TOXICOLOGY RESEARCH LABORATORY DOW CHEMICAL U.S.A.

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		October 23, 1974	K-028126

PLAINTIFF'S EXHIBIT

DOW-715

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TOXICOLOGY OF INGESTED ASBESTOS LITERATURE SURVEY

REPORTED BY: Charles T. Lichy CTL CHECKED BY: L. W. Rampy LWR

INFORMATIVE SUMMARY WITH CONCLUSIONS BASED ON THE SAMPLE RECEIVED. ADDITIONAL INFORMATION INCLUDING THE EFFECTS OF REPEATED EXPOSURE MAY BE REQUIRED AS SPECIFIC USES AND FORMULATIONS ARE DEVELOPED OR IF PROCESS CHANGES OCCUR.

A survey of the literature that is pertinent to the ingestion of asbestos was made.

Asbestos is a ubiquitous mineral appearing everywhere - air, snow, rivers, drinking water, beverages, and drugs. Even control animals in one feeding study had asbestos particles in the several organs examined.

Since it must be assumed that during inhalation, some portion of the material must be swallowed, the incidence of gastrointestinal cancer in asbestos workers is pertinent to the ingestion of asbestos. Although the incidence of GI cancer in asbestos workers is relatively low in relation to the incidence of lung cancer, studies have consistently shown GI cancer incidences of 2-3 times that expected in the general population. The incidence appears to increase with the duration of exposure and there is a long latent period for development.

Feeding asbestos to animals has not increased the incidence of tumors.

A study designed to determine the carcinogenicity of various sizes of asbestos and fiberglass particles when applied to the pleura of rats showed a definite relationship between carcinogenicity and size. Fibers < 3 microns in diameter and > 20 microns in length are more carcinogenic than fibers with diameters > 3 microns regardless of length or less than 20 microns in length regardless of diameter. Most fibers found in water or beverages are individual fibers less than 20 microns in length.

In 1973 The Advisory Committee on Asbestos Cancer reported to the Director of the International Agency for Research on Cancer (a division of the World Health Organization). As part of their report they stated that, "such evidence as there is does not indicate any risk from asbestos fibers present in water, food, beverage, or drugs".

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DOW CONFIDENTIAL
MIDLAND, MICHIGAN

DEPARTMENT	SECTION	REPORT NUMBER
DESIGNED PRODUCTS	Designed Latex	DP-1135

AUTHOR(S): D. M. Blake/W. A. Kibble
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Approved by: K. R. Meath

BUILDING: 2040 Dow Center

TITLE: SD-395 AND SD-617 REPLACEMENT LATEX EVALUATIONS

DP-1135 REPORT NO. 75 8815

SUMMARY:

One of our goals for 1975 was to replace SD-395 and SD-617 at Congoleum because of their slow cycle times. Experimental Latex XD-8902.02 has all the physical properties of SD-395 in an asbestos felt sheet. Experimental Latex XD-8989.00 can be blended 50/50 with XD-8902.02 to produce a replacement for SD-617 (XD-8990.00). An additional feature to these latexes is that they are sodium hydroxide neutralized which makes them more ecologically acceptable. These latexes have been submitted to Congoleum as replacements for SD-395 and SD-617.

ECOLOGY STATEMENT

Dow S/B latexes comply with portions of the Federal Food, Drug and Cosmetic Act as amended, for food packaging. No serious industrial handling or environmental pollution problems in manufacture or end use of these latexes are known.

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TYPE OF REPORT	DATE	PROBLEM NUMBER
Summary	December 5, 1975	0602040

FORM C-33080 PRINTED 8-1-74

TITLE:

SD-395 AND SD-617 REPLACEMENT LATEX EVALUATIONS

PURPOSE:

This study was initiated to find two latexes with similar properties to SD-395 and SD-617 that do not contain ammonia. The Environmental Protection Agency has informed Congoleum of their intentions to monitor the effluent from their plant and to reduce the allowable limits of ammonia in the near future.

CONCLUSIONS AND RECOMMENDATIONS:

CONCLUSIONS

1. Experimental Latex XD-8902.01 has wet end properties equal to SD-395 and better room temperature and hot tensile, better stiffness, and plasticizer resistance.

