MVA, Inc.
Excellence in
Microanalysis

08 December 1992

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

Re: Microscopic Analysis of a Sample of
Asbestos Board Cut During the
Micarta/Marinite Experiment
MVA Project No. 0393

Dear Ms. Wagner:

Enclosed please find a copy of our report on the microscopic examination 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:RPT1208



5500 Oakbrook Parkway #200
Norcross, Georgia 30093

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Report of Results: MVA0393

Microscopic Analysis of a Sample of Asbestos Board Cut During the Micarta/Marinite Experiment

Prepared for:

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

Prepared by:

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08 December 1992

MVA0393:RPT1208

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

MVA Project No. 0393

Microscopic Analysis of a Sample of Asbestos Board Cut During the Micarta/Marinite Experiment

Introduction

Portions of the asbestos board cut during the Micarta/Marinite experiment for MVA, Inc. Project No. 0393 were examined by several microscopic techniques including stereo microscopy, polarized light microscopy (PLM), scanning electron microscopy (SEM), and fourier transform infrared microscopy (FTIR). The sample, identified as field sample number 2 and laboratory sample C4503 was found to be a multi-layered sample.

Analytical Results

Based on the analysis for asbestos using standard techniques of PLM and dispersion staining, the multi-layered nature of the material can be summarized as:

Layer A - No asbestos in a tan consolidated material
Layer B - Chrysotile in a gray consolidated material
Layer C - Amosite in a white powdery material
Layer D - Chrysotile in a gray consolidated material
Layer E - No asbestos in a tan consolidated material

Layers A and E were the same non-asbestos material. Layer B was the same material as Layer D. The overall board material is a sandwich of decorative sheets on the outside of chrysotile-containing sheets on both sides of an amosite-containing sheet. A view of a polished cross-section of the outer portion of sample C4503 clearly shows the Layers A and B and a portion of Layer C (Figure 1). Layers E and D would appear the same way if a portion of the sample were taken from the other side of the board.

Scanning electron microscope images of the polished cross-section show that Layer B is characteristic of a laminate material in which striations are built-up on top of

each other (Figures 2 and 3). At higher magnifications it can be seen that chrysotile fibers are present in the striations in Layer B (Figure 4).

Layer C was found to be composed of amosite asbestos in a calcium silicate matrix.

The microscopy data shows the material cut was consistent with information available about Micarta/Marinite product material. 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.

Releasable Asbestos Fibers

A portion of the Micarta/Marinite board was mounted on an SEM stub so that an area of the Micarta cut by the Skil saw could be examined for asbestos fibers. Although the Micarta is made with chrysotile and an organic resin which forms a hard product, sawing the material breaks asbestos bundles which then protrude from the surface of the bound laminate. The chrysotile fibers within the bundles are not encased in resin and are free to be abraded from the surface. The SEM micrographs shown in Appendix B show clearly chrysotile asbestos fibers protruding from the cut edge of Micarta board.

