MVA, Inc.
Excellence in
Microanalysis

COPY

03 December 1992

Ms. Jennifer Wagner
Richard F. Scruggs, P.A.
734 Delmas Avenue
Pascagoula, MS 39568-1425

Re: Studies to Determine Asbestos Fiber Release
During Cutting of Asbestos Board Materials
Micarta/Marinite
MVA Project No. 0393

Dear Ms. Wagner:

Enclosed please find a copy of our report on the cutting of Micarta/Marinite Board. If you have any questions, please do not hesitate to contact me.

Thank you for consulting MVA, Inc.

Sincerely,

James R. Millette, Ph.D.
Executive Director

JRM/aw

Enclosure

MVA0393:RPT1203

PLAINTIFF'S EXHIBIT
WH-772

5500 Oakbrook Parkway #200
Norcross, Georgia 30093

Telephone 404-662-8509
Facsimile 404-662-8532

Report of Results: MVA0393

Studies to Determine Asbestos Fiber Release During Cutting of Asbestos Board Materials Micarta/Marinite

Prepared for:

Richard F. Scruggs, P.A.
734 Delmas Avenue
Pascagoula, MS 39568-1425

Prepared by:

MVA, Inc.
5500 Oakbrook Parkway, Suite 200
Norcross, GA 30093

03 December 1992

MVA, Inc.
Excellence in
Microanalysis

5500 Oakbrook Parkway #200
Norcross, Georgia 30093
404-662-8509

MVA Project No. 0393

Studies to Determine Asbestos Fiber Release During Cutting of Asbestos Board Materials Micarta/Marinite

Introduction

Construction board materials containing asbestos have a variety of uses including those as a thermal/fireproofing barrier in many types of walls. Asbestos board includes materials such as asbestos-cement (A-C) sheet products and millboard. Any sawing, drilling or sanding of A-C sheet products during installation or renovation is known to result in release of asbestos dust[1,2]. This study was designed to determine under controlled conditions, the levels of asbestos, if any, which might be released into the air when Micarta/Marinite asbestos board is cut and what might be re-suspended into the air when sweeping the dust released during the cuttings.

Product Materials

Micarta/Marinite is an asbestos board construction material composed of two sheet products joined together. Two sheets of Micarta, a high pressure decorative laminate containing chrysotile asbestos, are bound to both sides of a sheet of Marinite, an amosite/calcium silicate board. Together the Micarta and Marinite are used as one product as fire-safe wall partitions in ship construction.

Study Design

In a controlled containment area, background area air samples were collected before any work was performed on the asbestos board material. Area air samples and personal monitoring samples were collected while the material was cut (in a dry condition) with a 7 ¼ inch electric hand saw (Skil Corp.). The cutting was done under the supervision of a carpenter who had worked in shipyards throughout his life installing this type of material.

Area air samples were also collected at specific intervals after the cutting to gain information about air concentrations after known periods of settling time. Personal and area air samples were also collected during dry sweeping of the dust released by the cutting.

Study Site

The study was conducted in an empty building in Pascagoula, Mississippi. The study team conducted the board cutting tests after an asbestos abatement contractor had prepared the containment area. The containment barriers in the area consisted of two layers of 6-mil polyethylene plastic sheets on the floor, walls and ceiling of each room. The containment area was 100-150 square feet with an 8 foot ceiling height.

Study Procedures

For the experiment, three (3) cuts (2 cuts of approximately 2 feet each and 1 cut of approximately 8 inches) were made on a Micarta/Marinite board. Air samples were collected during the cutting and during the settling period after the cutting. The cutting test lasted about 15 minutes. Air samples were also collected during the sweeping and the settling period following the sweeping.

The person cutting the asbestos boards was fitted with two personal air sampling devices and the person observing and photographing the activity wore one personal air sampling device. These personal air samples were collected at rates of 0.9 and 1.9 liters per minute.

All personnel inside the study area were protected by air purifying respirators and complete head and body coverings. The decontamination system consisted of a changing room outside the testing area, a shower room and a clean suit-up room. The decontamination system was used each time a person exited the study area.

Analytical Methods

Air samples were analyzed by the standard phase contrast microscopy (PCM) method [3] using the "A" counting rules.

Although the phase contrast microscope enhances the analyst's ability to see fibers over other types of light microscopes, the standard procedure does not involve identification steps which specifically determine how many of the fibers counted are actually asbestos. Because this material may contain other types of fibers, some of the samples were analyzed by scanning electron microscopy (SEM) using a technique developed by the Salt Lake City Laboratory of the Occupational Safety and Health Administration (OSHA)[4]. The SEM analysis method differentiates between the different types of asbestos fibers on the basis of morphology and x-ray elemental analysis. A section of the air filter was cut and mounted on a microscope stub with carbon tape. Although both chrysotile and amosite asbestos fibers were identified on the filter section, the large amount of material on the filter would not allow for reasonable counting of the fibers. A small portion of the material on the filter was removed with a needle and dispersed on a carbon planchet for further study. Additional analysis and counts of fibers were made with the transmission electron microscopy (TEM) following an indirect preparation procedure for the heavily loaded samples. The TEM analysis method identifies asbestos fibers on the basis of morphology, crystal structure and x-ray elemental analysis. Although many shorter fibers were seen, only asbestos fibers longer than 5 μm were counted.

Results

The results of air monitoring are shown in Tables I, and II. Concentrations of asbestos fibers were very high during the cutting of the Micarta/Marinite Board. Electron micrographs of asbestos fibers found on some of the air filters are shown in Appendix B.

References:

(1) U.S. Environmental Protection Agency: Asbestos Waste Management Guidance, Office of Solid Waste EPA/530-SW-85-007, May 1985.

(2) Falgout, D.A., Environmental Release of Asbestos from Commercial Product Shaping. U.S. EPA Contract No. 68-03-3040. Project Summary NTIS Report No. PB 85-188-878/AS (1985).

(3) Carter, J.W., Taylor, D.G., Baron, P.A.; NIOSH 7400. National Institute of Occupational Health Manual of Analytical Methods, p. 7400-1 - 7400-8 (1984).

(4) Method I160, U.S. Department of Labor, OSHA, Salt Lake City Analytical Laboratory.

TABLE I

Air Monitoring Data
Micarta/Marinite Board

Phase Contrast Microscopy (PCM)

Sample Description	Sample Duration (minutes)	Air Volume (liters)	Concentration* (fibers/cc)
Area, Before Cutting	50	520	0.13
Area, Before Cutting	50	520	0.14
Area, Before Cutting	50	520	0.12
Personal, During Cutting	17	15.3	54.7
Personal, During Cutting	17	15.3	81.5
Area, During Cutting	17	32.3	NA**
Area, During Cutting	17	15.3	NA**
Area, During Cutting	17	32.3	NA**
Personal, Helping Cutter	17	32.3	NA**
Area, During Settling (45 min. after cut)	15	156	NA**
Area, During Settling (45 min. after cut)	15	156	NA**
Area, During Settling (45 min. after cut)	15	156	NA**
Personal, During Sweeping	15	28.5	30.7
Area, During Sweeping	15	13.5	60.0
Area, During Sweeping	15	28.5	16.4
Area, During Sweeping	15	28.5	25.3
Area, 30 min. after Sweeping	16	166	6.5
Area, 30 min. after Sweeping	15	156	7.8
Area, 30 min. after Sweeping	15	156	6.5
Area, 60 min. after Sweeping	30	312	3.2
Area, 60 min. after Sweeping	30	312	3.4
Area, 60 min. after Sweeping	30	312	3.0

