

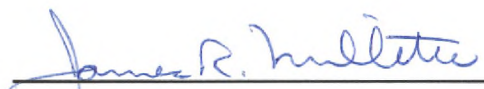
Report of Results: MVA9214

**Examination of a SQUARE D
Enclosed Switch Box
Exhibit D (Beach Case)**

Prepared for:

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Introduction

This report presents the results of an examination of a SQUARE D enclosed switch electrical control unit that was delivered to MVA Scientific Consultants from Sue McGregor of Lipsitz & Ponterio on 04 April 2012. The label on the box showed "Cat. No. A85341, SER. T2, 30 AMP, 600 Volts A.C.". The sample was assigned the MVA sample number X0479. MVA Scientific Consultants was asked to analyze the unit for asbestos content. Components of the unit were analyzed separately and assigned sample number modifiers as listed in Table 1. The analyses were done in our laboratory during the period of 09 April to 27 April 2012.

Methods

Each component was initially examined under an Olympus SZ-40 stereomicroscope at magnifications from 7X to 40X. A rasp was used to collect representative portions of the particulate from each component and these were mounted in Cargille refractive index liquids for analysis by polarized light microscopy (PLM) using an Olympus BH-2 polarized light microscope with a magnification range from 100X to 1,000X. The PLM analysis followed the analytical procedures recommended by the U.S. Environmental Protection Agency [1]. The PLM results for asbestos are given in terms of percent by volume.

A portion of Sample X0479A was also analyzed by Fourier transform infrared microspectrophotometry (micro-FTIR) utilizing a SensIR IlluminatIR infrared microspectrometer coupled to an Olympus BX51 microscope.

Sample X0479A was analyzed further using a Philips EM420 transmission electron microscope (TEM) equipped with an Oxford INCA energy dispersive spectrometry (EDS) x-ray analysis system. In order to concentrate possible amphibole material for analysis, an acid/base digestion procedure [2, 3] was used to eliminate the soluble fractions. A portion of X0476A was ashed and the residue remaining was transferred to a 100 ml round-bottom flask containing 80 ml of acid (2N H₂SO₄) and fitted with a reflux condenser. The acid was boiled for one hour. The residue was collected by centrifugation and the reflux procedure was repeated with sodium hydroxide (4N). The residue was collected by centrifugation, then suspended in water and a known aliquot was extracted and filtered through a 0.2 µm pore size filter. The filter was dried and grids prepared following standard direct preparation procedures [4] for analysis by TEM. A laboratory blank sample following all the procedures except the addition of test material was prepared in a similar way. The TEM results for amphibole are given in terms of percent by weight.



In order to determine whether or not asbestos fibers were readily releasable from the unit surface, a finger was applied to the surface of subsample X0479A and the particles transferred to an SEM stub for analysis by scanning electron microscopy (SEM). The SEM analysis was done using a JEOL JSM-6490LV coupled with a Thermo Scientific Noran System SIX x-ray energy dispersive spectrometer (EDS).

Results

Sample X0479 (SQUARE D Class 6536 electrical control unit labeled 'Exhibit D') contained three suspect pieces that were designated as X0479A, X0479B and X0479C (Figures 1 and 2). The results of the PLM analyses are summarized in Table 1.

Subsample X0479A contained 10-20% chrysotile asbestos by PLM (Figure 3). Asbestos fibers were protruding from the surface (Figure 4). According to the FTIR analysis, the resin binder in X0479A is consistent with a polyethylene (Figure 5). No amphibole asbestos fibers were found by TEM in Sample X0476A after acid/base digestion. The analytical sensitivity of the TEM amphibole analysis was $8 \times 10^{-8}\%$. Asbestos fibers were released from the X0479A material and transferred onto a finger (Figure 6).

Subsamples X0479A, X0479B and X0479C appeared to be identical material. X0479B and X0479C were not analyzed.