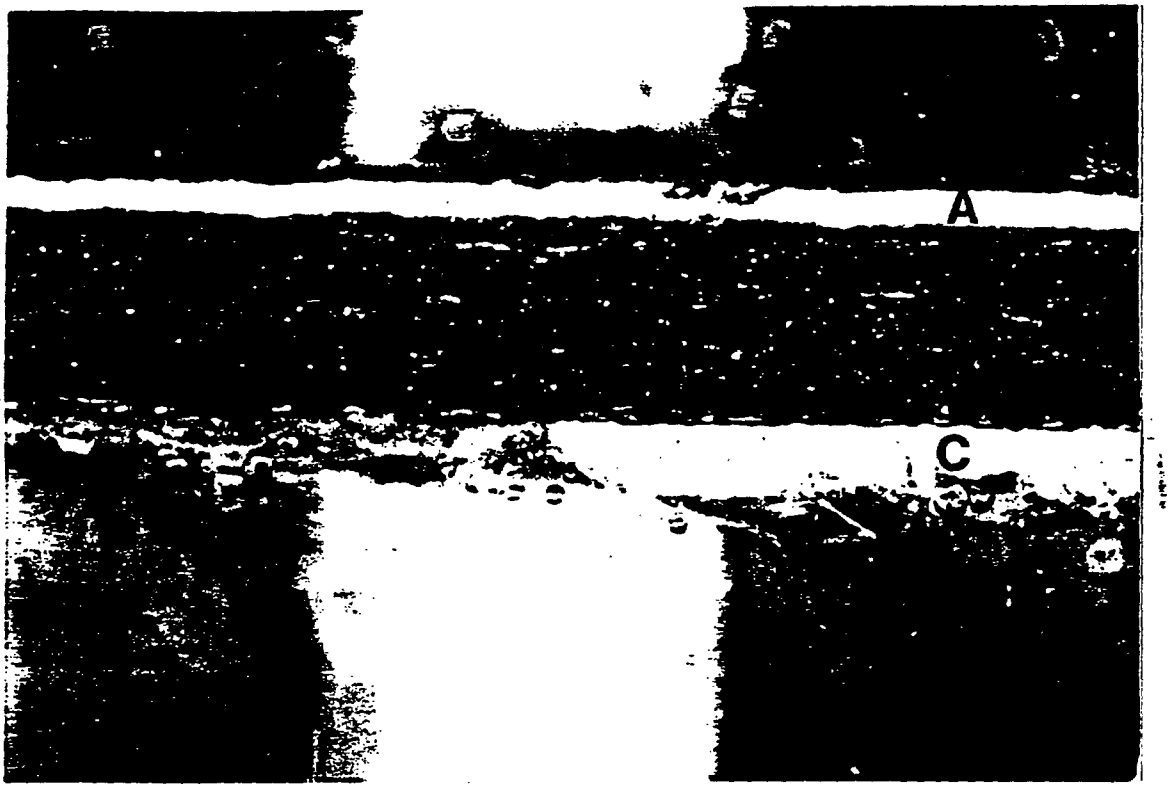

Figure 1: View through a stereo light microscope of a polished cross-section of a portion of an asbestos board (C4503). Layer A is an outside layer which contains no asbestos. Layer B contains chrysotile asbestos. Layer C of which only a part is shown here is an amosite-containing layer. Magnification = 23X

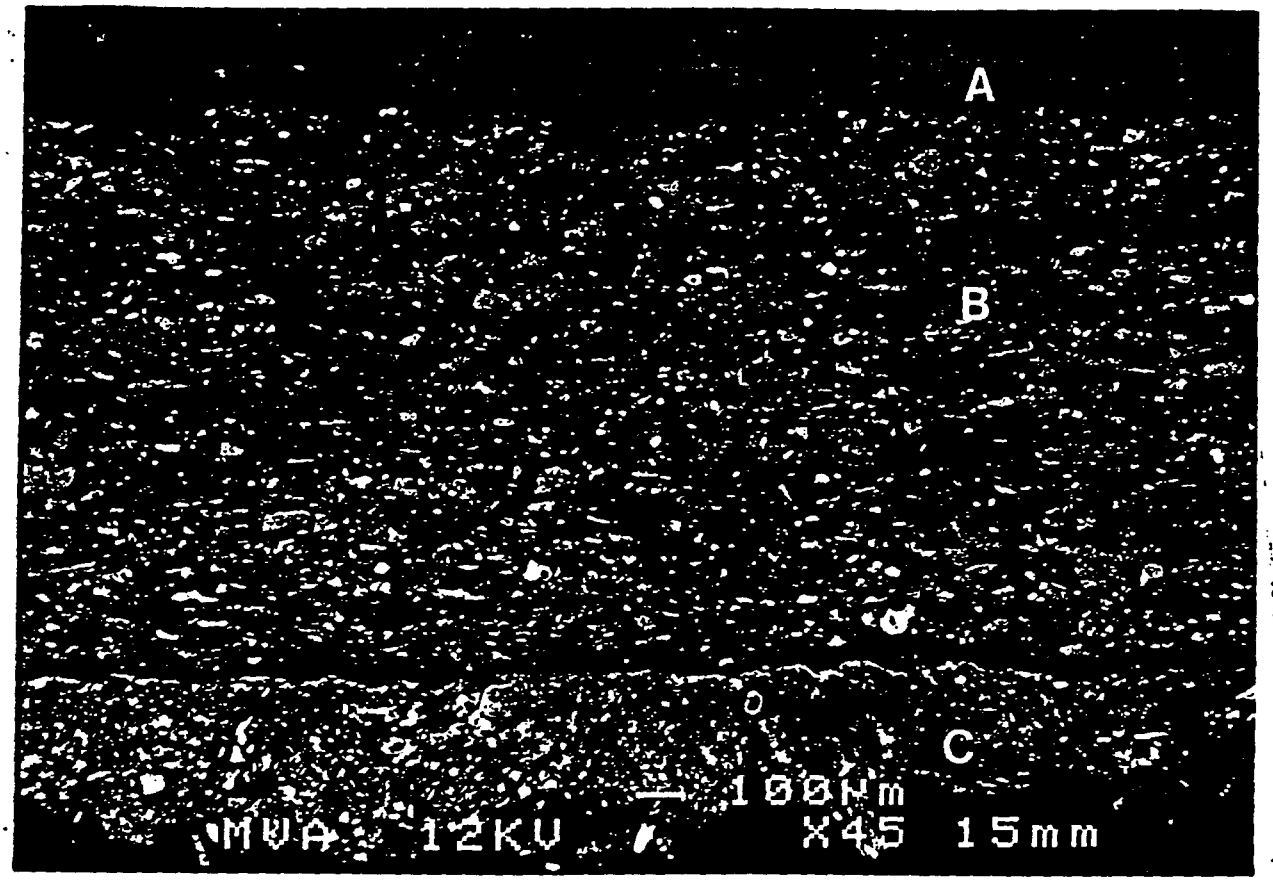

Figure 2: A scanning electron microscope (SEM) view of the same polished cross-section as shown in Figure 1. The layers are labeled in the same way. Magnification = 60X