* Blank subtracted
** Not analyzed - Very heavy loading

TABLE II

Air Monitoring Data
Micarta/Marinite Board

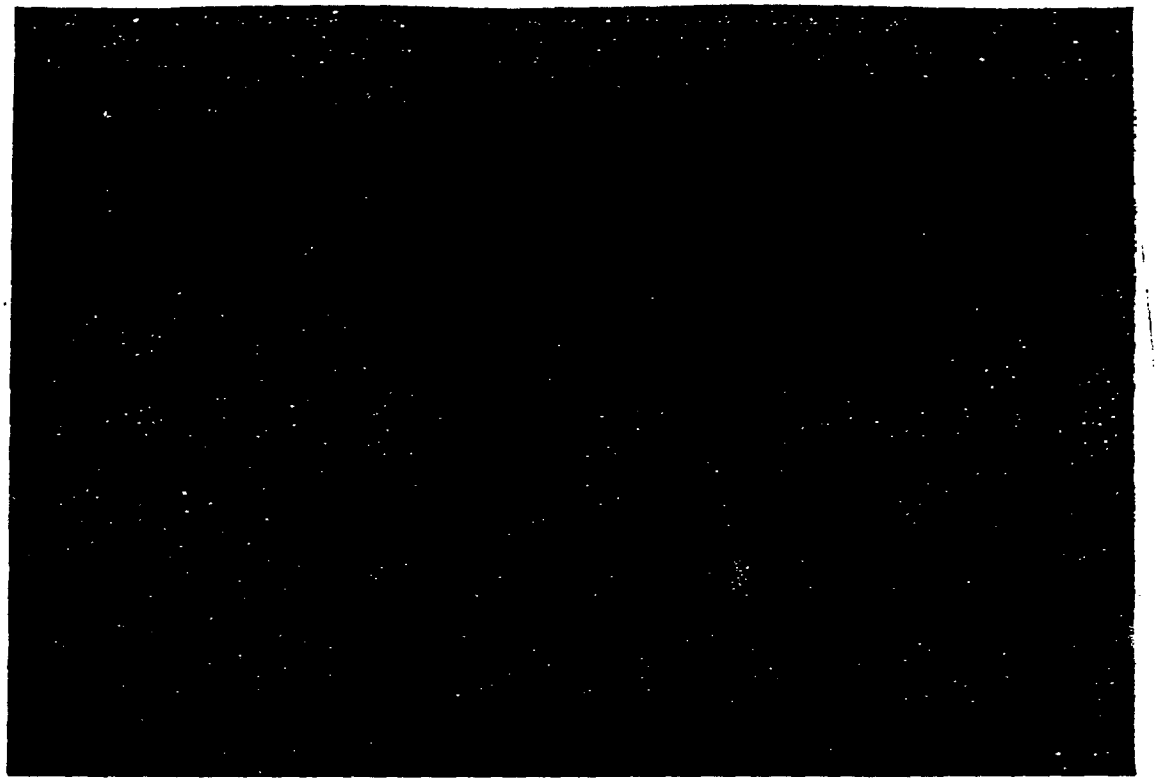
Transmission Electron Microscopy (TEM)

Sample Description	Concentration* (fibers/cc) Chrysotile	Amosite
Personal, During Cutting	900	500
Personal, During Cutting	300	420

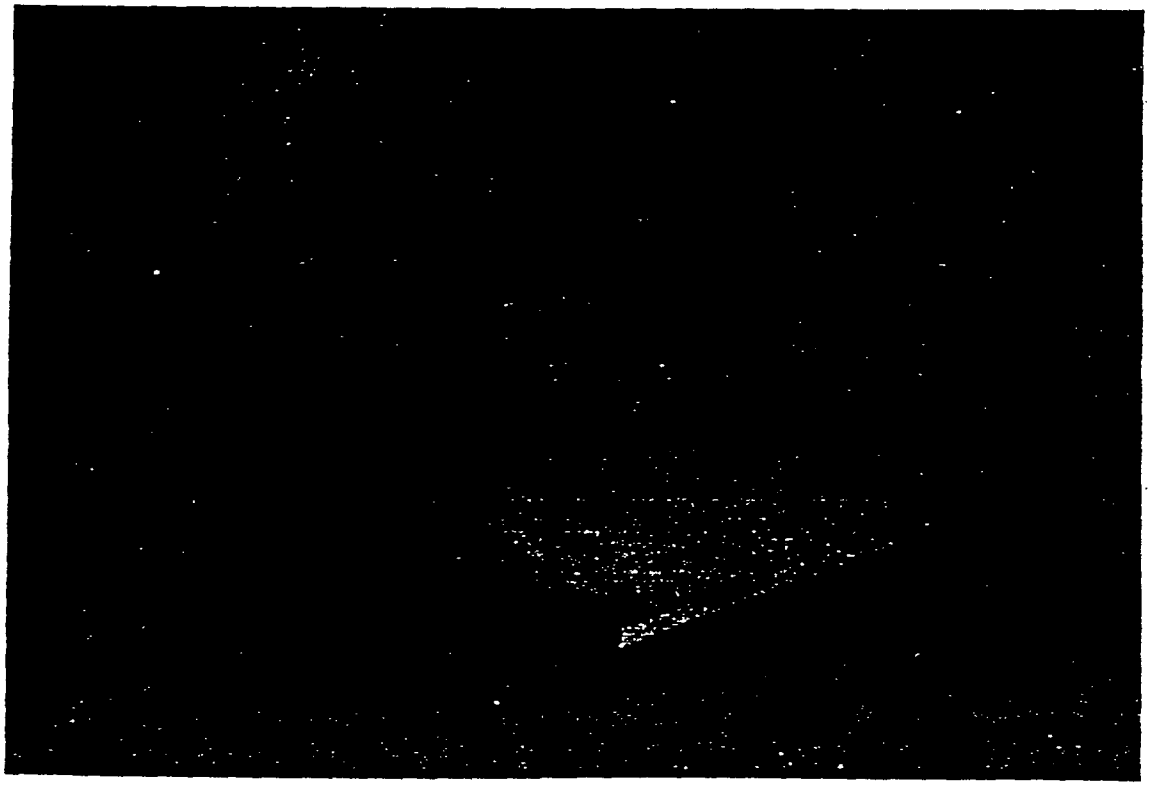
* Fibers longer than 5 μm in length and greater than 3:1 aspect ratio.

Appendix A

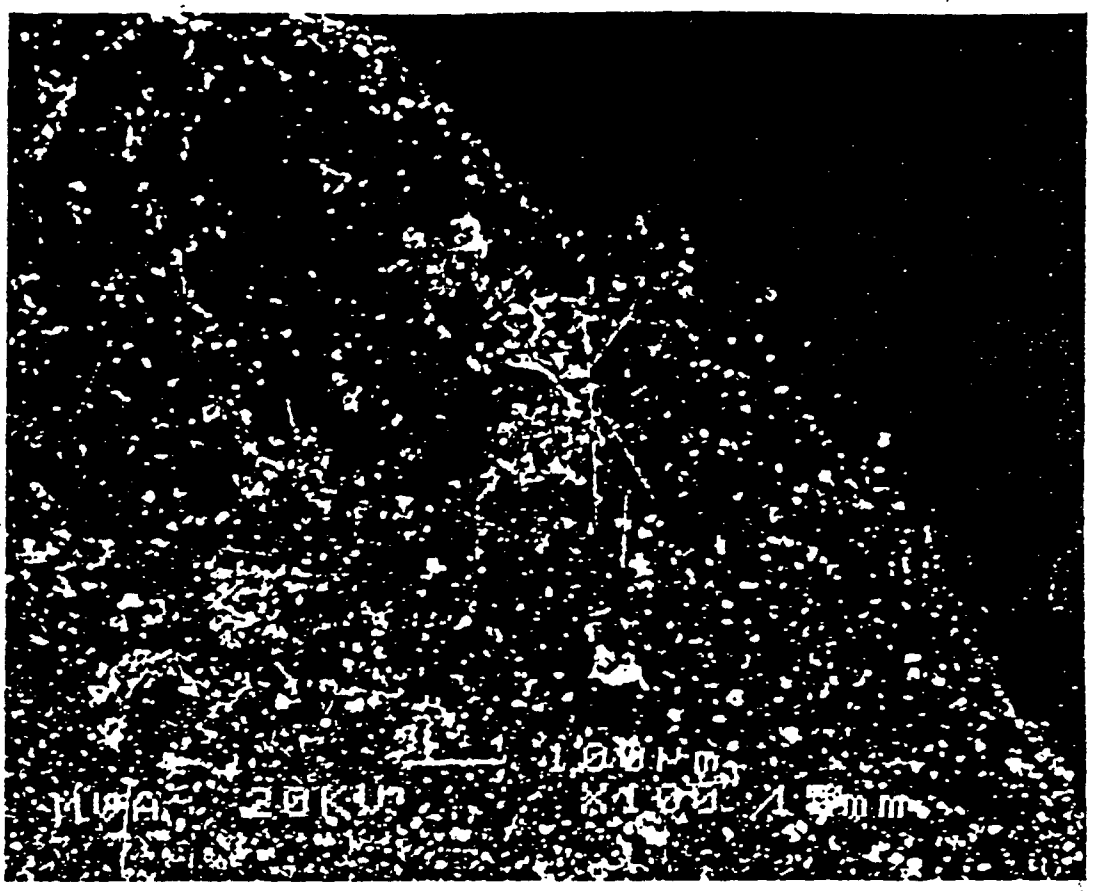
Photographs Taken Inside the Experimental Chambers



A-1: Worker performing cut on Micarta/Marinite" asbestos board.



