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1976

**Large
Rotating
Apparatus
Division**



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**PLAINTIFF'S
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WH-403

Westinghouse Electric Corporation

East Pittsburgh, Pa. 15112

JOHN T. ALBRAMS
 by C. R. Sullivan
 DIRECTOR
 1992
 Class 2

Proprietary Class 2

A program was developed to eliminate the use of asbestos products in LRA. Replacement materials have been obtained for most items and evaluation of these materials continue.

C. R. Ruffing
Insulation Development Engineering
Large Rotating Apparatus Division

August 24, 1976

J. C. Botts
Manager, Ins. Dev. Engrg.

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ID 76-31

ASBESTOS IN LRA
PROGRESS REPORT

Proprietary Class 2

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ASBESTOS IN LRA
PROGRESS REPORT

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Background

The use of asbestos in Westinghouse became restricted by an act of Congress, the Occupational Safety and Health Act which was signed by the President in December 1970. The act became effective in April 1971 with the stated objective of assuring the workers' health and safety on the job. In December 1971 the Secretary of Labor issued a temporary emergency asbestos dust standard and the permanent standard was issued in June 1972.

The present OSHA asbestos standard of July 1976 has further reduced the allowable asbestos dust content in air and increased the scope of labor and other expense involved in compliance with the law.

The National Institute for Occupational Safety and Health (NIOSH) has been instrumental in having the asbestos standards strengthened through its recommendations to OSHA. In all cases, except for temporary emergency standards, public notice is given of proposed changes and hearings are held before the NIOSH recommendations become law.

Asbestos in LRA

Asbestos fiber and asbestos containing products have been available as commercial materials since the beginning of the manufacturing industry in this country. Westinghouse up to the present has used plastic molded products, wire insulation, tapes, cement-asbestos board, gaskets, brake shoes, papers, tubing, cloth and many other products containing asbestos reinforcement. The original selection of asbestos for use in electrical apparatus was made because it is fire resistant, a good dielectric, and creep resistant. For many years it was the only inorganic fiber reinforcement available in commercial quantities.

Woven glass products were not introduced till after World War II and the large scale availability of glass mat and cloth molded compositions did not take place until the mid 1950's. Even with the introduction of

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fiber glass, asbestos continued to be used because of unique reinforcement properties.

Asbestos has the ability to break into very fine (finer than fiber glass) fibers when crushed or cut during manufacturing operations. This ability to keep splitting fibers rather than breaking them in short stubby pieces as is the case with glass fiber has now been widely shown to be the most critical factor in asbestos airborne pollution. Also the surface chemistry of asbestos makes it a hazardous substance when absorbed into the body.

The hazard of breathing large quantities of asbestos dust has been known since ancient Rome and written references appear down through history. In the past forty years with the control of tuberculosis and a general increase in life span, asbestos dust has been more widely recognized as an industrial hazard.

The latent effects of asbestos exposure have become evident only in recent years.

LRA, Westinghouse has had a Safe Practice Data Sheet A-20 covering asbestos limits and precautions since 1953. These precautions are similar to those found in present OSHA recommendations with the exception of airborne concentrations which have been reduced under recent federal laws.

Restrictions

Until 1969 control of asbestos dust was related to various state and industry standards some of which were established in the early 1900's.

In 1969 the Walsh-Healy act which applied to public contracts was passed and a 12 fibers/cc standard was placed in effect. The OSHA standard a few years later was set at 5 fibers/cc and was further reduced to 2 fibers/cc in July 1976.

LRA was able to comply with the 5 fibers/cc in the past and it appears that the 2 fibers/cc limit will be met largely by the elimination of asbestos containing raw materials from LRA.

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There is a real possibility that all asbestos products will disappear from the market; even those products which LRA does not grind or machine. There is a proposal for a limit of 0.5 fibers/cc which if it becomes law would for the most part eliminate the use of asbestos in any product.

The Present Law and Trade Recommendations

Without going into details on each item the following list is included so the reader can understand the increased cost associated with using asbestos containing products after July 1976.

1. A maximum allowable fiber concentration has been set as of July 1976 which is very difficult to meet (2 fibers/cc).
2. Equipment should function below the limit of 2 fibers/cc and personal protective devices and clothing may be required.
3. Measurements and monitoring must meet recognized standards.
4. Warning signs and labels are required.
5. Record keeping and medical examinations are required.