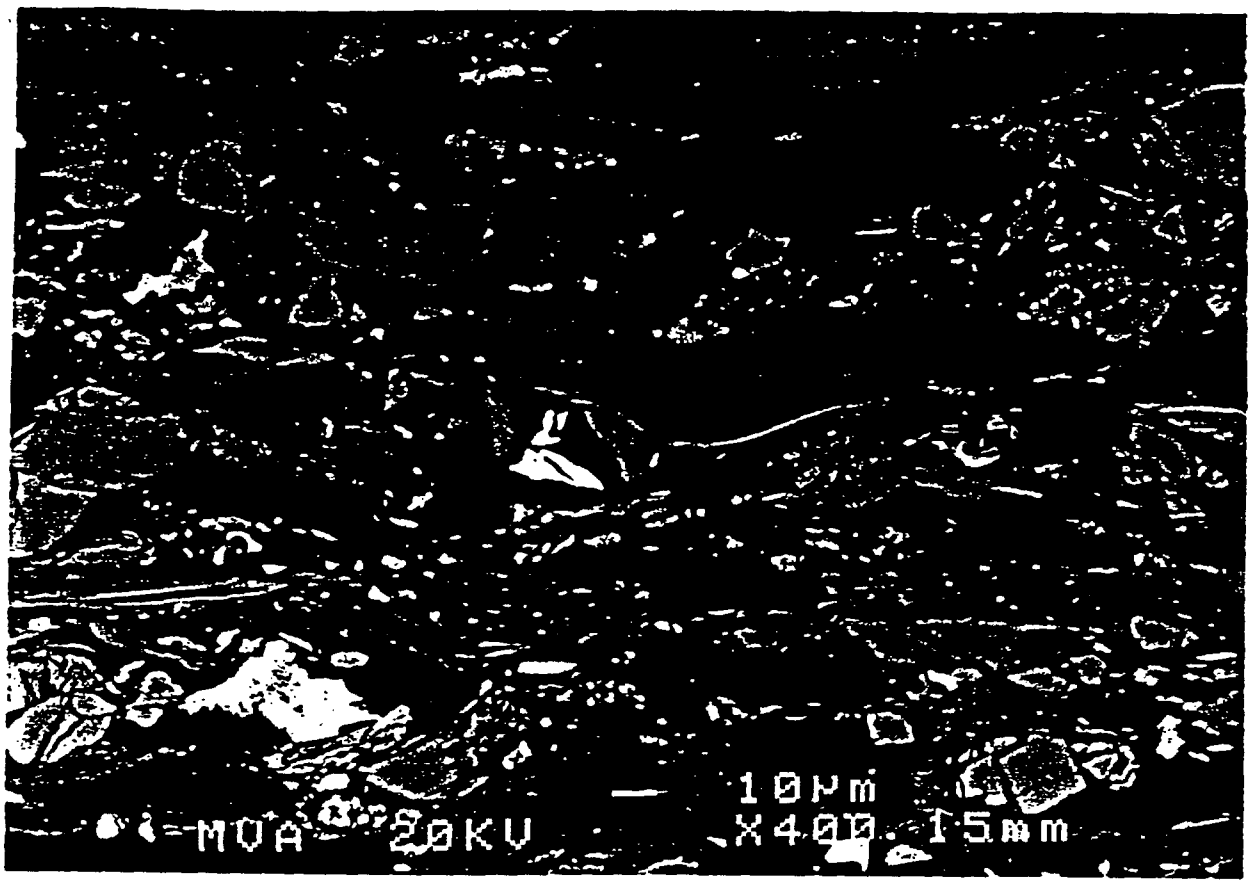

Figure 3: SEM micrograph at higher magnification of an area of Layer B shown in Figure 2. The striations characteristic of laminate material are clearly evident. Magnification = 600X