References

1. U. S. Environmental Protection Agency, "Test Method EPA/600/R-93/116 -- Method for the Determination of Asbestos in Bulk Building Materials."
2. Addison, J. and L.S.T. Davies, "Analysis of Amphibole Asbestos in Chrysotile and Other Minerals," Ann. Occup. Hyg. Vol. 34. No. 2. pp. 159-175, 1990.
3. Millette J.R., A. Harmon, P. Few, W.L. Turner, Jr., and W.R. Boltin. Analysis of amphibole asbestos in chrysotile-containing ores and a manufactured asbestos product. Microscope, 57(1):19-22, 2009.
4. "AHERA" - Appendix A to Subpart E - Interim Transmission Electron Microscopy Analytical Methods, U.S. EPA, 40 CFR Part 763. Asbestos-Containing Materials in Schools, Final Rule and Notice. Fed. Reg. 52(210), 41857-41894, 1987.

Table 1. Sample Information and Asbestos Analysis Results

Sample ID	Description	PLM Analysis Results % Chrysotile	TEM Analysis Results % Amphibole
MVA X0479A	'Exhibit D' SQUARE D Cat. No. A85341 Unit Gray Molded Resin Piece with white fibers	10-20%	No Amphibole Detected
MVA X0479B	'Exhibit D' SQUARE D Cat. No. A85341 Unit Gray Molded Resin Piece with white fibers	NA*	NA
MVA X0479C	'Exhibit D' SQUARE D Cat. No. A85341 Unit Gray Molded Resin Piece with white fibers	NA*	NA

Subsamples X0479A, X0479B and X0479C appeared to be identical material. X0479B and X0479C were not analyzed (NA).

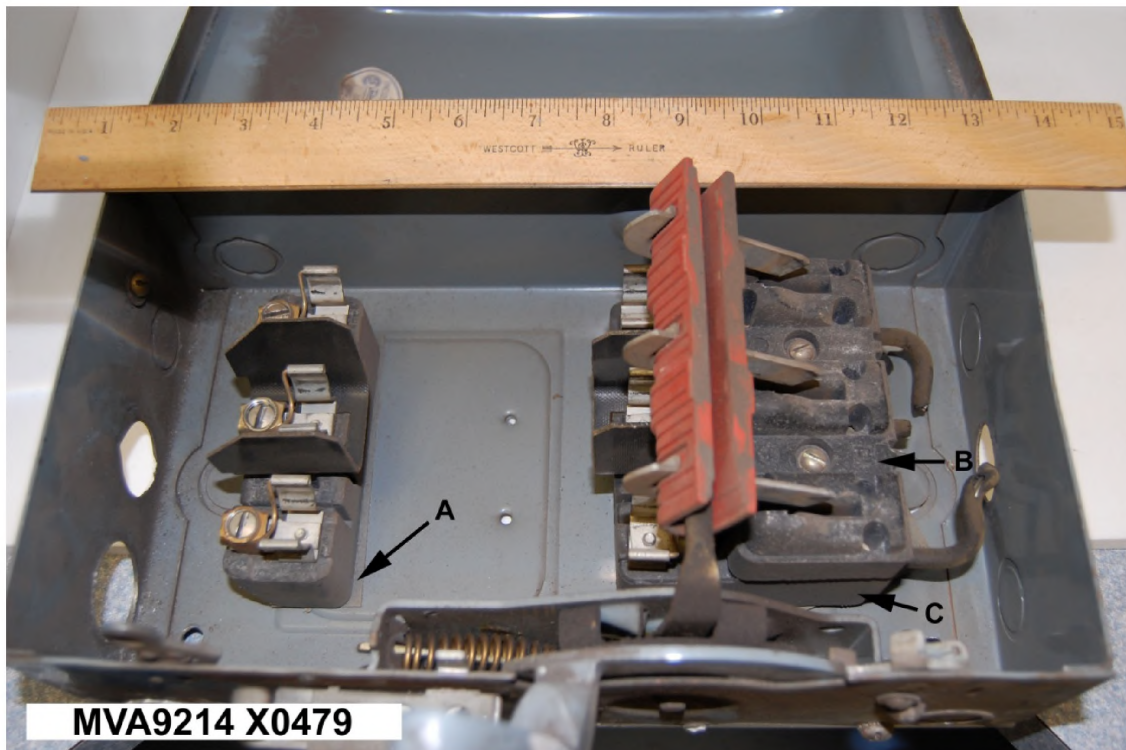


Figure 1. Sample X0479 (SQUARE D electrical control unit) showing materials suspected of containing asbestos after the initial examination.