In addition the Asbestos Information Association recommends the following list for the workers' personal hygiene.

1. Do not smoke.
2. Wash before eating.
3. Shower after work.
4. Use protective devices and clothing properly.
5. Change to work clothes upon arrival at work and from them at the end of the shift using change rooms.
6. If work clothing is taken home, carry in a bag impermeable to asbestos fibers and wash separately from other clothing. Never shake dusty clothing. Use a washing machine.

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The LRA Program to Phase Out Asbestos

The Hampton Micarta Division notified LRA in January 1976 that the manufacture of their asbestos containing products would cease July 1, 1976 as a result of the new OSHA requirements. Planning for the phase out of asbestos in LRA started in February. A program was approved (Appendix I) and monthly asbestos committee meetings have been held each month. This program has a scheduled total of 32-1/4 man months to the end of August 1976 involving all Code Engineering, M&P and Development Engineering, Purchasing and Manufacturing. In addition, Industrial Hygiene (RCD) and the Safety Department (LRA) are included in the program. It is planned that after August 1976, a somewhat smaller program will continue into the future because of long time tests of alternate materials and service requirements of machines sold in the past.

Alternate Materials for LRA

Satisfactory materials are available for most items with the major exceptions being brake shoes and gaskets.

These items require separate programs because:

1. Suppliers have no alternates and no new suppliers have been developed through the Purchasing Department effort.
2. A single superseding item cannot be used in gasket applications without examination of each end use because of individual requirements.

A list of active LRA asbestos containing items is found in Appendix II along with alternates and possible alternates. A few very low activity materials which are ordered by manufacturers' name (no Westinghouse number) can be expected to appear at times and they should be brought to the attention of the committee.

Recommendations

1. A review of the asbestos program should be made at the end of six months (September 1976) and revisions made where necessary.

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2. It is recommended that a smaller effort consisting of Purchasing, Materials Development, Insulation Development and H&P Engineering continue the program into mid 1977.

3. Mr. G. T. Brady, manager of Accident Prevention, E. Pittsburgh, should continue his review of the program and have his representatives follow LRA manufacturing in regard to the small amount of asbestos items which will continue to appear in machines returned for service to East Pittsburgh or serviced in the field.

4. The existing computer programs should be modified to print lists of drawings which show the use of asbestos containing materials and list these drawings by code group so they may be more easily followed.

5. A separate development program for brake shoe and gasket materials should be undertaken.

C.R. Ruffing

C. R. Ruffing
Insulation Development Engineering
Large Rotating Apparatus Division

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2299-5256

Tim Matovich

6-299-4591

C.R. Ruffin
Retired 8/1/83

312 Dancy St.
Pittsburgh, PA 15218

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Test Program - Time
Independent - Compression
Depend - Abrasion

1.) Monthly Meeting with representative from each LRA group

(3) First Program - not
Time Dependent

(2) Contact Suppliers for the replacement of asbestos containing items

'1 Identify LRA materials which contain asbestos

1		Insulation Dev. Eng.
2	1/11	Mechanical Dev. Eng.
1	1	Electrical Dev. Eng.
1	1/11	Materials Dev. Eng.
1/2	1	Large Turbine Gen.
1/2	2	Medium Turbine Gen.
1/2	1/4	Large Motor
1/2	1/4	Hydrogenerator
1/2	1/4	L.R.A. OSHA Rep.
9-1/11	1	Purchasing Dept.
6-1/11	2	M & P Dept.
5	1	Research Consulting and Testing

APPENDIX I

TIME TABLE

LRA ASBESTOS REPLACEMENT FOR OSHA COMPLIANCE

Task	0	1	2	3	4	5	6 months
(1) Identifying LRA materials which contain asbestos	Δ	Δ					
(2) Contact suppliers for replacement of items in (1)	Δ				Δ		
(3) Testing not time dependent		Δ				Δ	
(4) Monthly select one representative from each job	Δ	Δ	Δ	Δ	Δ		Δ
(5) Time dependent tests (compression, creep, abrasion)	Δ						Δ
(6) Letter progress reports		Δ	Δ	Δ	Δ	Δ	Δ (6 Months Progress Report)