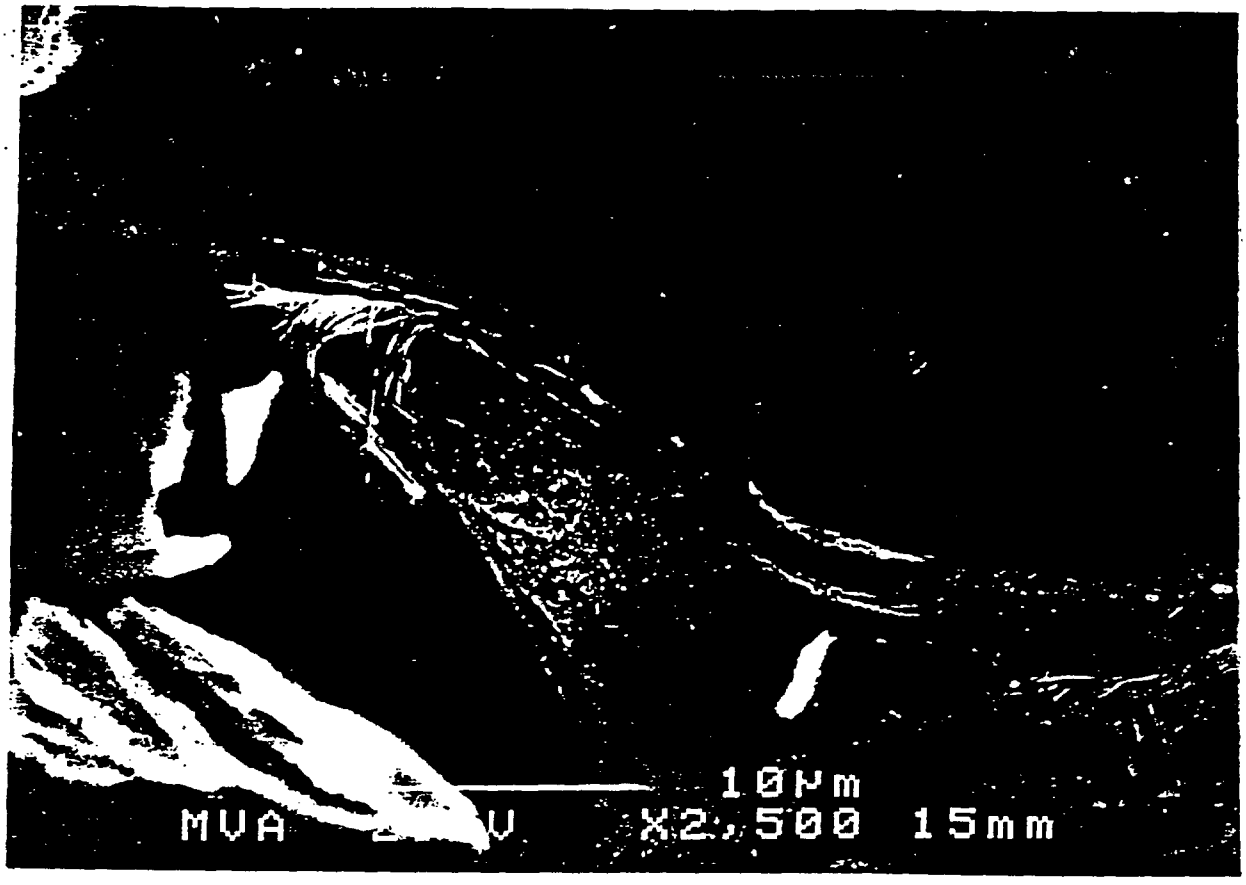

Figure 4. SEM micrograph showing chrysotile fibers in Layer B.
Magnification = 3400X

Appendix A

Polarized Light Microscope (PLM) Analysis Sheets
MVA Sample C4503

MVA, Inc.
PLM Constituent Analysis

Date: 11/09/92

MVA#: 0393 **Location:** not provided

Sample I.D.#: C4503B **Client Sample I.D.#:** 2

Examination using the stereomicroscope: C4503 is a multi-layered material composed of A) a tan consolidated material, B) a gray consolidated material, C) a white powdery material, D) a gray consolidated material, and E) a tan consolidated material.

CONSTITUENT	%	CONSTITUENT	%	CONSTITUENT	%
Fibers:		Pigment:		Fillers:	
Cotton	---	Binders:		Diatoms	---
Fiberglass		Kaolinite	---	Iron Chromite	---
Filament	---	Montmorillonite	---	Iron Oxide	---
Wool	---	Gypsum	---	Limestone	---
Mineral Wool	---	Anhydrite	---	Magnetite	---
Hair	---	Portland Cement	---	Mica	---
Paper/Wood		Lime (hydrated)	---	Perlite	---
Chem. Proc.	~24%	Precipitated		Synthetic Foam	---
Mech. Proc.	---	Carbonate	---	Pumice	---
Synthetic	---	Starch	---	Quartz	---
		Other	~50%	Talc	---
				Vermiculite	---
				Opaque	~2%

Asbestos Minerals

Chrysotile	~24%	Anthophyllite	---	Tremolite/	
Amosite	---	Crocidolite	---	Actinolite	---

Comments: No asbestos was detected in the "A" and "E" layers and they were not included in the analysis. Please see sheet labeled C4503C and C4503D for the analyses of the "C" and "D" layers.

