

PARTICLE DATA LABORATORIES, LTD.



115 Hahn Street • Elmhurst, Illinois 60126 • (312) 832-5658

October 5, 1982



Abex Corporation
Medical Department
4550 West 26th Street
Chicago, Illinois 60623

Attn: Mr. R. S. Suga

PDL Project: I-6960

Dear Mr. Suga:

The ten samples you submitted for asbestos evaluation on September 28, 1982, have been examined by optical techniques. Two species of asbestos - amosite and chrysotile - were found. Identification and quantitation were initiated by a gross examination of the samples as received. Any obvious fractions were noted and samples of each fraction were mounted for polarized light microscopy in a 1.515 index liquid. The fibers were thoroughly separated for examination. Preliminary evaluation was performed by morphology, refractive index relative to the mounting medium and birefringence to determine the possible asbestos present, as well as the abundance and type of other fibers, fillers and binders. The identification of non-asbestos material was not rigorous as these were not the specific item of interest.

When asbestos type fibers were seen morphologically, they were additionally characterized by immersion matching in refractive index liquids using both white light and the sodium d-line. A numeric determination of birefringence was available based on the index measurements. A sample had to fit into the accepted ranges of indices, birefringence and morphological features to be classed as asbestos. (For Amosite, straight thin single fibers and bundles of such fibers, usually with cleanly broken ends on individual fibers, refractive indices of 1.700 and 1.695, birefringence .005 and parallel extinction. Chrysotile has thin fibers and fiber bundles with both straight and wavy sections. The ends of bundles tend to be frayed. Indices are 1.529 - 1.559 and 1.537 - 1.567 and birefringence of .004 to .016. Anthophyllite was ruled out by its indices of 1.60 - 1.64, while crocidolite was ruled out by its blue color.) Quantities were based on areal coverage and thickness of the various species present. This is about as accurate as can be achieved by optical

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microscopy, especially with a heterogeneous material. Also, the quantitation was based on noting the fraction of asbestos in each portion of the heterogeneous material and what fraction that portion was of the total sample. Representative micrographs, both in unpolarized light and with crossed polars and first order red compensation, were taken as documentation of what was seen.

The results of the evaluation were as follows:

- EG-5 Amosite 0.1 - 0.2% (indices 1.700 and 1.696)
Mostly an esparto or burlap type organic fiber (woven) with some binder.
- EG-6 Fiberglass 20 - 25%
Balance is binder and quartz, calcite, etc.
- EG-7 Fiberglass 30 - 35%
Balance is binder similar to EG-6.
- EG-8 Chrysotile 1 - 2%
Balance is fiberglass (70 - 80%) and binder (organic ?) 10 - 15%.
- EG-9 Chrysotile 8 - 10%
Organic fibers 50 - 60%, Binder 20 - 30%.
- EG-10 Chrysotile 2 - 3%
Organic fibers 80 - 90%, Binder 10 - 15%.
- EG-11 Chrysotile 40 - 50%
Organic fibers 30 - 40%, Binder 10%.
- EG-12 Chrysotile 30 - 35%
Balance is binder with pumice filler.
- EG-13 Chrysotile about 0.5%
Organic fibers 60 - 70%, Binder 30 - 40%.
- EG-14 Chrysotile 0.1 - 0.2%
Organic fibers 10 - 20%, Binder 80%.

Thank you for consulting Particle Data Laboratories in this matter.