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APPENDIX IIA

ASBESTOS CONTAINING ITEMS LISTED BY MATERIAL NUMBER

41211AA	asbestos yarn
41211AB	asbestos yarn
41321AA	rope packing, graphited
414219J	molded insulating board
41511AA	asbestos tape
41511AS	asbestos cloth
415119A	asbestos cloth
415118L	asbestos cloth
41521AJ	epoxy treated tape
41521AN	phenolic treated edge tape
41521CB	varnish treated cloth
41521CC	silicone treated cloth
41521CB	epoxy treated cloth
41521CF	polyester treated cloth
41521FJ	brake lining
41524LA	paper laminate
41524LO	glass cloth asbestos paper flexible laminate
42231AA	asbestos paper
42251AA	ungraphited sheet packing
42331AA	commercial asbestos paper
4233180	electrical grade paper
423318F	2 ply (4233180)
42351AA	millboard
44341VA	Micarta shapes
44141AA	phenolic Micarta sheet materials
44141AB	phenolic Micarta sheet materials
44141AC	phenolic Micarta sheet materials
44141AD	phenolic Micarta sheet materials
44141AE	phenolic Micarta sheet materials

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APPENDIX IIA

ASBESTOS CONTAINING ITEMS LISTED BY MATERIAL NUMBER

44141AJ	phenolic Micarta sheet materials
44141AX	phenolic Micarta sheet materials
44141PA	Micarta tubing
44141JA	Micarta shapes
44141XA	Micarta bars
44341AH	paper phenolic laminate
44641AE	molded composition
44641BX	molded composition
44641CA	brake lining
44641C9	brake lining
44641CC	brake lining
44641CE	brake lining
44641CG	brake lining
45723AA	asbestos neoprene sheet
46316CA	asbestos cement sheet
46316CB	asbestos cement sheet
46316CC	asbestos cement sheet
46316CE	asbestos cement sheet
53311AM	filling cement
53351BA	caulking compound
53351BB	caulking compound
53351BC	caulking compound
53351BD	caulking compound
65711AA	asbestos insulated cable
65711AB	asbestos insulated cable
65711AD	asbestos insulated cable
65711AE	asbestos insulated cable
65711AJ	asbestos insulated cable

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APPENDIX IIA

OLD MATERIALS NUMBERS AND RECOMMENDED REPLACEMENT

<u>Asbestos PDS</u>		<u>Recommended Material</u>
20403 AB	Asbestos Fibers	Fiberfrax Ceramic Bulk Fiber Carborundum Ceramic Fiber Branch P.O. Box 808 Niagara Falls, N.Y. 14302 \$2.35/lb
41211AA	Asbestos Yarn	#11) Fiberfrax #12) Yarn #14) Carborundum #1824 Fiberglass yarn, asbestos and fiber glass textiles North Wales, Pa. 19454
41511AA	Asbestos Tape	Fiberglass Tape State Width and Thickness - Asbestos and Fiberglass Textiles North Wales, Pa. 19454 M Numbers may exist.
415118A	Asbestos Cloth	) State thickness required,) Refrasil 41514GC.
415118B	Asbestos Cloth	
41421BJ	Asbestos Insu- lating Board	Fiberfrax GH Board 1/4" thick \$4-/sq. ft.
41511BL	Asbestos Cloth	State thickness required, Refrasil 41414GC also Fiber glass cloth Hess Goldsmith & Co. State fabric style.
41521AN	Asbestos Tape	Fiber glass tape state width and thickness - Asbestos and Fiber Glass Textiles North Wales, Pa. 19454