Analyst: Maureen C. Bottrell

MVA, Inc.
PLM Constituent Analysis

Date: 11/09/92

MVA#: 0393 **Location:** not provided

Sample I.D.#: C4503C **Client Sample I.D.#:** 2

Examination using the stereomicroscope: C4503 is a multi-layered material composed of A) a tan consolidated material, B) a gray consolidated material, C) a white powdery material, D) a gray consolidated material, and E) a tan consolidated material.

CONSTITUENT	%	CONSTITUENT	%	CONSTITUENT	%
Fibers:		Pigment:		Fillers:	
Cotton	---	Binders:		Diatoms	---
Fiberglass		Kaolinite	---	Iron Chromite	---
Filament	---	Montmorillonite	---	Iron Oxide	---
Wool	---	Gypsum	---	**Limestone**	~20%
Mineral Wool	---	Anhydrite	---	Magnetite	---
Hair	---	Portland Cement	---	Mica	---
Paper/Wood		Lime (hydrated)	---	Perlite	---
Chem. Proc.	---	Precipitated		Synthetic Foam	---
Mech. Proc.	---	Carbonate	---	Pumice	---
Synthetic	---	Starch	---	**Quartz**	~1%
		Other*	~44%	Talc	---
				Vermiculite	---

Asbestos Minerals

Chrysotile	---	Anthophyllite	---	Tremolite/	
Amosite	~35%	Crocidolite	---	Actinolite	---

Comments: No asbestos was detected in the "A" and "E" layers and they were not included in the analysis. Please see sheet labeled C4503D and C4503B for the analyses of the "D" and "B" layers. *Binder is consistent with calcium silicate binders.

Analyst: Maureen C. Bottrell

MVA, Inc.
PLM Constituent Analysis

Date: 11/09/92

MVA#: 0393 **Location:** not provided

Sample I.D.#: C4503D **Client Sample I.D.#:** 2

Examination using the stereomicroscope: C4503 is a multi-layered material composed of A) a tan consolidated material, B) a gray consolidated material, C) a white powdery material, D) a gray consolidated material, and E) a tan consolidated material.

CONSTITUENT	%	CONSTITUENT	%	CONSTITUENT	%
Fibers:		Pigment:		Fillers:	
Cotton	---	Binders:		Diatoms	---
Fiberglass		Kaolinite	---	Iron Chromite	---
Filament	---	Montmorillonite	---	Iron Oxide	---
Wool	---	Gypsum	---	Limestone	---
Mineral Wool	---	Anhydrite	---	Magnetite	---
Hair	---	Portland Cement	---	Mica	---
Paper/Wood		Lime (hydrated)	---	Perlite	---
Chem. Proc.	~24%	Precipitated		Synthetic Foam	---
Mech. Proc.	---	Carbonate	---	Pumice	---
Synthetic	---	Starch	---	Quartz	---
		Other	~50%	Talc	---
				Vermiculite	---
				Opaque	~2%

Asbestos Minerals

Chrysotile	~24%	Anthophyllite	---	Tremolite/	
Amosite	---	Crocidolite	---	Actinolite	---

Comments: No asbestos was detected in the "A" and "E" layers and they were not included in the analysis. Please see sheet labeled C4503C and C4503B for the analyses of the "C" and "B" layers.

Analyst: Maureen C. Bottrell

Appendix B

Scanning Electron Microscopy Micrographs as Received Cut Edge of Micarta MVA Sample C4503