Respectfully submitted,

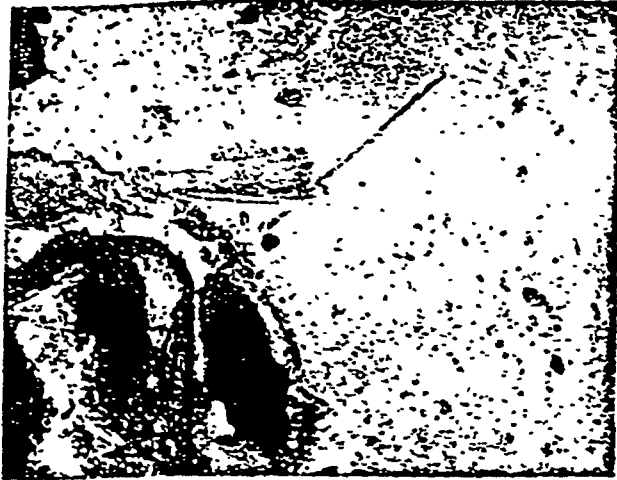
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Michael Bayard
Michael Bayard
Research Microscopist

MB:cnl
Enclosures

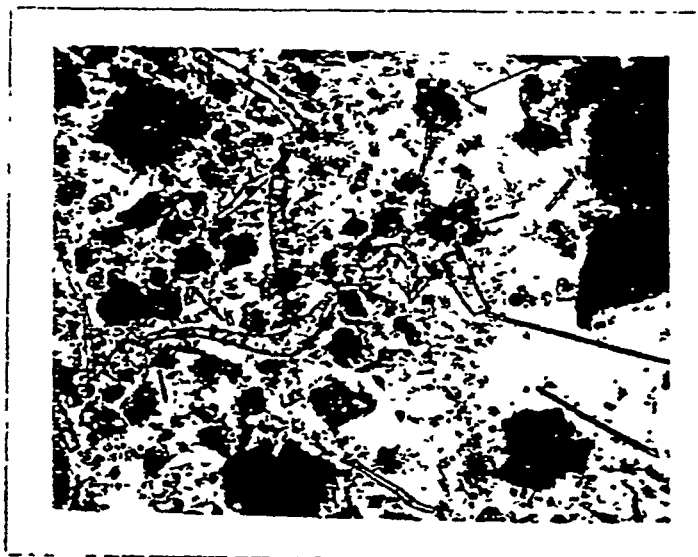
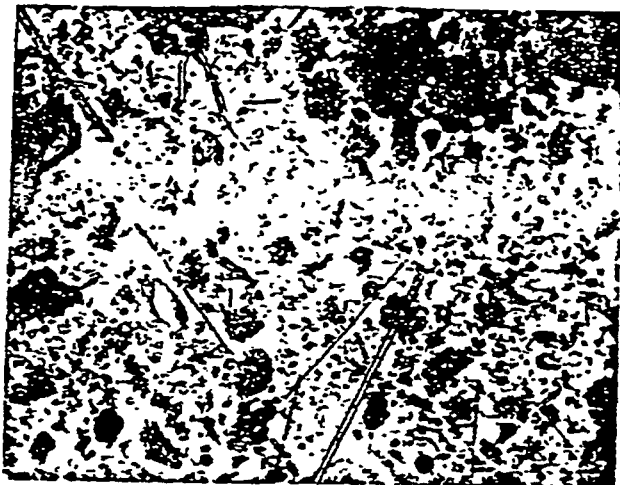
SP-1199