Figure 2. Cover on Sample X0479 (SQUARE D electrical control unit).
Label: Enclosed Switch, Cat. No. A85341, SER. T2, 30 AMP, 600 Volts A.C.

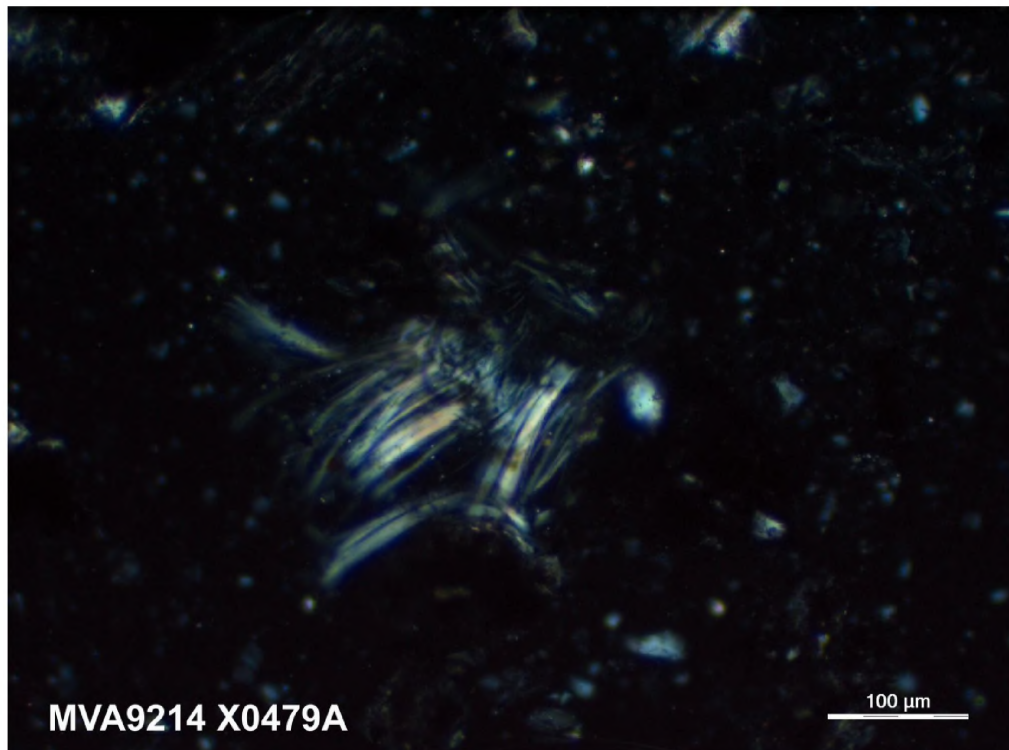


Figure 3. PLM image of chrysotile from X0479A.



Figure 4. Asbestos fibers are protruding from the surface of Sample X0479A.