A-2: "Micarta/Marinite" asbestos board. After cut.



. MVA0393-C4558: Secondary electron (SE) image of material from the lters surface dispersed on a carbon stub. Magnification = 140X.

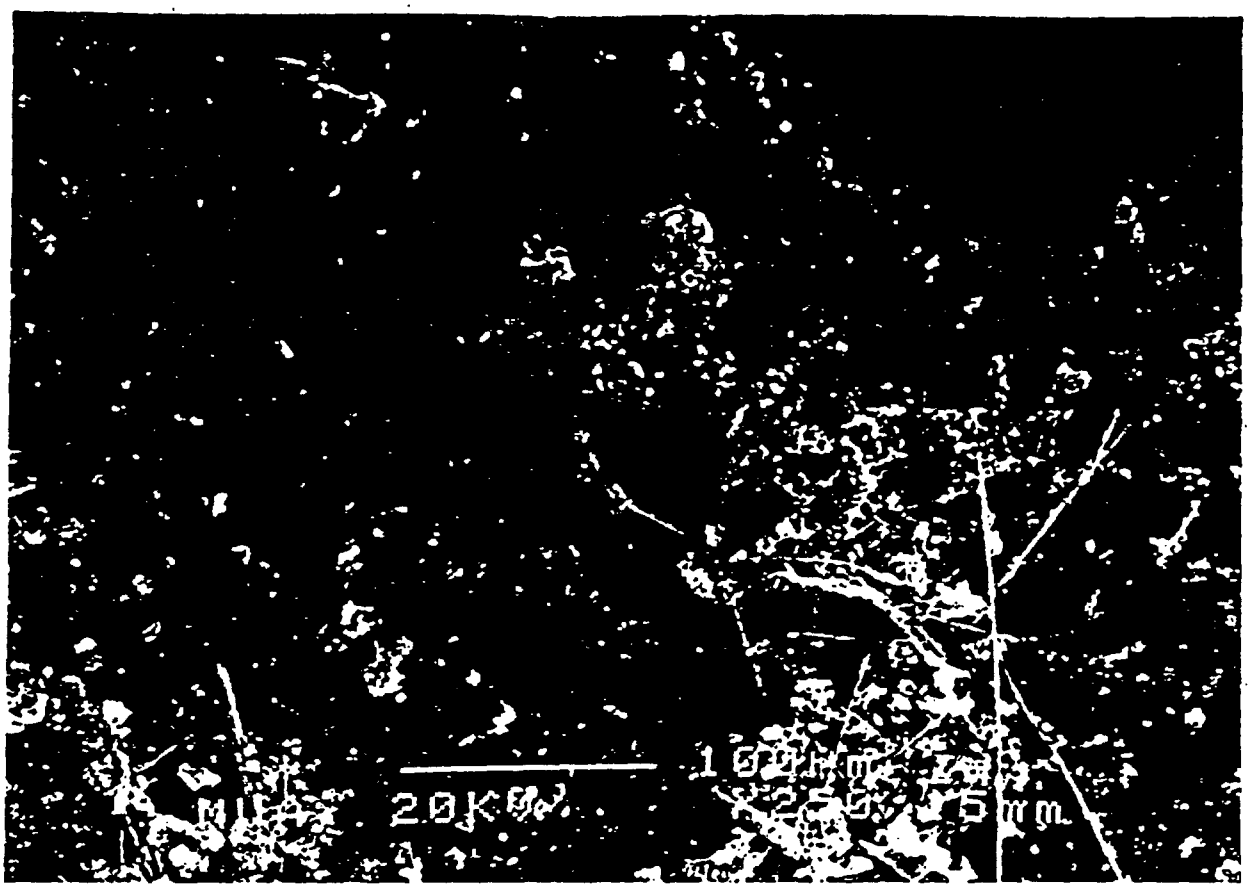


Figure B2. MVA0393-C4558: SE image of Figure B1 at a higher magnification of 335X. Chrysotile asbestos fibers and amosite asbestos fibers can be seen.

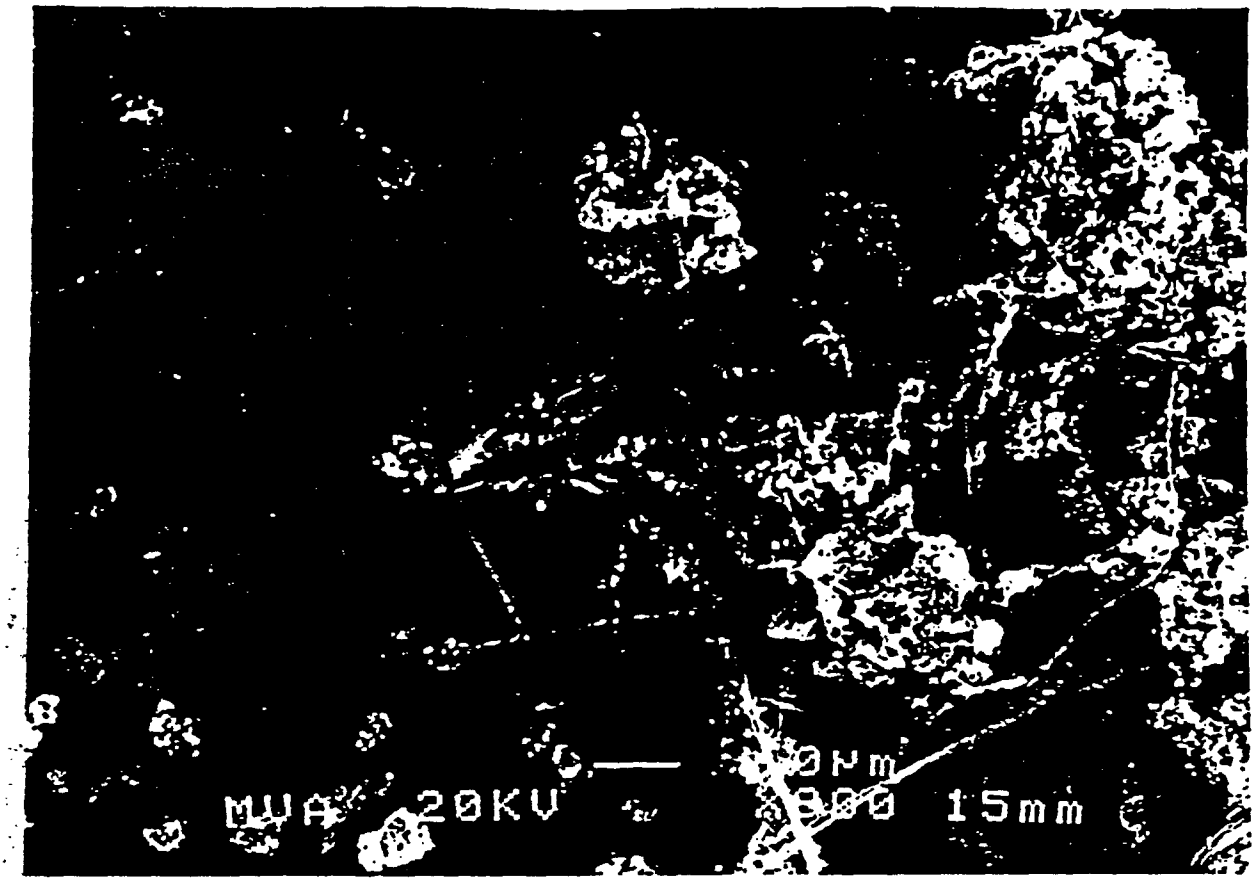


Figure B3. MVA0393-C4558: Higher magnification SE image of a chrysotile fiber bundle in Figure B2. Magnification = 1150X.

