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Specialty MINERALS

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November 30, 2000

Dr. Mary S. Wolfe
NIEHS
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111 T.W. Alexander Drive
Building 101, South Campus
Research Triangle Park, NC 27709
Telephone No: 919-541-3971
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Dear Dr. Wolfe:

Attached please find a statement relating to the NTP proposed listing of Non-Asbestiform Talc as reasonably anticipated to be a human carcinogen, submitted by Gary P. Tomaino on behalf of Minerals Technologies Inc.

The attached statement supplements additional comments to be submitted by Dr. Roger McClellan, also on behalf of Minerals Technologies Inc., in a separate transmittal. We anticipate that Dr. McClellan will make an oral presentation at the NTP Board of Scientific Counselors RoC Subcommittee meeting, December 13-15, for Minerals Technologies Inc.

Sincerely,

Frederick J. Squire
Executive Director, Value Creating Processes

drmwolfeltr113000

Attachments

cc: R. McClellan
G. Tomaino

Comments on NTP Proposed Listing of Non-Asbestiform Talc
as Reasonably Anticipated to be a Human Carcinogen

Minerals Technologies Inc.
Gary P. Tomaino
Group Leader Analytical Services

Introduction

While we consider this review of past and some more recent studies as important within the role of NTP, we take issue with the draft 10th Report on Carcinogens (RoC) presumption that all talc deposits and their respective commercial talc products have a contamination of asbestiform mineral. Before risks uniquely associated with talc can be discussed meaningfully, one must provide a thorough characterization of the talc used in the studies with respect to its purity, the levels of any associated minerals (specifically asbestiform minerals), and the morphology of each mineral phase. Review of potential risks associated with the distinct varieties of talc becomes impossible when the characterization is not correctly and consistently defined.

Discussion

In the fields of geology/mineralogy, there are well-documented definitions and terminology for asbestiform and non-asbestiform minerals. The draft NTP summary document relies on studies that have not adhered to specific mineralogical guidelines, and the summary document itself uses the mineralogical terminology in inconsistent and confusing ways.

An example of contradictory statements can be found on page 11 of the document. A definition of asbestiform talc is stated as the following- "talc is generally identified as either containing asbestiform fibers (asbestiform talc) or not containing asbestiform fibers (non-asbestiform talc)". This statement is unclear as to whether the asbestiform fibers are specific to talc or the other well-known regulated asbestiform minerals. Again, within the same paragraph the asbestiform talc definition is stated as the following-"asbestiform talc generally refers to talcs containing asbestiform tremolite/ actinolite, anthophylllite or chrysotile". Here, the definition suggests platy talc which is associated with well-known regulated asbestiform minerals.

These definitions are unclear whether the talc deposit being mined and processed is an asbestiform talc or that an asbestiform mineral, if present at all, appears as a contaminant. Broad categorizations of talc, such as are relied on in the NTP summary document, create confusion and should be avoided in the interest of "good" science and proper public understanding of this significant issue.

Discussion

Within the fields of geology and mineralogy, morphological terms such as asbestiform, fibrous, and acicular are not synonymous. It is, also, scientifically acceptable to state that an asbestiform mineral is fibrous; but not all minerals having a fibrous habit are asbestiform. For many years, researchers have taken rudimentary aspect ratios and have equated them to the term asbestos. This oversimplification of morphology and aspect ratio can lead to an inaccurate determination of an asbestiform mineral and its content, whether specific to talc or to one of the amphibole or serpentine minerals.

Asbestos has unique physical properties as thoroughly documented by Bureau of Mines RI 8367 and IC 8751:

a) an aspect ratio well above 20:1 or even 100:1
b) very thin fibrils, where the width is < 0.5 microns,
c) very high flexibility and tensile strength compared to non-asbestos minerals
d) parallel fiber growth in veins

The asbestiform variety from the serpentine group is chrysotile and from the amphibole group are amosite, crocidolite, asbestiform tremolite/actinolite, and asbestiform anthophyllite.

The characterization of talc can and should be evaluated using analytical techniques such as Polarized Light Microscopy (PLM), Scanning Electron Microscopy (SEM)/Energy Dispersive Spectroscopy (EDS), Transmission Electron Microscopy (TEM)/ EDS/ Selected Area Electron Diffraction (SAED), and X-Ray Diffraction (XRD) or a combination thereof. With proper quality controls at the mine site and processing plant and the use of proven and sophisticated analytical techniques, talc products can be evaluated and precisely characterized as to asbestiform mineral content.

Some of the studies cited in the NTP draft report have not characterized the subject talc consistent with these definitions and methodologies. Their conclusions are therefore unreliable with respect to health impact findings associated with distinct varieties of talc. A prime example of such faulty reasoning associated with a failure to fully characterize specific talcs appears on page 37 of draft NTP report. It is stated, "neither occupational studies conducted outside of the talc and pottery industries nor the extensive literature concerning cancer and perennially applied talcum powder provide any characterization of talc mineralogy or morphology that could be used to determine the effects of different kinds of talc".

This statement is followed by a questionable conclusion that, "because of the widespread contamination of talc and commercial talc products with asbestiform minerals, it must be assumed that "talc" without further specification of mineralogy or morphology may contain asbestos fibers". Our comments here are supported by findings, referenced on pages 29 through 31 of the draft report indicating that in many of the epidemiological studies the effects of talc independent of other asbestiform minerals could not be adequately determined.

Conclusion

As research continues in the area of health effects of naturally occurring minerals, proper characterization of the fundamental mineralogical differences that can exist with these specific minerals is an essential prerequisite to consistent and meaningful findings.

Worldwide talc deposits should not be considered as uniform and the uniqueness of a mineral's crystal habit should not be understated in risk assessment.

Until better studies based on an approach set forth above can be completed, reliable conclusions regarding cancer risks associated with non-asbestiform talc are not possible.