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CHARACTERIZATION AND OCCURRENCE OF TALC

by

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My name is H. T. Mulryan. I am president of Cyprus Mines Corporation's United Sierra Division. The division is the world's largest producer of talc in terms of product value.

It operates talc mines in the States of Montana, Nevada, California, and Texas and talc processing units in the States of Montana, California, and Nebraska, Belgium, and through an affiliate, Mexico.

The division employs about 180 persons at its talc production units. Approximately half of them work in our Montana mines and mills, the remainder are scattered among the other eight talc locations. The Montana product approaches the purity of pure talc mineral and its habit is platy or granular, depending on the material source and fineness of grind. Figures 1 and 2 illustrate the nature of the particles by transmission and scanning electron microscope, respectively.

On the other hand, mixtures of minerals from other sources may contain little or no talc mineral and still be correctly known commercially as "talc." Figures 3 and 4 show the particle shapes of "talcs" from the Gouverneur district of New York State. The needles or fibers are mainly tremolite with anthophyllite also commonly present.

This type of commercial talc is not confined to New York State, being extensively mined and processed in California. Table 1 compares the mineral content of talc from New York, California, and Montana. The Silver Lake, Calif., tremolitic talc is similar to a typical New York State talc except for the missing anthophyllite and quartz impurities.

TABLE 1: - Comparison of mineral content of talc from New York, California, and Montana, in percent

Talc type	Talc	Carbonate	Tremolite	Anthophyllite	Quartz	Other
New York.....	62	-	30	5	3	-
Silver Lake, Calif....	54	3	43	-	-	-
Panamint, Calif.....	82	12	-	-	Trace	2 Mont. 4 Mica.
Yellowstone, Mont....	99	1	-	-	<0.5	-
Beaverhead, Mont....	98	1	-	-	-	1 Chlorite

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FIGURE 1. - Nature of particles by transmission and scanning electron microscope (X 6,000).

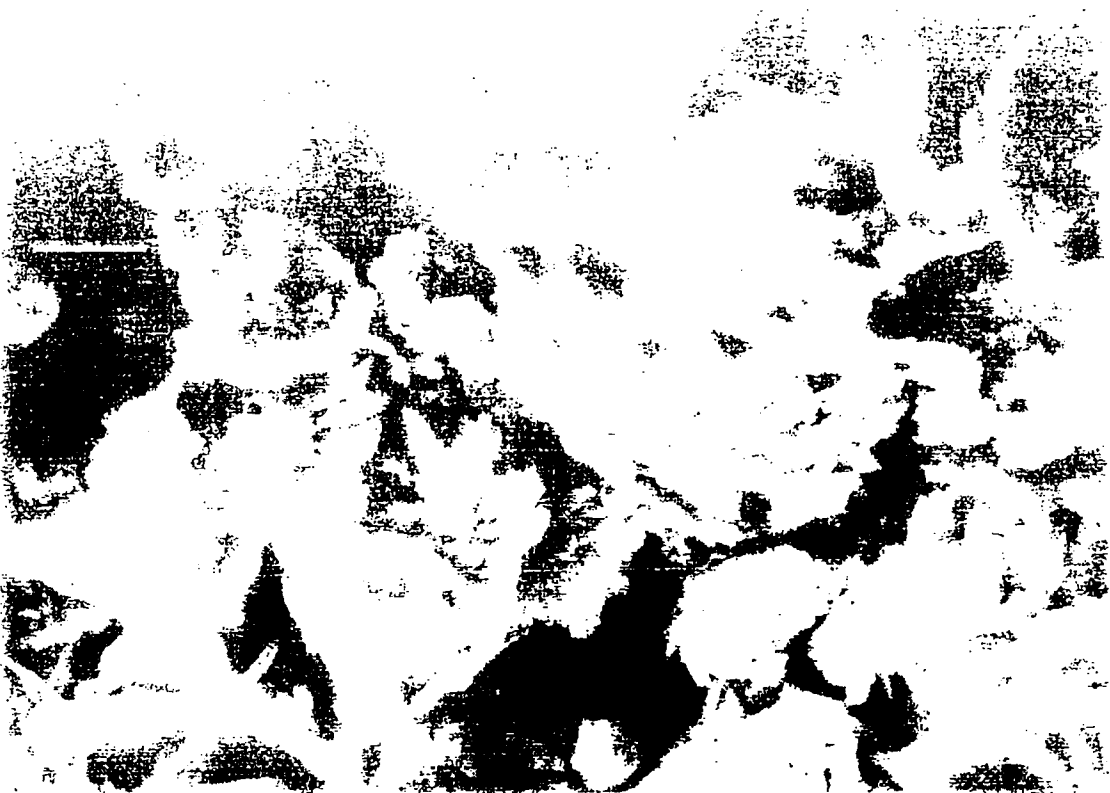


FIGURE 2. - Nature of particles by transmission and scanning electron microscope (X 4,400).

5 micrometers





5 micrometers

FIGURE 4. Particle shapes of "talc" from the Gouverneur District of New York State (X 880).

Another California talc, the Panamint, contains calcite and mica as principal impurities with no asbestos minerals present. The two Montana talcs, Yellowstone and Beaverhead, are high purity and also free of asbestos minerals.

It has been the policy of the Cyprus Mines Corporation to X-ray the production workers at all of our operations annually. This policy has been in effect for 5 years and these examinations have not turned up any lung or pleural cancer among our talc workers, nor have they revealed chronic respiratory disease of any kind.

Seven of the employees were first exposed to talc dust 25 to 44 years ago. All the long service group were California workers who had been exposed to tremolitic talcs as well as tremolite-free materials.

When the threshold limit values for tremolitic talcs were first made public, we became concerned about the possibility that our people had been inadvertently exposed to a health hazard and we took two steps.

First, the division ceased production of all talcs containing detectable amounts of tremolite and established an X-ray diffraction facility at our California mines to assure control.

Second, the seven long-service employees together with four retirees and ex-employees were subjected to exhaustive physical examinations with emphasis on the respiratory system, chest, and abdomen. This group's first exposure to talc dust ranged from 25 to 49 years ago. There are no records to tell us what conditions were like in the talc mines and mills of the 1920's and 1930's, but neither were mining nor milling techniques designed with dust control as a major objective. The oldtime worker was, therefore, exposed to vastly greater amounts of dust than his modern counterpart.

Nevertheless, these exhaustive examinations failed to detect any sign of cancer among any of the long-service group. One of the retirees did reveal signs of possible pneumoconiosis.

Cyprus Mines Corporation's interest in this proceeding is one of concern for the welfare of its workers and for the truth. Although the medical data presented are admittedly limited, they contain no indication that talcs of either the pure Montana type or less pure California varieties are carcinogenic.

We should emphasize that Cyprus' talc operations are in compliance with threshold limit values both as relates to dust from nonasbestiform talc and fiber count. We realized that any dust in excessive amounts cannot be a positive health factor and are making every effort to minimize employee exposure.