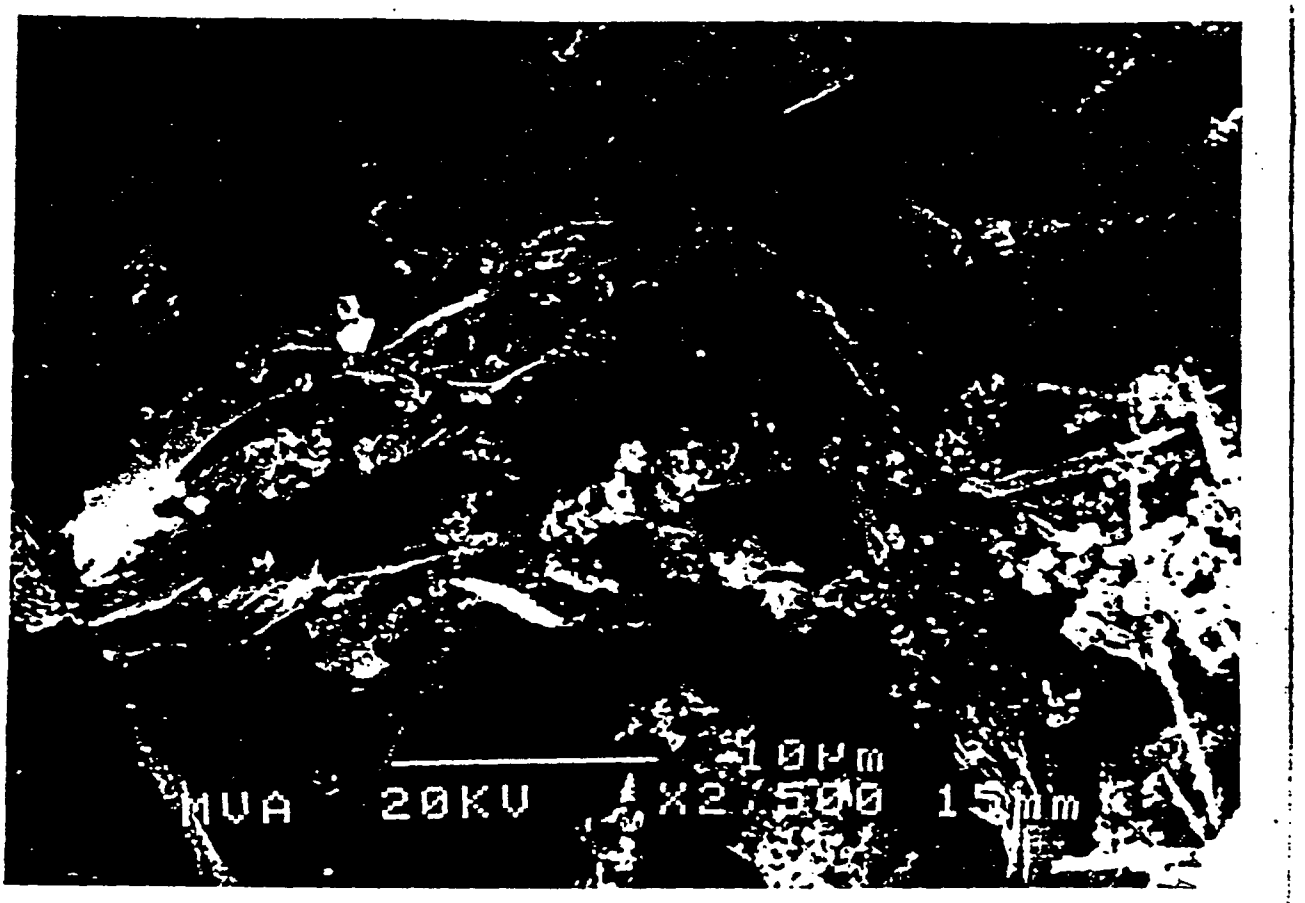


Figure B4. MVA0393-C4558: Higher magnification SE image of the chrysotile fiber bundle in Figure B3. Magnification = 3500X

Figure B5. MVA0393-C4558: SE image of a typical field at a magnification of 2850X. The rounded aggregates are calcium/silicon particles.

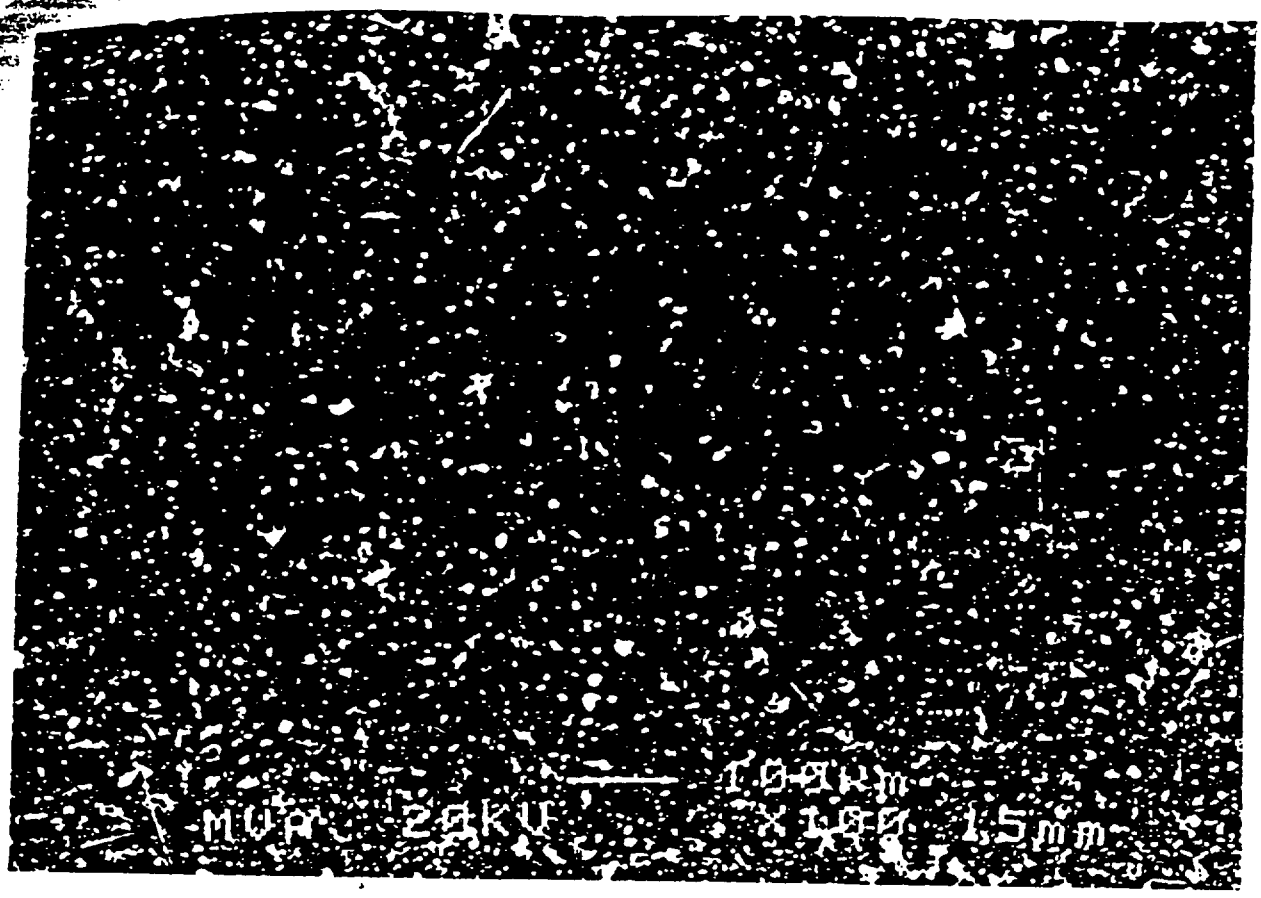


Figure B6. MVA0393-C4559: SE image of material from the filter surface dispersed on a carbon stub. Magnification = 145X

