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W. H. REYSEN

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ANALYTICAL RESEARCH DEPARTMENT REPORT

ADP 8461

Subject Examination of Talc for the Presence of Asbestos

064-109

Manufacturer Various Customer

Department Analytical Research

Requested by R. W. Scott Data Completed 9/15/72

ABSTRACT

There are fifteen different talcs in use for Chicago Production. Four of these were analyzed and reported in ADP-8435. The additional eleven talcs are analyzed and reported herewith.

Micronscopic and X-ray analysis indicates that among the fifteen talcs, six are relatively clean, the rest are more or less contaminated by tremolite which is a mineral classified as asbestos. The six clean talcs are:

62 23 00	Talc, Very Fine
62 34 00	Microne Talc 549
62 20 25	Mistron BCD-75
62 20 26	Ental 4190
62 30 21	Ental 41 - Talc
62 32 25	Texas Talc Tailings

PLAINTIFF'S
EXHIBIT
WCD-228

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PURPOSE

In order to be prepared to comply with the Illinois Asbestos Emission Regulations which might apply to the paint industry, four talcs used for Chicago Production were analyzed for fibrous asbestos. The results of that analysis were reported in ADP-8435.

As informed by Joe Thornton, there are actually fifteen different talcs in use in Chicago Production including the four talcs analyzed. It was therefore requested that the presence or absence of fibrous asbestos in the additional eleven talcs be determined.

CONCLUSIONS

Eleven additional talcs were analyzed by microscopic and X-ray diffraction methods. The results indicate that among the total of fifteen different talcs, the following six are relatively clean:

<u>Code</u>	<u>Name</u>	<u>Supplier</u>
62 23 00	Talc, Very Fine	Eastern Magnesia Whitaker, Clark and Daniels United Sierra
62 34 00	Microne Talc 549	Eastern Magnesia Whitaker, Clark and Daniels
62 20 25	Mistron HGD-75	United Sierra
62 20 26*	Ental 4190	Eastern Magnesia
62 30 21*	Ental - Talc	Eastern Magnesia
62 32 25	Texas Talc Tailings	Whitaker, Clark and Daniels

* Reported in ADP-8435.

The first two are the cleanest. The last one is of much larger particle size.

Generally, the talcs from the same supplier have similar characteristics. Judging by the results of this analysis, the characteristics of the products of the six suppliers are as follows:

- (1) Eastern Magnesia Talc (EM): Relatively clean talcs of fine particle size.
- (2) Whitaker, Clark and Daniels (WCD): Relatively clean talcs, coarse particle size sometimes.
- (3) United Sierra (US): Uniform particle size, some grades are clean talcs, some grades are contaminated with tremolite.

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- (4) Desert Minerals (DM): Fine particle size with a small amount of tremolite.
- (5) New York Talc (NY): Contains crystal needles of various lengths and widths, contaminated with tremolite.
- (6) International Talc (IT): Contains crystal needles and/or fibers, contaminated with asbestos.

RESULTS

The results of microscopic and X-ray diffraction analysis are listed below including the four talcs previously reported (ADP-8435). The sequence of listing is in accordance with their degrees of contamination. The six clean talcs are listed first, the more contaminated ones are listed last. Talcs from the same supplier are grouped together if possible. For the sake of simplicity, the initials of various suppliers are used in the first column of the list. One complete set of Polaroid microphotographs is attached to R. W. Scott's copy of this report. They are available to anyone who is interested.

<u>Sample, Code and Supplier</u>	<u>Microscopy</u>	<u>Observations</u>	<u>X-Ray Diffraction</u>
62 23 00, Talc, Very Fine, EM, US, WCD	Fine powder of rather uniform particle size and shape. The apparent particle size is about 1-5 μ . Few prismatic crystals (rods) of larger sizes.		Clean talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558.
62 34 00, Microne Talc 549, EM, WCD	Very similar to 62 23 00.		Clean talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558.
62 20 25, Mistron HGD-75, US	Very similar to 62 23 00.		Clean talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558.
62 20 26, Emtal 4190, EM	Very similar to 62 23 00. (See ADP-8435)		Clean talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558, but not as clean as 62 23 00.
62 30 21, Emtal 41- Talc, EM	Very similar to 62 23 00, but coarser in particle size. (See ADP-8435)		Clean talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558. Its X-ray diffraction pattern is very similar to that of 62 20 26.

