PLAINTIFF'S EXHIBIT WH-893
PENGAD-Bayonne,NJ

From: Steam Division G-3

Date: January 30, 1969

Subject: Asbestos Gasket Sheets for Crossover Pipes

Index: Steam Service Data Letter 69-5

Prioprietary Class 2

Samples of deteriorated gasket sheets from a crossover pipe application have been referred to Lester for review. The broken pieces of asbestos gaskets were made from Garlock style #900 sheets. The maximum calculated full load crossover steam conditions for the particular unit were 710 psia and 708°F. This unit has been operating near full load or above 700°F.

Because of this gasket problem, the writer has contacted a number of major asbestos gasket companies, and the ratings of their top quality asbestos sheets are listed on the attached table. Also shown on the tables are the allowable service temperatures for the gaskets. Please keep in mind that even with the best available asbestos sheets, successful operation of asbestos gaskets at temperatures above 700°F. depends on correct bolt set-up and subsequent re-tightening of the joint. The following discussion explains why.

L. T. Metallurgical Engineering have tested three asbestos gasket materials: Johns-Manville #60, Anchor Packing "Tauril" and Garlock #7735 (equivalent of #900). The three gasket sheets were compressed to 5,000 psi and then exposed to 700°F. for 68 hours. All specimens tested became brittle after heating.

Gasket suppliers are well aware of the fact that even a premium quality asbestos sheet looses much of its tensile strength at temperature above 700°F, therefore, to successfully seal the internal pressure in a pipe at high temperature, an even and adequate bolt load on the gasket is extremely important to set up the bolting correctly when making up a flanged joint. Practically all asbestos gaskets recover only 40% after being compressed to 5,000 psi. Imagine what could happen if the bolts in a flanged joint were incorrectly tightened to 45,000 psi without alternating from side to side across the diameter. This could cause an uneven initial compression on the gasket, and the initially over compressed areas can very well become a leakage problem because of the inability of asbestos gaskets to recover completely.

Form 3506

28045518

Produced 3/93

The attached table shows supplier's ratings of their top quality asbestos sheets which are acceptable for steam-over-pipe applications. Note that Garlock #900 and #7021 are rated at 700°F, which is below the 750°F temperature rating required by PSE 4225IA8. On this basis, Garlock #900 and #7021 are not recommended for application above 700°F, as indicated in the "Allow. Temp" column.

Pressure rating of an asbestos gasket material has little meaning without the corresponding temperature. Johns-Manville Style 60 is the only gasket sheet that gives pressure ratings at specific temperatures. Because of this, the pressure ratings for other asbestos sheets have not been included on the table.

R. F. Crozier

R. F. Crozier, Mgr.
Technical Development
Steam Service

SSDL 69-5-2

28045519

Produced 3/93

SUPPLIER'S RATINGS OF 1/16 THK. ASBESTOS SHEETS

SUPPLIER & GASKET STYLE NO.	TEMP. RATING °F	PRESSURE RATING PSI	AVERAGE* TENSILE STRENGTH PSI	RECOVERY AFTER COMPRESSING TO 3000 PSI	ALLOW. TEMP. 700°F	750°F	800°F
Anchor Packing Co: "Tauril"	800		7,000	40%	yes	yes	X
Argo Co: "Powrite" #350	1,000		7,180	40%	yes	yes	yes
Collins Packing co: Style #3005	1,100		8,000	40%	yes	yes	yes
Collins Packing Co: "Silver Queen" #926	800		7,000	40%	yes	yes	X
Garlock Inc: Style #7021 (See A)	700		3,000	40%	yes	X	X
Garlock Inc: Style # 900 (See A)	700		4,250	40%	yes	X	X
Johns-Manville: Style #60	~~850~~ 650	~~at 300~~ at 300	4,000	55%	yes	yes	X
Raybestos-Manhattan: Style #A-56	1,100		10,750	40%	yes	yes	yes
Raybestos-Manhattan: Style #73	800		5,300	40%	yes	X	X
James Walker & Co. LTD: (See B) "Super Golden Walkerite" #271	1,000		9,000		yes	yes	yes
Turner Brothers Co. LTD: (See C) "Permanite"	950		7,000	45%	yes	yes	yes

Note: *Average of with-the-grain & across-grain tensile strengths.
(A) W PDS 42251AB specified 750°F & 400 PSI ratings. Garlock #7021 & #900 do not meet the spec.
(B) James Walker & Co. Ltd. is an English Co. represented by "Loewy Machinery Supplies Co., Inc." 305 East 47th street New York, N.Y. 10017
(C) Turner Brothers Co. Ltd. is an English Co. represented by "KAY Asbestos Co", Morton & Pennington Ave., Morton, Pa. 19070.
(D) The Anchor Packing Co., Phila.Pa. 19108; Argo Asbestos & Rubber Co., Oakmont, Pa. 15139; Collins Packing Co. Inc., Phila.Pa. 19108; Garlock Inc., Palmyra, N.Y. 14522; Johns-Manville, New York, N.Y. 10016; Raybestos-Manhattan, Inc., Manheim, Pa. 17545.

28045520