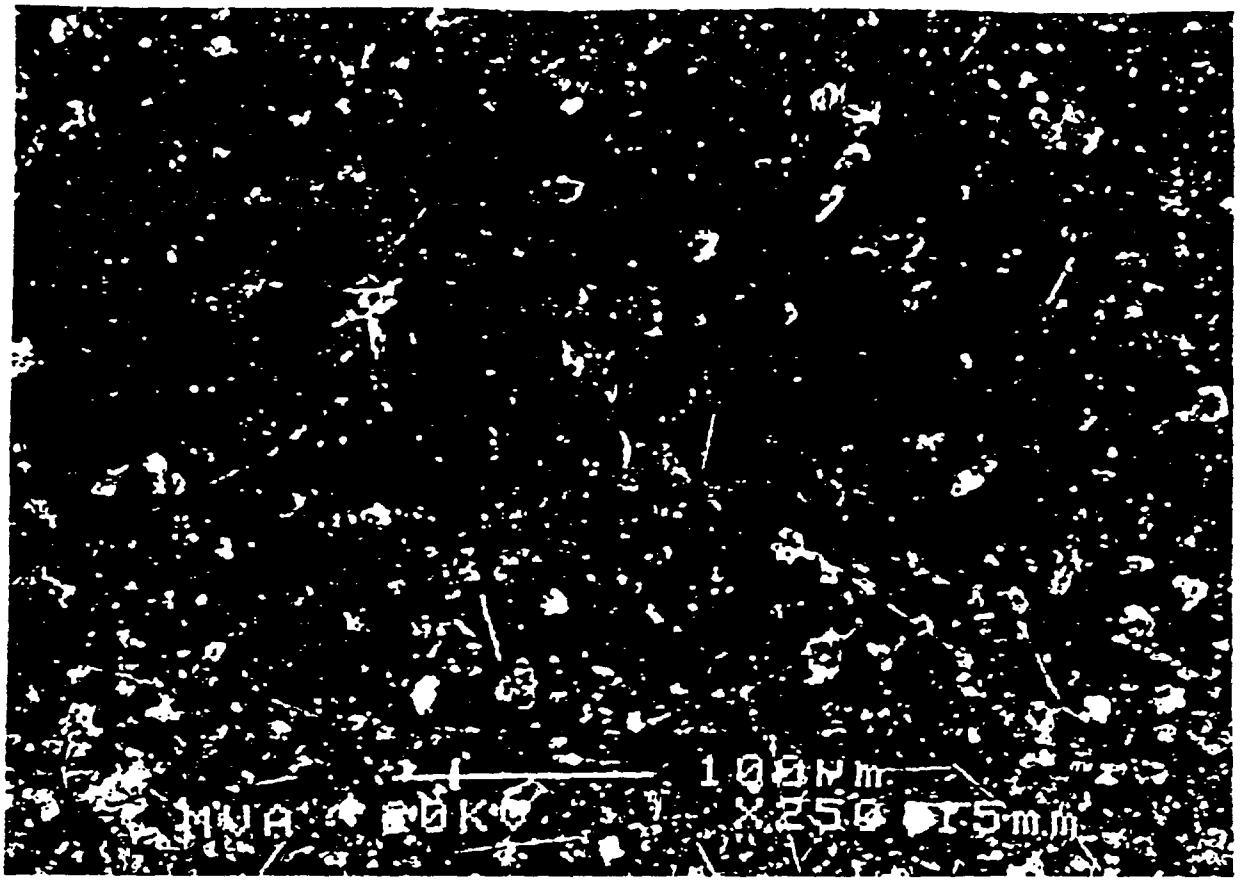


Figure B7. MVA0393-C4559: SE image of Figure B6 at a higher magnification of 350X. Chrysotile asbestos fibers and amosite asbestos fibers can be seen.

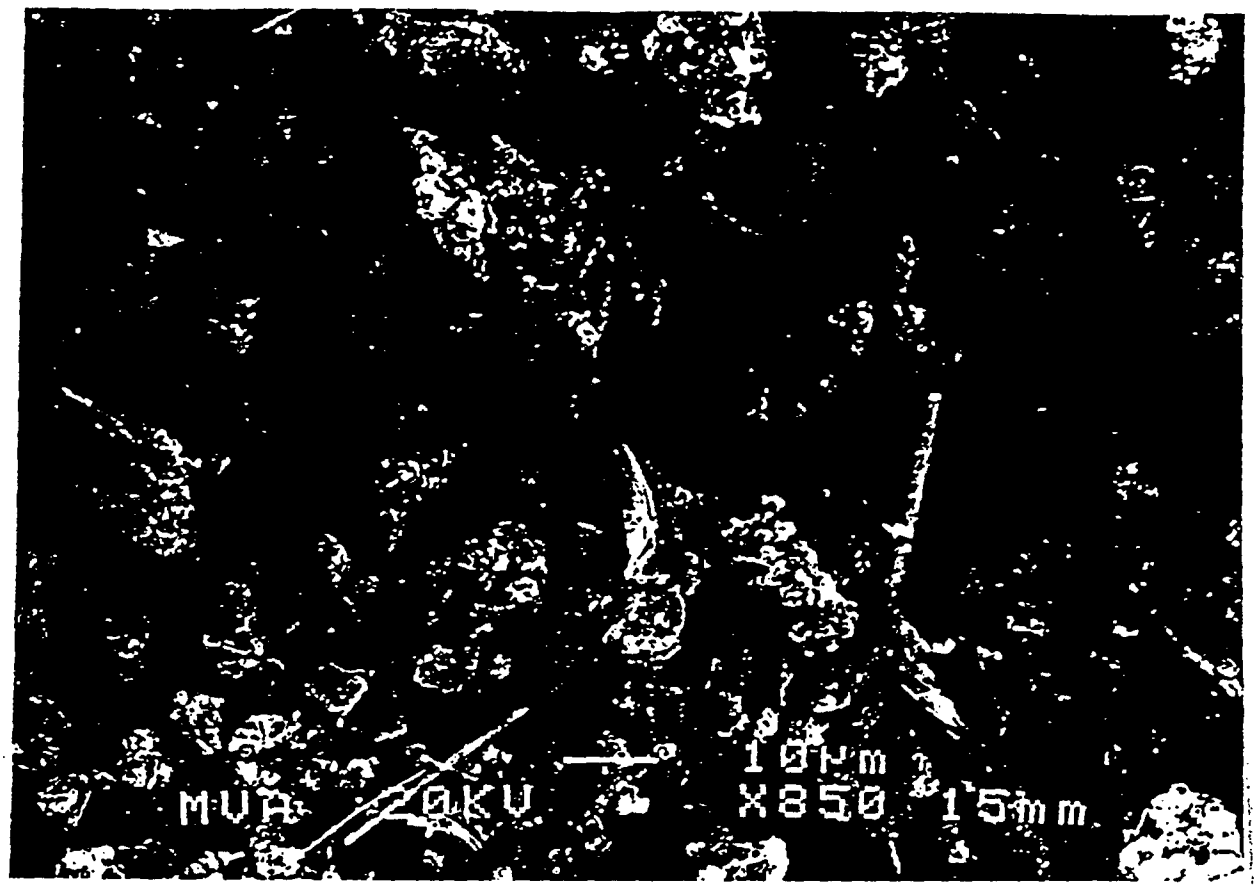


Figure B8. MVA0393-C4559: Higher magnification SE image of a chrysotile fiber bundle in Figure B7. Magnification = 1300X.