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EG-5

SPIN 1640



EG-6

SPM 1841



EG-7

SPM 1942



EG-8

8PM 1943



EG-9

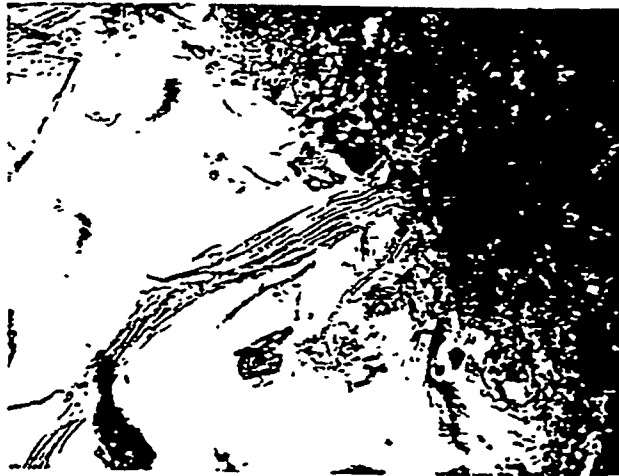
SPIN 1944

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EG-10

SPIM 1945



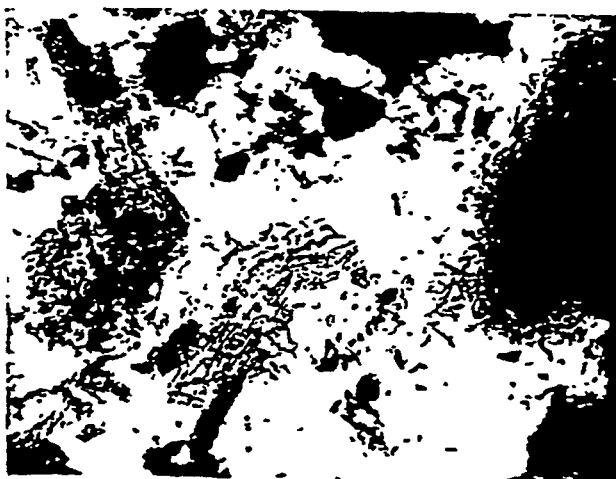
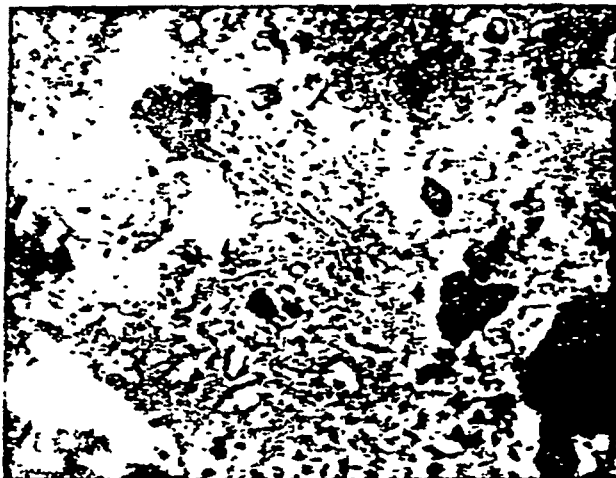
EG-11



EG-12

SP-11347

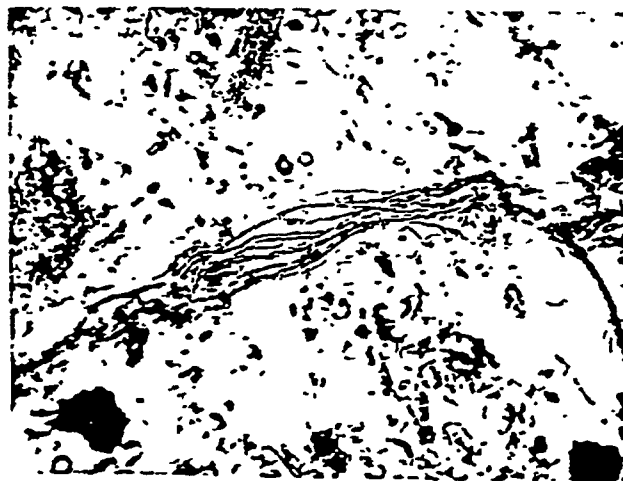
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EG-13

SPM 1948

MCLE DATA LABORATORIES, LTD.



EG-14

SPM 1549



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YOUR
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TO

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Chicago, Illinois 60623

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TO

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Attn: Mr. R. S. Suga

DATE SHIPPED		SHIPPED VIA		PPD OR COLL.		TERMS		SALESMAN	
10-05-82		U. S. Mail				Net 30 Days			
QUANTITY ORDERED	QUANTITY SHIPPED	DESCRIPTION					UNIT PRICE	PER	AMOUNT
		Evaluation of 10 Bulk Asbestos Samples					25.00		\$250.00
		PDL PROJECT: I-6960 ,							
		cde to pay By 10/15/82							

SPIN 1850