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Sample, Code and Supplier	Observations	
	Microscopy	X-Ray Diffraction
62 32 25, Texas Talc Tailings, WCD.	Particles are much coarser than that of 62 23 00 with a wide particle size distribution. Larger particles are up to 30 μ in diameter. No needles or fibers were observed.	Mainly talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558. Small amount of antigorite, ASTM Card 7-417. No detectable tremolite.
62 40 00, Talc, Soap- stone, WCD.	It has a <u>gray</u> color while all the other talcs are white. Its particles are still coarser than that of 62 32 25, but its particle size distribution is narrower.	Talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM 13-558. Magnesium Chamosite, ASTM Card 5-0146. Very small amount of tremolite, ASTM Card 13-437.
62 20 24, Mistron MSC, US.	Similar to 62 23 00 in particle size but has many crystal needles. (See ADP-8435)	Talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558. Tremolite, $Ca_2Mg_5Si_8O_{22}(OH)_2$, ASTM Card 13-437.
62 33 00 Talc, Mistron, T-076, US	Similar to 62 20 24 in particle size and shape. The crystal needles are larger in number and longer in length.	Same as 62 20 24 but appears to contain more tremolite.
62 20 21 Nytal 400, Talc, Vanderbilt, NY	Very similar to 62 33 00 in every respect under the microscope. (See ADP-8435)	Same as 62 33 00 but contains one additional component chrysotile, ASTM Card 9-444.
62 32 00 Nytal 300, Talc, NY	Similar to 62 33 00 but much coarser. It contains many large prismatic crystals of size up to 20 x 40 μ and some real long needle crystals of size about 2 x 500 μ .	Same as 62 20 21, ie, Nytal 300 and Nytal 400 are the same material, the former is much coarser.
62 35 00 Talc, Flaky- Granular, Very Fine, IT, DM	Fine powder of particle size about 1-5 μ , many crystal needles of about 1 x 15 μ , a few larger prismatic crystals of about 10 x 120 μ in size.	Similar to 62 40 00 but contains less talc more chamosite, approximately the same amount of tremolite.

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<u>Sample, Code and Supplier</u>	<u>Microscopy</u>	<u>Observations</u>	<u>X-Ray Diffraction</u>
62 36 24, Talc, Hi-Fine 80, DM	Similar to 62 35 00 in particle size and shape.		Talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558, Tremolite, $Ca_2Mg_5Si_8O_{22}(OH)_2$, ASTM Card 13-437.
62 22 00, Talc, Asbestine, 5X, IT	Similar to 62 35 00, but the crystal needles are several times longer and the prismatic crystals are 2 to 3 times wider.		Talc, $Mg_3Si_4O_{10}(OH)_2$, ASTM Card 13-558, Tremolite, ASTM Card 13-437. Probably contains small amount of chrysotile asbestos, ASTM Card 9-444.
62 21 21, Talc, Fibrous, IT	It is composed of the following: 1. Fine powder of parti- cle size in the 1-5 μ range. 2. Some prismatic cry- stals of about 16 x 45 μ in size. 3. Some crystal needles of size about 1 x 45 μ . 4. Small amount of fibers of size up to 18 x 400 μ , each is a bundle of parallel fibrils.		Same as 62 22 00. It appears that both 62 21 21 and 62 22 00 are of the same material but different grinding grades, the latter has finer particle size.

DISCUSSION

All the samples were obtained from the mill room in the Research Center except 62 21 21 and 62 32 25 which were submitted by Joe Thornton. In cases where there are several suppliers of the talcs with the same code number, the name of the supplier of the specific talc sample analysed is not available.

... It is noticeable that the talcs from Eastern Magnesia are all clean, while those from Desert Minerals and New York Talc are all contaminated. The talcs from Whitaker, Clark and Daniels and United Sierra may or may not be contaminated with tremolite.

Microscopic observations reveal the color, particle size, and particle shape. X-ray diffraction analysis gives the chemical composition and crystal structure of the sample. Materials of different chemical composition and/or different crystal structure might look alike under the microscope.

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Both chrysotile (asbestos) and antigorites (non-asbestos) approximate to the same formula $Mg_3Si_2O_5(OH)_2$ and have very similar X-ray powder patterns although the chrysotiles are fibrous and the antigorites are lamellar. Microscopic examination is very helpful for their differentiation.