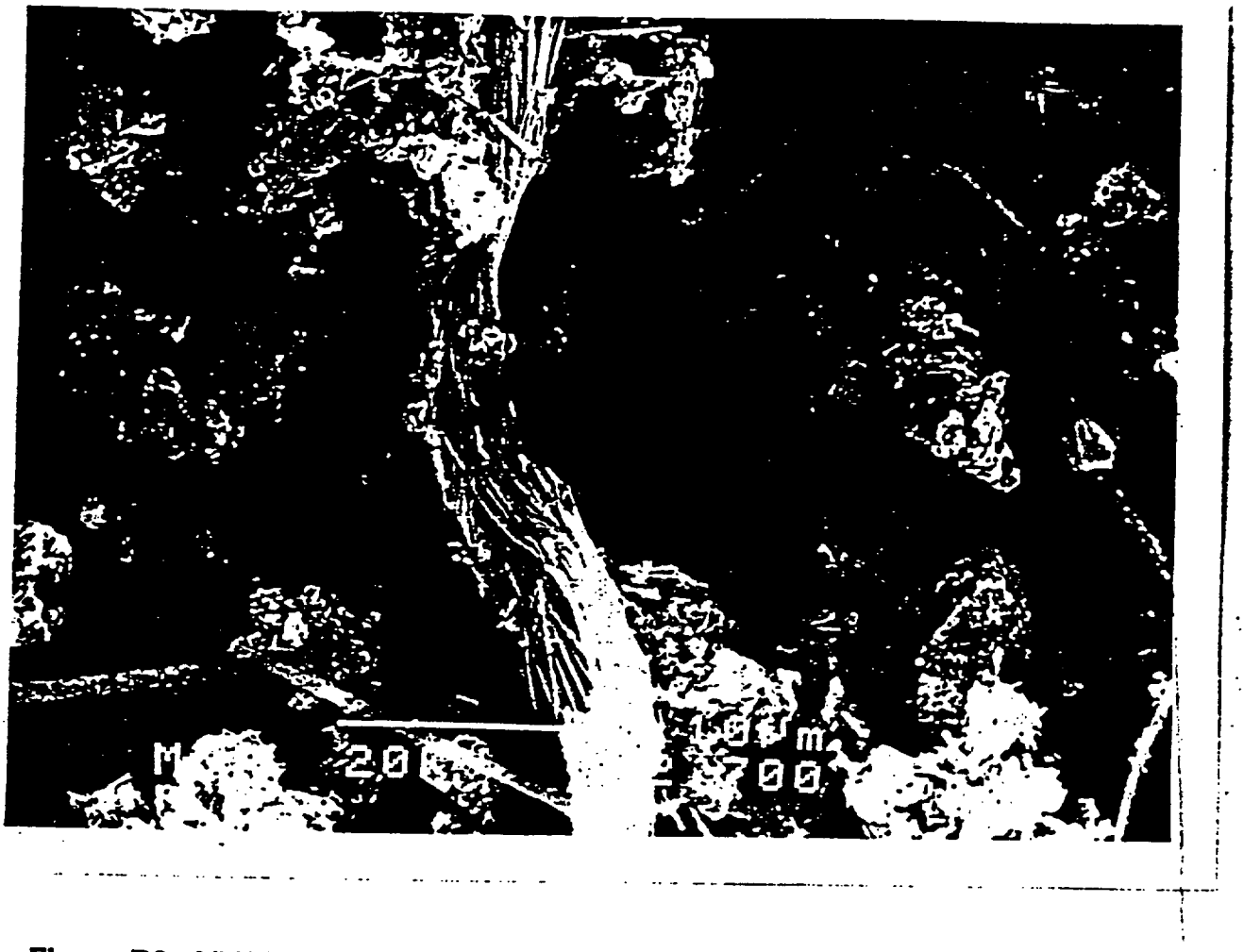


Figure B9. MVA0393-C4559: Higher magnification SE image of the chrysotile fiber bundle in Figure B8. Magnification = 3900X

Figure B10. MVA0393-C4559: SE image of a typical field. Magnification = 3100X. The rounded aggregates are calcium/silicon particles.

Appendix C

Analysis Sheets
Transmission Electron Microscopy (TEM) Analysis
and X-ray Spectra

MVA, Inc.

SAMPLE ANALYSIS INFORMATION

MVA PROJECT NO: 0393 DATE: 11/20/92
MVA SAMPLE NO: C4558
CLIENT SAMPLE NO: _

Amount collected:	15.3	liters
Amount prepped:	0.001	liters
Area of collection filter:	1339	mm²
Magnification used for fiber counting:	25000	
Aspect ratio for fiber definition:	3:1	
Mean dimension of grid openings:	0.0083	mm²
Number of grid openings examined:	10	
Number of asbestos structures counted:	34	
Number of fibers longer than 5 µm:	34	
Initials of Analyst:	ATC	

Grid Opening	Structure Number	Structure Type	Length µm	Width µm	Identif-ication	Comments
1/F5	1	F	12.48	0.04	CDX	
	2	F	4.60	0.04	CDX	
	3	F	4.20	0.04	CD	
	4	F	7.60	0.28	ADX	
1/H4	5	F	4.40	0.24	ADX	
	6	F	12.80	0.40	ADX	
	7	B	6.40	0.24	CD	
	8	M11	4.80	1.20		
		MF	4.80	0.24	ADX	
1/E2	9	M11	6.40	1.60		
		MB	4.00	0.12	CD	
	10	F	8.80	0.04	CD	
	11	CL31	5.60	3.80		
		CF	4.40	0.04	CD	
	12	F	4.40	0.04	CD	
	13	F	4.80	0.12	CD	
	14	B	5.60	0.20	CD	
1/C10	15	F	4.80	1.20	ADX	
1/I4	16	B	4.80	0.60	CDX	
	17	B	10.80	0.12	CD	
	18	B	4.40	0.04	CD	
	19	F	5.20	0.28	AD	
2/H4	20	F	9.60	0.04	CD	
	21	B	4.80	0.20	CD	
	22	F	7.60	0.24	AD	

*No Asbestos Structures Detected

MVA PROJECT NO: 0393 DATE: 11/20/92
MVA SAMPLE NO: C4558
CLIENT SAMPLE NO: _

Grid Opening	Structure Number	Structure Type	Length um	Width um	Identif-ication	Comments
2/F8	23	F	4.80	0.28	AD	
	24	F	4.40	0.20	AD	
	25	F	4.20	0.20	AD	
	26	F	10.40	0.04	CD	
2/J6	27	F	12.80	0.80	AD	
	28	F	4.40	0.02	CD	
2/I8	29	B	24.80	0.20	CD	
	30	CL	6.00	2.40	CD	
2/H6	31	F	12.40	0.20	CD	
	32	F	5.20	0.28	AD	
	33	F	9.20	0.02	CD	
	34	F	6.00	0.02	CD	

*No Asbestos Structures Detected

MVA, Inc.
SAMPLE ANALYSIS INFORMATION

MVA PROJECT NO: 0393 DATE: 11/20/92
MVA SAMPLE NO: C4559
CLIENT SAMPLE NO: _

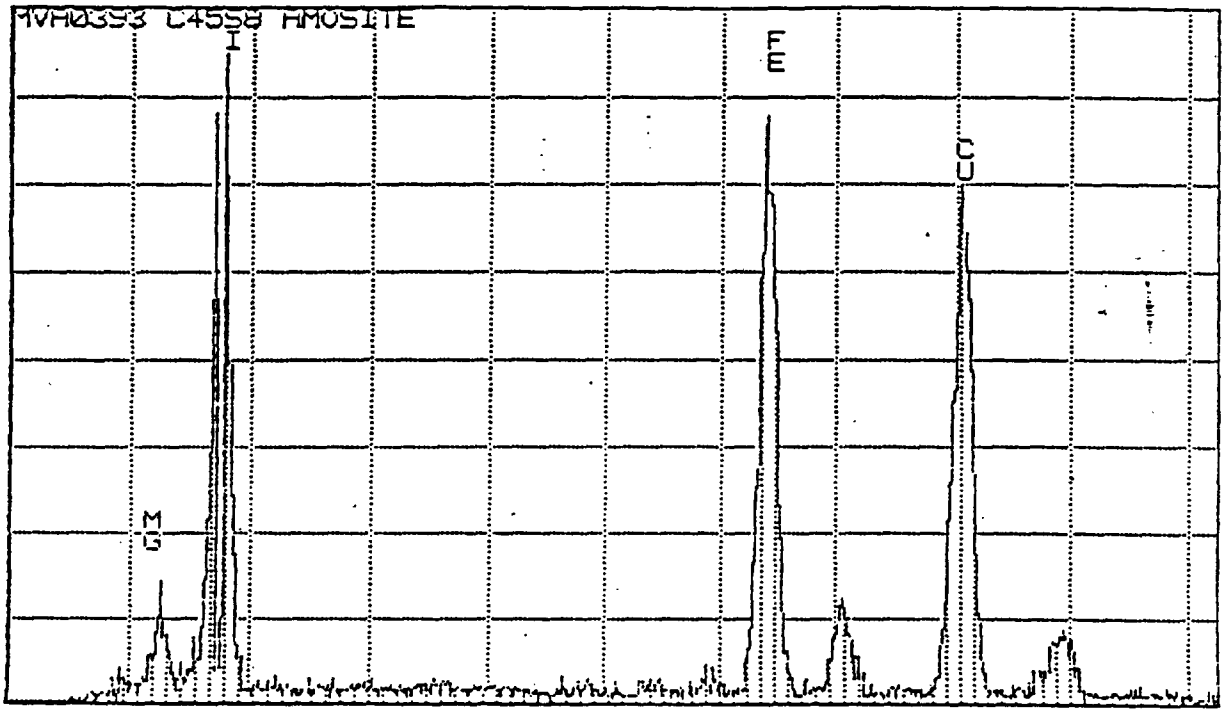
Amount collected:	15.3	liters
Amount prepped:	0.001	liters
Area of collection filter:	1339	mm^2
Magnification used for fiber counting:	25000	
Aspect ratio for fiber definition:	3:1	
Mean dimension of grid openings:	0.0083	mm^2
Number of grid openings examined:	10	
Number of asbestos structures counted:	17	
Number of fibers longer than 5 µm:	17	
Initials of Analyst:	ATC	