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APPENDIX 11B

OLD MATERIALS NUMBERS AND RECOMMENDED REPLACEMENT

<u>Asbestos PDS</u>		<u>Recommended Material</u>
41521CB	Asbestos Cloth for Varnish Treatment	To be supplied by Bedford on glass cloth ET number later.
41521CR	Asbestos Cloth treated at Irwin	Cancelled. If required in future, a new number required for glass or Refrasil replacement.
41524LD	Asbestos glass composite	.015" thick Nomex and glass cloth laminate supplied by Bedford.
42231AA	Asbestos paper .025" thick and .063" thick	Fiberfrax 970A .020" thick .080" thick 970JM Fiberfrax Ceramic Fiber Paper.
42251AA	Asbestos Sheet Packing	Development materials from Carborundum.
42331AA	Asbestos Paper Sheet	Ceramic Paper Bedford LD4299
42331BD	Asbestos Paper Treated with Silicone Resin Turn Insulation on Field Coils	Ceramic Paper - Bedford
42341BN	Shellac Treated Asbestos Paper	Bedford - Four Items 1. Nomex Adhesive ET1318 2. Nomex M with adhesive ET 1420 3. Ceramic Shellac LD 4297 4. Ceramic Epoxy LD 4298
42351AA	Mill Board Gaskets	Fiberfrax GH Board
42351AG	Mill Board .063"	Fiberfrax GH Board or 6 Ply Ceramic Paper - Bedford LD4299

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APPENDIX IIB

OLD MATERIALS NUMBERS AND RECOMMENDED REPLACEMENT

	<u>Asbestos POS</u>	<u>Recommended Material</u>
ss	44141AA Asbestos Phenolic Coil Supports in E-31	Hampton Kevlar Phenolic Laminate H24907
der	44141AB Asbestos Phenolic Laminate	H24907
n	44141AC Asbestos Phenolic Laminate	H24907
	44141AD Asbestos Phenolic Laminate	H24907
	44141AE Asbestos Phenolic Laminate	H24907
	44141AJ Asbestos Phenolic Laminate	H24907
	44141AF Asbestos Phenolic Laminate	H24907
	44141AX Asbestos Phenolic Laminate	H24907
	44341AH Phenolic Asbestos Paper Sheet .062" and .125"	Hampton Phenolic Kevlar H24907 or Phenolic-Ceramic Paper
J	44641CE Asbestos-Metallic Friction Block	None available
	45723AA Asbestos Neoprene Sheet Gasket Material Tk. .063, .125, .160, .188	Development of in-house manufacturing required.

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APPENDIX IIS

OLD MATERIALS NUMBERS AND RECOMMENDED REPLACEMENT

<u>Asbestos PDS</u>		<u>Recommended Material</u>
46316CA	Asbestos Cement Sheet	Fiberfrax GH Board
46316CE	Asbestos Cement Sheet	Fiberfrax GH Board
46316CJ	Asbestos Cement Sheet	Fiberfrax GH Board
46316CL	Asbestos Cement Sheet	Fiberfrax GH Board
46316CC	Asbestos Cement Sheet	Fiberfrax GH Board
46316CJ	Asbestos Cement Sheet	Fiberfrax GH Board
53311AM	Asbestos Cement In-House	Irwin to use Fiberfrax bulk fiber

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APPENDIX IIC

OTHER SUPPLIERS AND REPRESENTATIVE MATERIALS

<u>Supplier</u>	<u>Material</u>
Johns-Manville	Refractory fiber felt bulk refractory fiber refractory fiber paper ceramic fibers in mat form refractory fiber tape ceramic fibers in blanket form ceramic fibers in bulk form refractory fiber felt Marinite-XL ceramic board
Cerro Wire & Cable Co. Division of Cerro Corp. New Haven, Connecticut 06504	66711F8, High Temperature Glass - Teflon cable
Manning Paper Co. Troy, N.Y. 12181 (518) 273-6320	76-72-28, Inorganic insulating paper
Hampton Works - Westinghouse	Kevlar Laminate H24907
Bedford - Westinghouse	Varnish treated glass LO 4303 (replaces 41521C8)
Hitco 1600 W. 135th Street Gardena, California 90249	41514GC Refrasil amorphous silica cloth
Carborundum Co. P.O.Box 808 Niagara Falls, N.Y. 14302	413118A Refractory fiber rope "Fiberfrax"
Owens Corning Fiberglas Corp. Toledo 1, Ohio	41314AA Glass cord, tying
E.I. DuPont de Nemours & Co.	42343EA Mica filled polyamide paper
E.I. DuPont de Nemours & Co.	423538A Uncalendered polyamide paper

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APPENDIX IIC

OTHER SUPPLIERS AND REPRESENTATIVE MATERIALS

<u>Supplier</u>	<u>Material</u>
Bedford - Westinghouse	Epoxy coated Nomex for strap wound coils — ET1420 resin coated ceramic paper
Southern Mills Inc.	Nomex blanket materials S/1095 S/470 S/619 S/9 (41482AA) (protection against welding sparks)

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