MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION

TO : DIVISION OF COSMETICS TECHNOLOGY
PRODUCT COMPOSITION BRANCH
ATTENTION: RONALD L. YATES

DATE: December 2, 1976

FROM : Acting Director, Science Branch (HFR-2160)

SUBJECT: Asbestos In Talc

Analysis has been completed on the eight samples that you forwarded with your October 5, 1976 memo. Four of the samples were found to contain chrysotile, and four were found to contain tremolite. The Nomarski Differential Interference Contrast microscope was found to be useful for the detection of chrysotile fibers in talc. A chrysotile count was made on the four samples found to contain that type of fiber.

Analyst Leonora Auerbach's report on her examination of these samples is enclosed. A copy of Ms. Auerbach's paper on the optical microscopic detection of asbestos in parenterals is also enclosed. This paper has been accepted for publication in the March issue of the JAOAC.

We would appreciate hearing how our results compared with those obtained by other methods.

TED M. HOPES
TMH:bh

(b) (5)

MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
FOOD AND DRUG ADMINISTRATION

TO : GEORGE H. BOONE
DIRECTOR, SCIENCE BRANCH
THRU: TED M. HOPES
CHIEF CHEMISTRY SECTION

DATE: November 23, 1976

FROM : Leonora Auerbach
Chemist, Lab H

SUBJECT: Results Of Survey Of Chrysotile And Tremolite Asbestos In Talc.

Introduction:

This memorandum reports on the application of the Nomarski Differential Interference Contrast microscopical system (NDIC) for the qualitative and quantitative analysis of chrysotile and tremolite in talc. A pre-publication copy* of the paper "Use Of Three Optical Systems To Obtain A Microscopic profile Of Asbestos And Other Non-Opaque Particulates Larger Than 5 Micrometers In Parenteral Drugs" is attached. The microscopic equipment used for analysis is described on page 3 of the paper. It was determined that the NDIC has no application for the detection and quantitation of tremolite in talc, but the NDIC is very useful for the detection and quantitation of chrysotile fibers in talc. Chrysotile fibers not visible in the crossed polar mode in plane polarized light are visible in the NDIC. Chrysotile is recognized by its characteristic fibrous morphology. The enclosed photo of Canadian chrysotile (photographed at 200X) in refractive index oil 1.464 illustrates the sharp image visible in the NDIC system.

---

*JAOAC, 1977, 60, March.

Qualitative:

The qualitative procedure used consisted of mounting sample crystals in refractive index oils 1.464 and 1.590. The 1.464 mount was examined at 500X using the NDIC, and the 1.590 mount was examined in plane polarized light at 500X. Crystals in the 1.590 mount which exhibited inclined extinction, positive elongation, and had a higher refractive index than the oil in both extinction positions were called tremolite particles. Wavy, cylindrical fibers visible in the NDIC in the 1.464 mount were called chrysotile fibers. The talc samples examined were known to contain either chrysotile or tremolite.

Results:

DCST 77-1371: chrysotile present.

DCST 77-1372: chrysotile present.

DCST 77-1373: chrysotile present.

DCST 77-1374: chrysotile present.

DCST 77-1375: tremolite present.

DCST 77-1383: tremolite present.

DCST 77-1384: tremolite present.

DCST 77-1385: tremolite present.

Quantitative:

The quantitative procedure employed for the chrysotile count was as follows: 0.5 mg $\pm$ (0.030 mg) of sample was carefully mixed in a drop of 1.464 Cargille refractive index oil and evenly distributed under a 22 X 22 mm coverslip. The preparation was examined at 500X using the NDIC optical system. A field by field count was made until 150 fibers were counted or 1/10 of the cover glass area was examined.

The number of fibers per 0.5 mg was calculated as follows:

$$\text{No. of fibers per 0.5 mg} = \frac{\text{No. of fibers counted x cover glass area}}{\text{No. of fields counted x microscopic field area}}$$

Results:

DCST 77-1371: found 4,267 chrysotile fibers per 0.5 mg

DCST 77-1372: found 1,943 chrysotile fibers per 0.5 mg

DCST 77-1373: found 760 chrysotile fibers per 0.5 mg

DCST 77-1374: found 1800 chrysotile fibers per 0.5 mg

Comment:

The NDIC system has application for the detection of chrysotile fibers when used with plane polarized light microscopy.

We would appreciate receiving information concerning the concentration of chrysotile and tremolite in the samples.

Leonora Auerbach

LEONORA AUERBACH