Grid Opening	Structure Number	Structure Type	Length µm	Width µm	Identif-ication	Comments
1/G9	1	F	5.20	0.04	CD	
	2	B	4.40	0.20	CDX	
	3	B	6.00	1.00	ADX	
	4	F	5.60	0.04	CD	
	5	F	4.40	0.04	CD	
1/H8	6	F	6.00	0.32	ADX	
	7	CL++	5.60	1.60	CD	
1/F3	8	F	13.20	0.20	AD	
1/D6	9	F	21.20	0.40	AD	
	10	M11	6.40	1.60		
		MF	6.40	0.32	AD	
1/I3	11	F	8.80	0.40	AD	
1/G4	12	F	8.40	0.02	CD	
	13	B	9.60	0.16	CD	
1/I6	16	F	4.80	0.36	AD	
1/G6	17	F	4.40	0.36	AD	
1/J8	NSD*					
1/B5	NSD					

*No Asbestos Structures Detected

SERIES II MON 08-AUG-92 14:12

Cursor: 0.000keV = 0 ROI (0) 0.000: 0.000

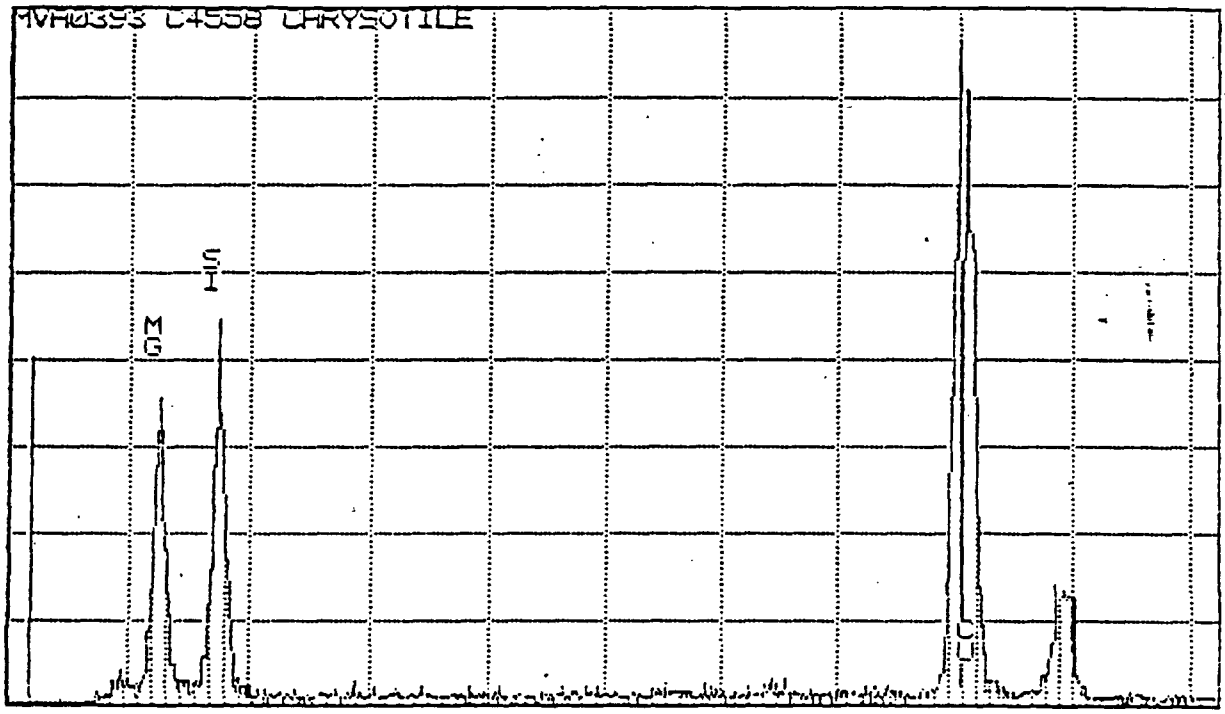


0.000 VFS = 256 10.240

S EXEC(7-0) DATA LAB

SERIES II MON 08-AUG-92 14:25

Cursor: 0.000keV = 0 ROI (0) 0.000: 0.000

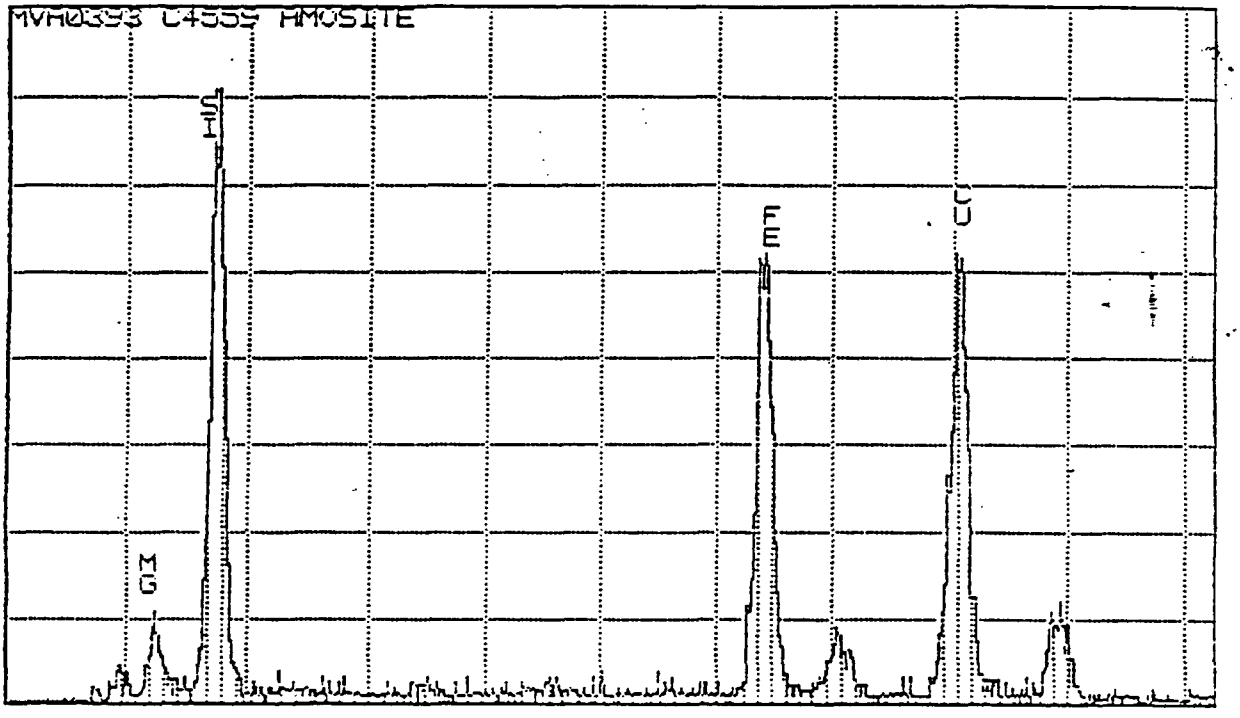


0.000 B- 5 VFS = 256 10.240

22 EXEC(7-D) DATA LAB

SERIES II MON 08-AUG-92 16:04

Cursor: 0.000keV = 0 ROI (0) 0.000: 0.000

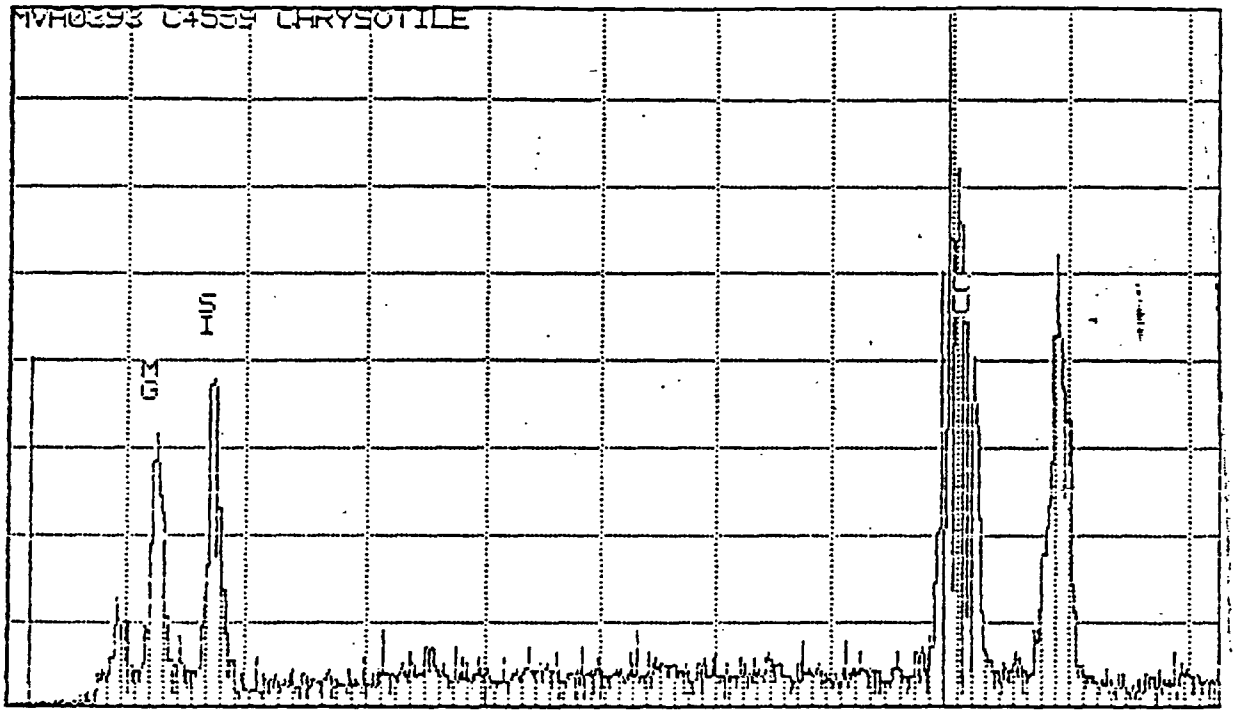


0.000 VFS = 128 10.240

S EXEC(7-D) DATA LAB

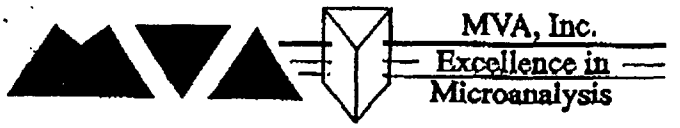
SERIES II MON 08-AUG-92 15:53

Cursor: 0.000keV = 0 ROI (0) 0.000: 0.000



0.000 B- 5 VFS = 128 10.240

152 EXEC(7-D) DATA LAB



17 December 1992

Ms. Jennifer Wagner
Richard F. Scruggs, P.A.
734 Delmas Avenue
Pascagoula, MS 39568-1425

Re: Corrections for Table II (TEM Air Monitoring Data)
Micarta/Marinite Experiment
MVA Project No. 0393

Dear Ms. Wagner,

In our report of 03 December 1992 entitled: "Studies to Determine Asbestos Fiber Release During Cutting of Asbestos Board Materials Micarta/Marinite" the plate magnification of 25,000X was inadvertently used on the TEM count sheets instead of the screen magnification of 21,600X. The correction causes a small change in the TEM air results shown on Table II. The values are still very high during the cutting of the Micarta/Marinite Board and my conclusions are not changed. Please replace Table II and the TEM count sheets in Appendix C with the pages enclosed.

Sincerely,

James R. Millette, Ph.D.
Executive Director

JRM/ds

Enclosures

cc: Ann Kearse

MVA0393:chg1217
5500 Oakbrook Parkway #200
Norcross, Georgia 30093
Telephone 404-662-8509
Facsimile 404-662-8532

TABLE II

Air Monitoring Data
Micarta/Marinite Board

Transmission Electron Microscopy (TEM)

MVA#	Sample Description	Concentration* (fibers/cc) Chrysotile	Amosite
MVA0393-C4558	Personal, During Cutting	800	460
MVA0393-C4559	Personal, During Cutting	300	340

*Fibers longer than 5 µm in length and greater than 3:1 aspect ratio.