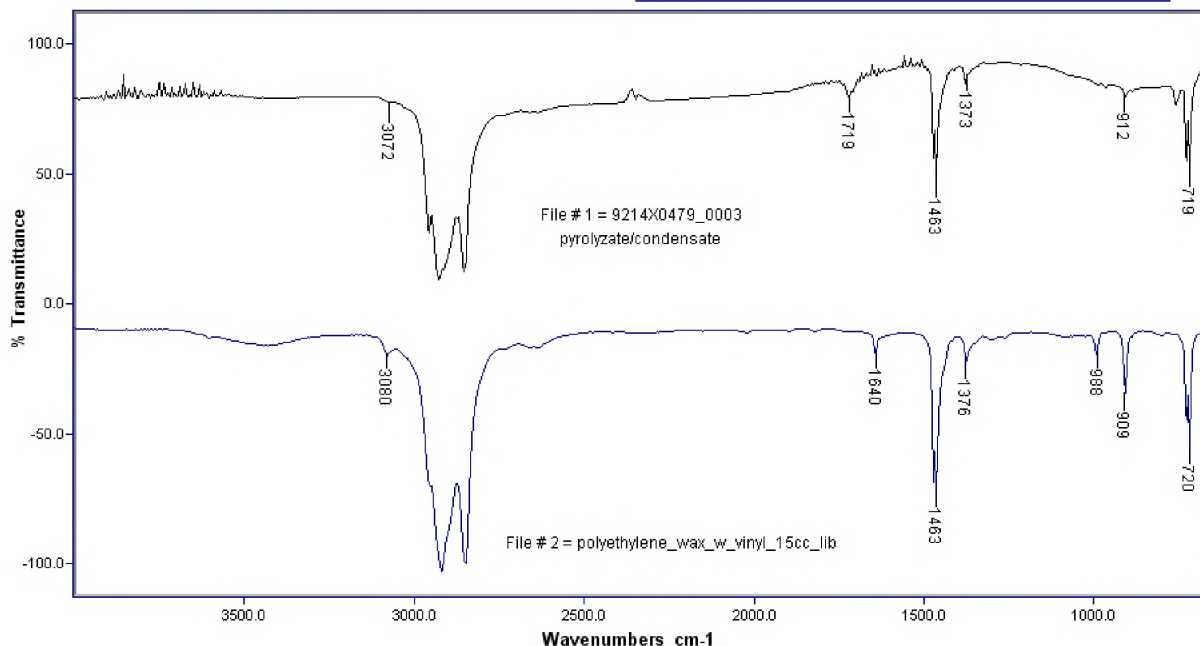


Figure 5. Comparison of the FTIR spectrum from X0479A and a reference spectrum from polyethylene.

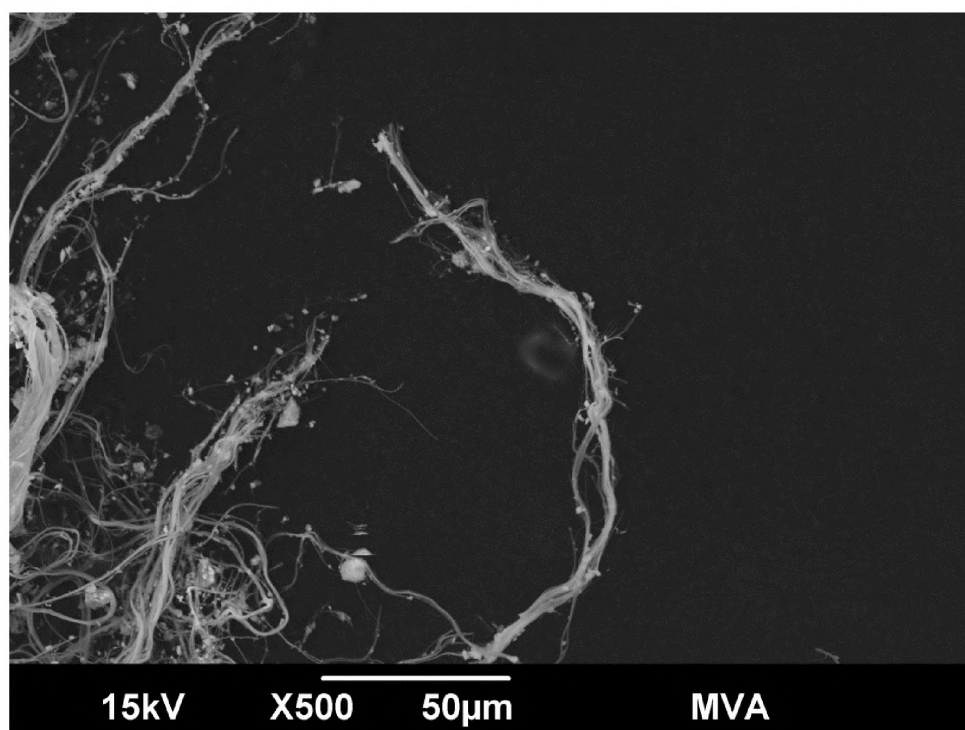


Figure 6. SEM image of chrysotile asbestos removed with a finger from the surface of Sample X0479A.