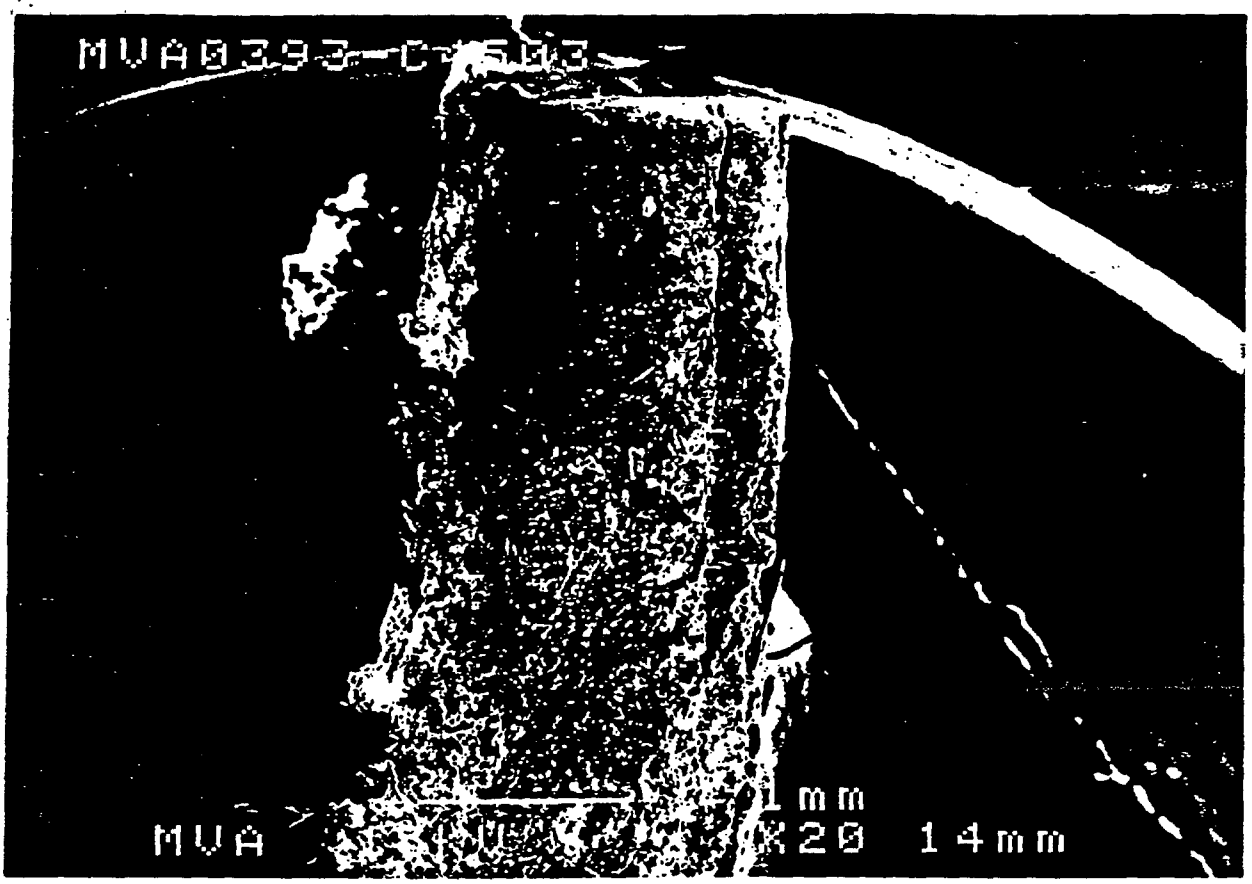

Figure B1. MVA0393-C4503: Secondary electron (SE) image of a cross-section of board laminate. The exposed surface had been previously cut with a Skil saw. Magnification = 29X