2. Experimental Latex XD-8902.01 or XD-8902.02 can replace SD-395 and a GAF latex in Congoleum's WS-62 formulation.

3. A 50/50 blend of XD-8989.00, XD-8902.02 with four parts of Averol 113 postadded has similar properties to SD-617.

4. A 50/50 blend of XD-8990.00 and XD-8902.02 should replace SD-395 and SD-617 at Congoleum.

RECOMMENDATIONS

1. Send samples of XD-8990.00 and XD-8902.02 to Congoleum for further evaluations and possible machine trials.

2. Start scaling up XD-8990.00 and XD-8902.02 at the pilot plant.

s set for this year was to replace SD-395 and SD-617 at Congoleum
th latexes contain DL-636 and DL-630, which are costly to make
:tion times and sensitivity of the reaction. It was fortuitous
of Maryland has also approached Congoleum and is in the process
nit on the amount of contaminant in their effluent entering
'er which empties into the Baltimore city water reservoir.

n two flooring felt formulations while SD-617 is only used in
WS-62 and WS-64. Both formulations contain other ingredients
ethylcellulose, gum arabic, Polycup 361, GAF latex and
. Some of these are very expensive and are being eliminated
tions with the idea of streamlining their flooring felts
ing physical properties. At this time Congoleum is con-
of WS-64 in all their flooring felts, however, any latexes
:ill qualify in both WS-62 and WS-64 in case they need to
:tter flooring grades.

: designated WS-62 contains SD-395, a GAF latex, wax and
dients. It is the Cadillac of the industry and very ex-
They also make a WS-64 grade flooring felt that consists
, wax and less active ingredients. This is where their
focused with the objective being to reduce the cost of the
the formulation but maintaining the physical properties.

ccording to standard test procedures outlined in the
:t manual as recommended by Congoleum Industries.

COMPOSITION

70% DL-636 V/30 DL-630

40% SD-395/60 DL-421

50 XD-8902.02/50 XD-8989.00 + 4 pts Averol 113

81 S/17/B/2 AA 0.2 CCl_4

60 S/38 B/2 FA 8 CCl_4

57.5 S/40.5 B/2 FA 4 CCl_4

B - Butadiene AA - Acrylic Acid FA = Fumaric acid.

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erimental Latex XD-8902.01 and SD-395 is shown in Table 1.
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um for evaluation. Their results are shown in Table 2.

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TABLE 2

DATA FROM CONGOLEUM COMPARING VARIOUS
DOW LATEXES IN ASBESTOS FELT

Evaluation	1	2	3	4	5
SD-395	85		43		
XD-8902.01		85		43	56
SD-617			43.5		
DL-421				43.5	30
Wax	15	15	13.5	13.5	13.5
Formulation	WS-62	WS-62	WS-64	WS-64	WS-64
Reams Weight		68.7	66.8	68.4	68.4
Gauge mils	.033	.036	.033	.025	.030
Gauge Wt. Ratio	.48	.52	.49	.51	.44
Tensile, 74°F	42	41	44	48	41
Elong., 74° Break	11.0	10.0	7.0	5.5	6.4
Tensile 350°	13	24	13	18	14
Elong., 350° Break	5.4	7.0	6.3	6.4	6.2
Water Ab. 1 Hr, %	33.8	40.5	16.5	20.5	25.3
Mullen	63	64	55	64	60
Taber/2 Stiffness	25	30	75	115	70
Taber/2 DOP	5	5	5	5	5
Bent Tensile	40	36	25	4	22
Freeness	10.0	9.5	15.0	24.0	10.0
PPT Time, Sec.	45	40	40	30	40
Elastomer, %	15	15	15	15	15
Plast. Immr. Tens.	14	18	12	13	11
Plast. Elong. Break	12.6	11.8	12.2	11.0	11.4

TABLE 3

DATA FROM CONGOLEUM COMPARING VARIOUS
DOW LATEXES IN ASBESTOS FELT WS-62 FORMULATION

Evaluation	1	2	3
SD-395	70		
XD-8902.01		70	85
GAF Latex	15	15	
Wax	15	15	15
Polycup 361	3.0	3.0	3.0
CMC	1.5	1.5	1.5
Gauge mils	315	30	30
Gauge Wt. Ratio	.465	.44	.435
Tensile 74°F	65	68	63
Elongation 74°	5.8	5.8	5.6
Elong. 74° Break	7.8	7.6	6.8
Tensile 350°	23	30	33
Elong. 350° Break	4.0	4.2	4.4
Water Ab. 1 Hr. %	12.2	15.8	16.8
Mullen	97	105	104
Taber/2 Stiffness	60	45	40
Taber/2 DOP	25	20	17
Bent Tensile	45	47	46
Freeness	51	58.5	44.0
PPT Time Sec.	20	20	20
Elastomer, %	15	15	15
Plast. Immr. Tensile	37	43	42
Plast. Elong. Break	7.4	7.8	8.4