MVA, Inc.
SAMPLE ANALYSIS INFORMATION

MVA PROJECT NO: 0393 DATE: 11/20/92
MVA SAMPLE NO: C4558
CLIENT SAMPLE NO: –

Amount collected:	15.3	liters
Amount prepped:	0.38	liters
Area of collection filter:	1339	mm²
Magnification used for fiber counting:	21600	
Aspect ratio for fiber definition:	3:1	
Mean dimension of grid openings:	0.0083	mm²
Number of grid openings examined:	10	
Number of asbestos structures counted:	34	
Number of fibers longer than 5 µm:	34	
Initials of Analyst:	ATC	

Grid Opening	Structure Number	Structure Type	Length µm	Width µm	Identification	Comments
1/F5	1	F	14.44	0.05	CDX	
	2	F	5.32	0.05	CDX	
	3	F	8.80	0.32	ADX	
H4	4	F	5.09	0.28	ADX	
	5	F	14.81	0.46	ADX	
	6	B	7.41	0.28	CD	
	7	M11	5.56	1.39		
		MF	5.56	0.28	ADX	
E2	8	F	10.19	0.05	CD	
	9	CL31	6.48	4.40		
		CF	5.09	0.05	CD	
	10	F	5.09	0.05	CD	
	11	F	5.56	0.14	CD	
	12	B	6.48	0.23	CD	
C10	13	F	5.56	1.39	ADX	
I4	14	B	5.56	0.69	CDX	
	15	B	12.50	0.14	CD	
	16	B	5.09	0.05	CD	
	17	F	6.02	0.32	AD	
2/H4	18	F	11.11	0.05	CD	
	19	B	5.56	0.23	CD	
	20	F	8.80	0.28	AD	

*No Asbestos Structures Detected

MVA PROJECT NO: 0393 DATE: 11/20/92
MVA SAMPLE NO: C4558
CLIENT SAMPLE NO: _

Grid Opening	Structure Number	Structure Type	Length um	Width um	Identif-ication	Comments
2/F8	21	F	5.56	0.32	AD	
	22	F	6.09	0.23	AD	
	23	F	12.04	0.05	CD	
J6	24	F	14.81	0.93	AD	
	25	F	5.09	0.02	CD	
I8	26	B	28.70	0.23	CD	
	27	CL	6.94	2.78	CD	
H6	28	F	14.35	0.23	CD	
	29	F	6.02	0.32	AD	
	30	F	10.65	0.02	CD	
	31	F	6.94	0.02	CD	

*No Asbestos Structures Detected

MVA, Inc.
SAMPLE ANALYSIS INFORMATION

MVA PROJECT NO: 0393 DATE: 11/20/92
MVA SAMPLE NO: C4559
CLIENT SAMPLE NO: -

Amount collected:	15.3	liters
Amount prepped:	0.38	liters
Area of collection filter:	1339	mm²
Magnification used for fiber counting:	21600	
Aspect ratio for fiber definition:	3:1	
Mean dimension of grid openings:	0.0083	mm²
Number of grid openings examined:	10	
Number of asbestos structures counted:	17	
Number of fibers longer than 5 µm:	17	
Initials of Analyst:	ATC	

Grid Opening	Structure Number	Structure Type	Length µm	Width µm	Identification	Comments
1/G9	1	F	6.02	0.05	CD	
	2	B	5.09	0.23	CDX	
	3	B	6.94	1.16	ADX	
	4	F	6.48	0.05	CD	
	5	F	5.09	0.05	CD	
H8	6	F	6.94	0.37	ADX	
	7	CL++	6.48	1.85	CD	
F3	8	F	15.28	0.23	AD	
D6	9	F	24.54	0.46	AD	
	10	M11	7.41	1.85		
		MF	7.41	0.37	AD	
I3	11	F	10.19	0.46	AD	
G4	12	F	9.72	0.02	CD	
	13	B	11.11	0.19	CD	
I6	14	F	5.56	0.42	AD	
G6	15	F	5.09	0.42	AD	
J8	NSD*					
B5	NSD					

*No Asbestos Structures Detected