were secondary processors of asbestos or importers of asbestos mixtures or articles that contain asbestos components. See "Reporting Commercial and Industrial Uses of Asbestos", 40 CFR Part 763, Subpart D, for a full description of the reporting requirement and reporting schedule.

If additional space is needed, you should use additional copies of this form.

WHO MUST COMPLETE EPA FORM 7710-37

1. Secondary processors of asbestos must complete Part I and II of the form. Each plant site or manufacturing facility must be reported separately. If you process bulk asbestos fiber to make any of your products at this plant site, then you are a PRIMARY PROCESSOR and you should report this plant site on EPA Form 7710-36.
2. Importers of asbestos mixture(s) or article(s) containing asbestos components must complete Part I and III of the form. If you import bulk asbestos fiber, then you should report all importation activities on EPA Form 7710-36.
3. Those who are both secondary processors and importers must complete Parts I, II and III of the form.

DEFINITIONS

1. Asbestos Mixture - means a mixture which contains bulk asbestos or another mixture. Section 2 below lists typical terms for asbestos mixtures.

2. Asbestos Component—means any asbestos mixture, including any finished product containing an asbestos mixture, which is incorporated into an article. Section I below lists typical terms for products made from asbestos mixtures and components. Some examples of asbestos components are asbestos paper in a hair-dryer; asbestos-reinforced plastic cabinet of a television; asbestos textile that is part of a particular type of garment.
3. Secondary Processor of Asbestos—means a person who processes an asbestos mixture.
4. Importer of Asbestos Mixtures or Articles Containing Asbestos Component(s)—means a person who imports merchandise that contains asbestos into the customs territory of the United States. Where there are two or more "importers" for the same shipment, the Principal rather than the Agent should report if possible.

PART I COMPANY INFORMATION

Enter the name, address, and phone number of your company. Enter the name of the principal technical contact who is either responsible for the completion of this form, or has sufficient knowledge of its content to respond to questions posed by EPA. If you are reporting as an importer, check the appropriate box to indicate that you are either the Principal Importer or the Agent for the Principal.

PART II SECONDARY PROCESSOR END PRODUCTS

End Product(s)—Locate in Section 1 the name of the product subcategory that most specifically describes your end product. In the column, enter the code number for the end product you make and write in the generic name for the product. If you are reporting a product that is not listed, enter the code for "other" that is listed under the most specific general category of products and write in the generic name. Report each end product on separate lines. For example, if you make appliances and are reporting toasters, enter "114" and "toaster".

Asbestos Mixture(s)—For each end product, locate in Section 2 the name of the asbestos mixture that most specifically describes the asbestos mixture that you incorporate into the end product. In this column, enter the code number for the asbestos mixture and write in the generic name. If you incorporate more than one asbestos mixture into a single end product, then use as many lines as necessary to report all asbestos mixtures in the end product. For example, if you incorporate asbestos millboard into your toaster, your entries would be as follows.

End Product	*Asbestos Mixture*
114 toaster	03 millboard

Quantity of Asbestos Mixture Consumed—Opposite each asbestos mixture that is listed, enter the quantity of each mixture that you consumed in 1981. Specify the quantity according to the unit of measure listed in Section 2. If the unit of measure is not listed, report the quantity in short tons. If your records do not permit you to list the quantities consumed for separate end products, then report the total amount of each type of asbestos mixture and enter "T" (for total) next to the figure.

PART III IMPORTERS OF ASBESTOS MIXTURE(S) OR ARTICLE(S) CONTAINING AN ASBESTOS COMPONENT

Asbestos Mixture or Article—For each type of imported product, locate in either Section 1 or Section 2 the name that most specifically describes the product you import. Enter the code number and generic name for the imported product.

Quantity of Asbestos Mixture(s) or Article(s) Imported—For each product listed, record the total annual quantity imported in 1981. Specify the quantity according to the unit of measure listed in Section 2, if possible, or according to the unit of measure as reported to the U.S. Customs Service upon entry of the merchandise into the United States.

Description of Asbestos Components in Article—List all asbestos components in the imported article by entering the name of the asbestos component opposite the name of the article. If the reported product is an asbestos mixture listed in Section 2, then you should not complete this description.

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