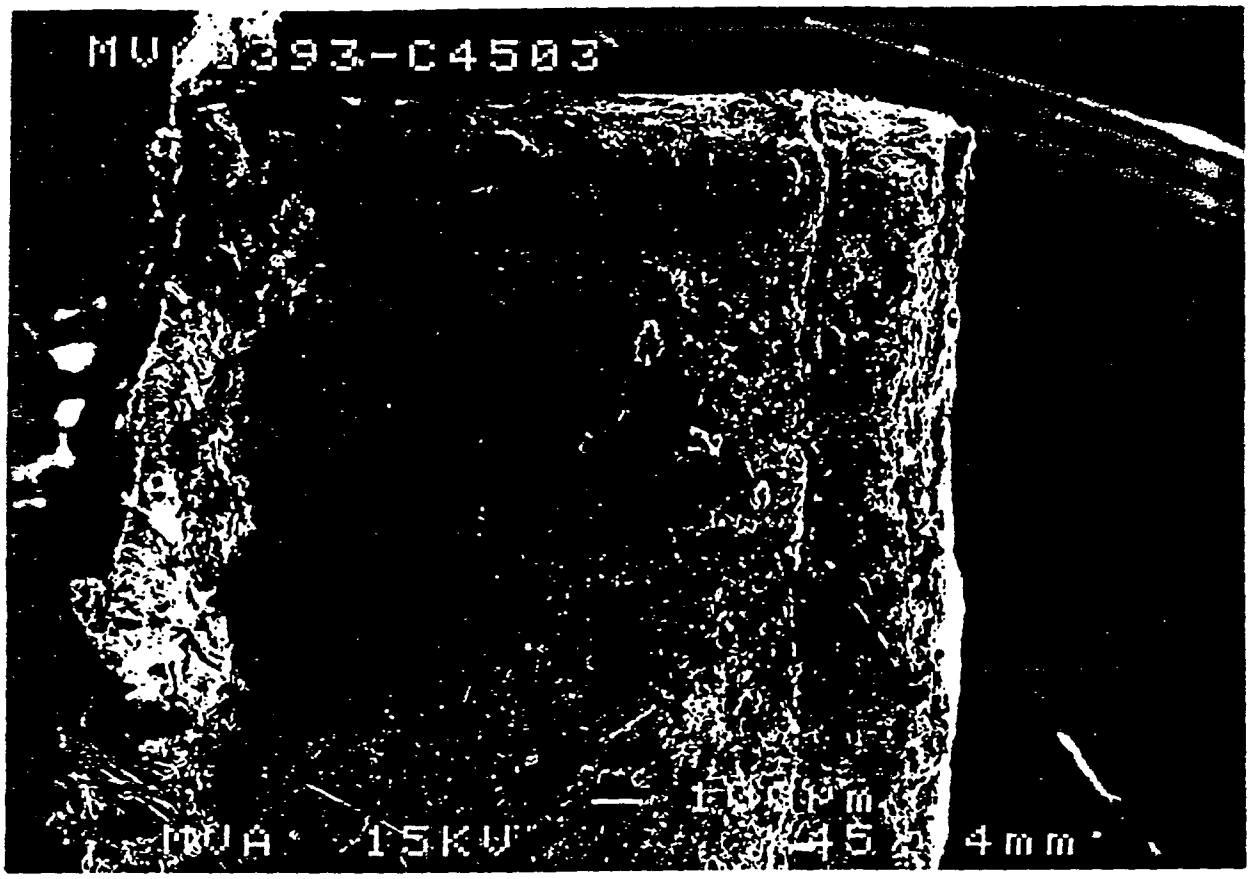

Figure B2. MVA0393-C4503: Higher magnification SE image of the board laminate cross-section. Magnification = 70X



Figure B3. MVA0393-C4503: Higher magnification SE image of an area in Figure B2 showing chrysotile asbestos fiber bundles and chrysotile fibers protruding from the surface of the board laminate. Magnification = 145X

