PLAINTIFF'S EXHIBIT WRG-1467

# Tremolite Fact Sheet

| | Libby | | | South Carolina | | |
|---|---|---|---|---|---|---|
| | Today | 1970 Data | Oldest Info | Today | 1970 Data | Oldest Info |
| % Amphibole In Ore | 4% | 7% | 7% (1962) | 2-20% | NA | 2-20% (1973) |
| % Tremolite in Ore | 4% | 7% | 7% (1962) | NA | NA | NA |
| | | | | Cannot accurately detect tremolite portion. (Probably less than 10.0% of amphibole.) | | |
| % Fibrous Tremolite in Ore | 4% | 7% | 7% (1962) | NA | NA | NA |
| | Note: 75-95% cemented in bundles. | | | Probably in PPM. | | |
| % Fibrous Tremolite in Concentrate | 0.5% | NA | 0.3-5.0% (1977) | NA | NA | NA |
| | | | | Probably in PPM. | | |
| % Fibrous Tremolite in Finished Product | 10-30 PPM | NA | .028-.074% (1977) | 0 | NA | 0 |
| | | | | 1984 ADL Report | | |

JWW
9/4/84

# Tremolite Fact Sheet

## Enoree

The laboratory cannot adequately distinguish between massive tremolite-actinolite and hornblende. In addition, one report dated 8/31/73 from Julie Yang to O. F. Stewart states that "all the identifiable fibers are hornblende".

## Ore

Concentration varies from 2-20 percent amphibole. Fibrous portion not measured, but would be in parts per million. Earliest recorded measurement was 1973. Present data essentially the same.

## Concentrate

Identification of mineral, i.e. tremolite or hornblende, remains the same as in the ore. A Dr. Yang 1983 memo to R. Frolich states that the tremolite content is essentially "less than 5 percent of the contaminant".

## Finished Product

Identification of contaminant remains as in ore and concentrate. The content of contaminant in the finished product is less than 0.5 percent by weight. A 1984 report from ADL shows no fibers present in South Carolina MONOKOTE.

## Libby

Essentially all of the amphibole in Libby's ore body is in the tremolite-actinolite series. This amphibole is essentially all fibrous in nature. However, the majority of the amphibole is cemented (probably due to calcite) in such a manner that during even severe handling, washing and heating the fibers remain in large bundles. Therefore, it is estimated that only 5-25 percent of the tremolite in the ore body could actually become airborne.

## Ore

The earliest measurements (1956) showed that the Libby dust contained 40% tremolite. The ore was estimated to contain up to 20 percent tremolite with an average of 3 percent (1962). A more comprehensive and ongoing analysis shows total tremolite in head feed varied from 3.6 percent to 6.4 percent during the past 5 years.

Concentrate

The tremolite content of the concentrate during the past 5 years has averaged between 0.3 and 1.1 percent for all products combined. However, the coarse fractions, i.e. L-1 and L-2, have contained up to 3 percent tremolite by weight during this period. It is believed that the tremolite content in the concentrate may have exceeded 5.0 percent during the 1973-1975 period when the new wet mill was coming on stream.

Finished Product

Report in 1977 shows tremolite content in finished product ranging from 0.028 to 0.074 percent by weight. At present the finished product (expanded vermiculite) probably contains less than the stated 10-30 PPM due to slotted screening.

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9/4/84

| DATE | CORRESPONDENCE | SUMMARY |
|---|---|---|
| 2/11/42 | State of Montana Board of Health to Universal Zonolite. | Dust and CO samples w/dust at 538 MPPCF vs. 50 allowed. |
| 8/9/56* | Montana State Board of Health (Ben Wade to Universal Zonolite. | Dust levels 11.6 - 83 MPPCF with 50 being allowable. |
| | *Probably most important memo in Libby file on subject. | |
| 1/23/59 | Dr. Nelson to E. Lovick re Walter McQueen. | Worked 13 years in mill - has lung problem. "I do not believe that his employment in the mill significantly contributed to it." |
| 1/12/59 | State of Montana Board of Health. Ben Wade to R. A. Bleich. | Follow-up on 1956 survey - asbestos in dust estimated @ 27%. "Some progress made" vs. 1956. |
| 4/27/60 | Dept. of Public Health State of California. From W. T. Roberts Ind. Hygiene Engr. | Discuss composition of minerals - "assume ore or concentrate" - No mention of hornblende only tremolite and actinolite. |
| 2/16/62 | Lovick to Kelley. (Superior Asbestos) | Stated that average mill feed over 24 hours was 3% and never reached 5%. |
| 5/9/62 | Lovick to Kelley. (Asbestos) | Stated vermiuclite feed grade was 22% and asbestos 7%. |
| 6/20/62 | Lovick to Kelley. (Asbestos) | Indicates a 20% grade asbestos is available. |
| 7/3/63 | State of Montana Board of Health - Ben Wade to R. A. Bleich. | Six samples of vermiculite containing 6.2 - 22.5% tremolite. |
| 5/19/62 | State of Montana - Wade. | Plant dust contains 40% tremolite. |
| 4/9/64 | To Western Minerals from Lovick. | Estimates concentrate tremolite to be "nil" in #3 a d #4 and less than 1% in #1. |
| 5/11/64 | State of Montana. | Informed management of cancer and mesothelioma risks from asbestos. |

*1956 memo from Wade to Zonolite states: "No asbestos content of the dust has been determined", "maximum allowable for asbestos is 5 MPPCF".