TABLE 4

DATA FROM CONGOLEUM COMPARING VARIOUS
DOW LATEXES IN ASBESTOS FELT WS-64 FORMULATION

Evaluation	1	2	3
SD-395	43		
SD-617	43.5		
XD-8989.00		43.5	36.5
XD-8902.01		43.0	50.0
Wax	13.5	13.5	13.5
Polycup 361	7.5		
Gauge mils	41	32	31
Gauge Weight Ratio	.45	.455	.445
Tensile 74°F	37	49	41
Elongation 74° Break	4.8	5.0	4.3
Tensile 350°	14	14	13
Elong. 350° Break	3.1	3.3	3.8
Water Ab. 1 Hr, %	12.0	16.1	17.2
Mullen	69	77	73
Taber/2 Stiff.	65	105	90
Taber/2 DOP	5	8	8
Bent Tensile	23	2	4
Freeness	12.5	14.5	10
PPT Time Sec.	40	35	35
Elastomer, %	15	15	15
Plast. Immr. Tensile	12	17	12
Plast. Elongation Break	9.0	10.2	9.0

TABLE 6

COMPARISON OF PHYSICAL PROPERTIES OF ASBESTOS FELT
USING DOW LATEXES AT DIFFERENT BINDER AND SURFACTANT LEVELS

Evaluation	1	2	3	4	5	6	7
SD-617	50						
SD-395	50						
XD-8902.02		50	50	50	50	50	50
XD-8989.00)* XD-8902.02)		50	50	50	50	50	50
Averol 113		4	4	4	4	4	0
Drainage Time	32	45	44	38	35	33	51
Weight in Gms	21	21	21	21	22	22	22
Gauge mils	.030	.030	.031	.031	.030	.031	.029
Tensile 74°F	37	38	29	35	35	43	36
Elongation, 74°	6.7	5.3	4.3	5.0	5.7	6.0	5.0
Tensile 350°	18	20	18	18	19	19	26
Elong. 35° Break	8.0	7.3	6.3	7.3	7.3	7.7	7.0
Mullen	70/68	65/73	50/53	51/47	61/61	70/65	76/78
Taber/2 Stiff.	120	118	90	90	120	128	93
Taber/2 DOP	8	20	19	19	21	21	22
Bent Tensile	12	7	4	7	5	2	7
Freeness	17	18	17	17	18	16	19
PPT Time Sec.	70	62	41	52	75	130	41
Elastomer, %	15	15	13	15	17	20	15

*A 50/50 blend of XD-8989.00 and XD-8902.02.

Letter Report OC-052201-12

DOW CHEMICAL U.S.A.

MICHIGAN DIVISON
December 5, 1975

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GASKET TESTING FOR DEPCT PLANT CONSTRUCTION

From previous corrison data (OC-52201-7), TEFLON gaskets would be recommended for all O,O-diethylphosphorchloridothioate (DEPCT) handling. In certain applications, however, high temperatures limit the use of TEFLON.

Table I summarizes the data obtained on five non-TEFLON gaskets which should have resisted DEPCT corrosion. All the gaskets were bound asbestos from two suppliers, Johns-Manville (J.M.) and Garlock (Gar). All samples were heated in Stauffer DEPCT for one week (7 days) at 100°C under nitrogen. At the end of the test the DEPCT was partially decomposed as evidenced by precipitated solids and loss of liquid.

Examination of the results listed in Table I clearly shows that two of the gaskets (JM-83 and Gar 7021) are completely unacceptable since they dissolved in hot DEPCT. Two other gaskets, JM-60-S and Gar 900, lost weight in DEPCT but did not decompose. They were, however, less flexible and cracked more easily when stressed. JM-61-S gained weight and showed cross-sectional separation when examined after the test.

Three of the gaskets tested, JM-60-S, JM-61-S and Gar-900, should prove acceptable for hot DEPCT handling. JM-60-S appears to have the best resistance but careful observation on gasket points during start-up would be advised.

D. H. Naffziger
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TABLE I

Run	Brand	I.D. Number	Wt. Gained	Wt. %Gained	Thickness Gained (in)	Thickness %Gained
1	JM	60-S	-0.2207	-9.9%	0.015	23.8
2	JM	61-S	0.0537	6.6%	0.072	59.5
3	JM	83	dissolved	-	-	-
4	Gar	900	-0.0373	-10.8%	0.060	35.5
5	Gar	7021	dissolved	-	-	-