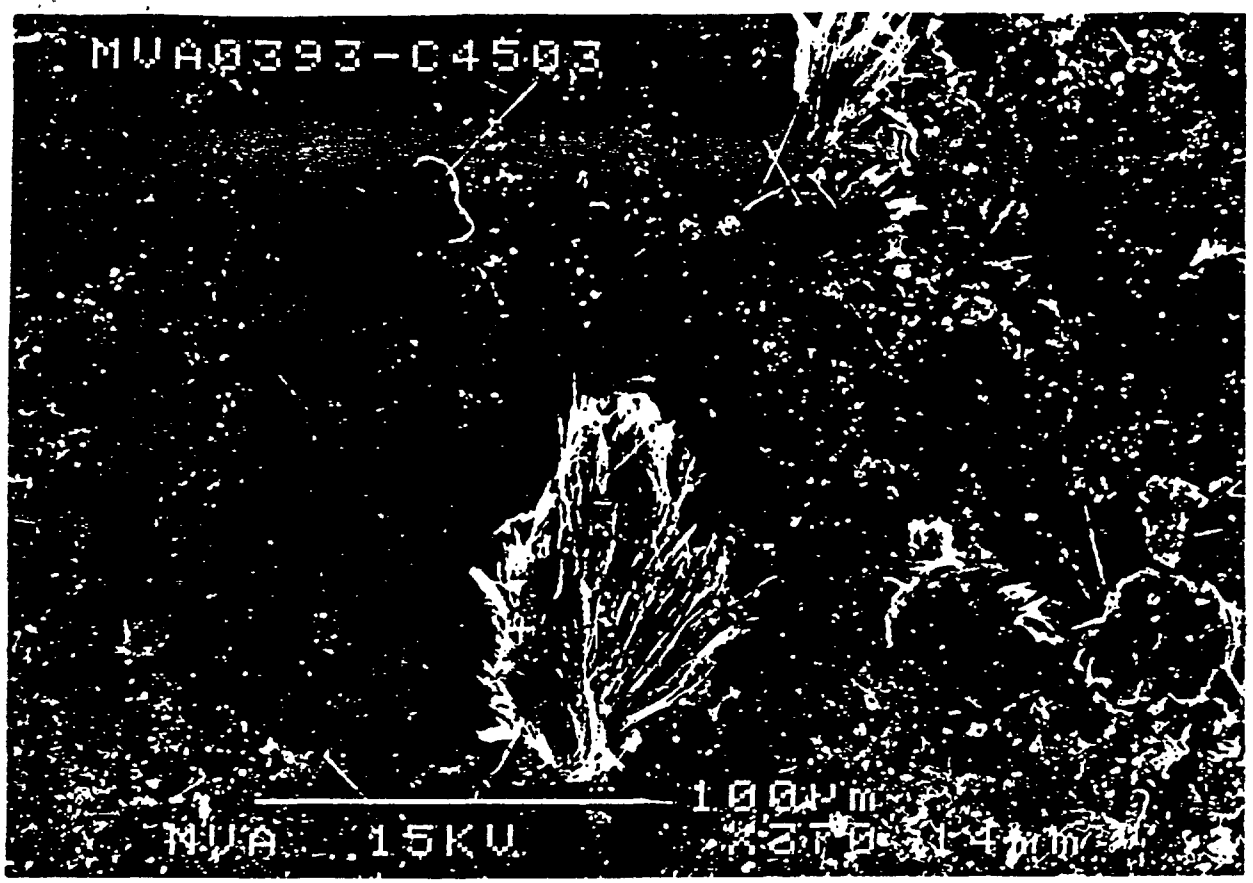

Figure B4. MVA0393-C4503: Higher magnification SE image of a protruding chrysotile asbestos fiber bundle in Figure B3. Magnification = 510X

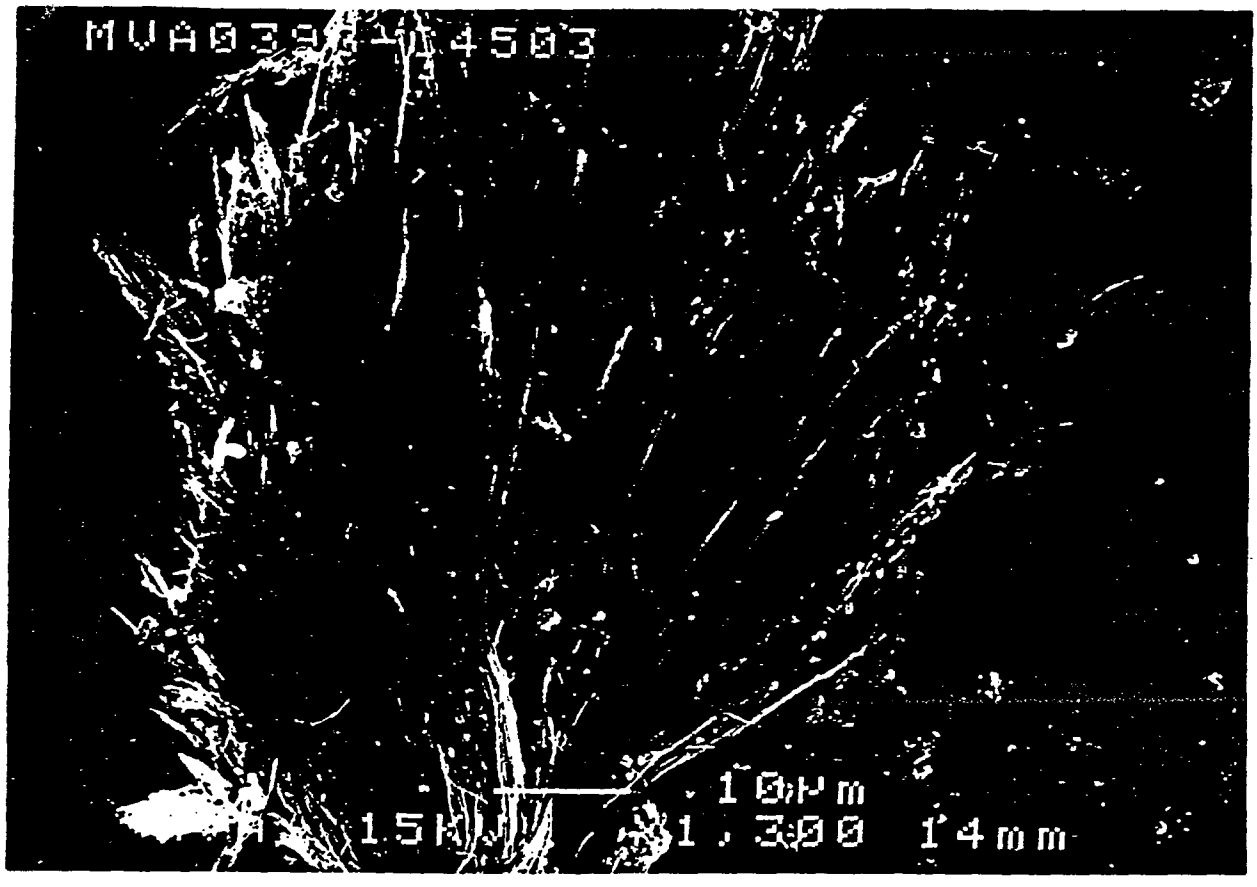

Figure B5. MVA0393-C4503: Higher magnification SE image of the protruding chrysotile fiber bundle in Figure B4. Magnification = 1900X