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MEMORANDUM

TRIP REPORT

NIOSH COURSE ON SAMPLING AND EVALUATING AIRBORNE ASBESTOS

U.S. DEPARTMENT OF HEW, CINCINNATI, OHIO

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SUMMARY The National Institute for Occupational Safety and Health (NIOSH), Division of Training course entitled "Sampling and Evaluating Airborne Asbestos Dust" was attended by the author on November 20-22, 1972. The major purpose in participating in the course was to compare our procedures for sampling and counting asbestos fibers to those used by NIOSH. That organization is responsible for developing the air sampling and fiber counting methods specified by OSHA. NIOSH laboratories also do the counting of field samples taken by OSHA inspectors.

The only major change in the procedure over what we have published in Method 38C-29X4-R1 is the number of fields that must be counted on the asbestos slide. NIOSH is instructing students in their classes that a sufficient number of fields be counted to yield at least 100 fibers. Further, that the minimum number of fields to be counted is 20 and the maximum number is 100 fields. This change will require considerably more time to count samples.

The NIOSH course should be of benefit to any UCC personnel who have to count asbestos samples and who have limited or no experience with a microscope. An experienced microscopist would obtain only a minimal amount of benefit from the course.

DISCUSSION The main reasons for attendance at the NIOSH course, "Sampling and Evaluating Airborne Asbestos Dust" was to establish if our Laboratory Manual Method, Volume 38C-29X4-R1 for asbestos sampling and counting is in agreement with the method of asbestos fiber evaluation specified by NIOSH. A second reason was to ascertain how our fiber counts would compare with counts made by NIOSH personnel. Unfortunately, the latter objective of count comparisons was not accomplished as the personnel at NIOSH did not have the time to count fibers on the students' slides. Counts were

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compared only among students in the course, with those students who had previous experience tending to obtain slightly higher fiber counts.

The counting procedure used by NIOSH has been modified slightly since our Volume 38C method was issued. The counting of 100 fibers or 20 fields, whichever comes first, was formerly recommended in the original procedure published by NIOSH and included in our Volume 38C method. The following counting procedure is now recommended:

1. Count as many fields as necessary to obtain a total count of 100 fibers, with the maximum number of fields that must be counted set at 100 fields.

2. Count a minimum of 20 fields even if the total count in the 20 fields exceeds 100 fibers.

3. Do not count a sample in which the average fiber counts per counting area exceeds 20 fibers. The sample will have to be taken with a reduced sampling time.

There are some other minor revisions (such as the magnification power of 400-450X instead of the 430X now listed in our method, and use of the Porton reticle instead of a Whipple disk) which will have to be made in our Volume 38C procedure for asbestos. The 38C method will be revised as soon as possible to correct these minor changes in procedure.

Attendance at the course presented an excellent opportunity to ask questions directly to persons responsible for establishing the counting procedures. The instructors were quick to point out that they cannot speak for OSHA enforcement policy on these questions, as the NIOSH role is that of an advisory agency, responsible for submitting criteria recommendations to OSHA. NIOSH personnel are, however, doing the majority of the counting for asbestos on samples taken by OSHA inspectors and are training many of the OSHA personnel in these courses. Some of the more significant questions which were asked, and the instructors' comments are as follows:

1. Are individual fibers in a bundle of asbestos fibers counted separately?

   Ans. No. A bundle of fibers is counted as 1 fiber.

2. Are fibers in an agglomerate counted?

Ans. The reply to this question is a little vague, as it can be a matter of individual judgment. The following rules should be used when dealing with an agglomerate (a group of particulates that adhere to one another).

a. If the agglomerate covers as much as 1/6 of the field area reject the field and select another.

b. Since you must be able to see both ends of a fiber, ideally you must only count free fibers; i.e., fibers that are unattached and you can see both ends.

3. Are fibers longer than 10 μm in length counted?

Ans. Yes. Under present regulations, any fiber over 5 μm in length is counted, regardless of the total length over 5 μm.

4. Are all fibers counted whether they are asbestos or not?

Ans. Unless you can positively identify a fiber as not being asbestos, then count all fibers. There is no convenient absolute way of identifying fibers as asbestos or not by phase-contrast microscopy. The intent of the law is to protect the workers' health and counting all fibers will assure a bias on the high or safer side.

5. Would polarized light microscopy be better than phase-contrast for counting and identifying asbestos fibers?

Ans. Although polarized light microscopy would be useful to identify large bundles of asbestos fibers, the counting of extremely fine fibers cannot be done with this type microscope.

6. Should air samples be taken on an openfaced filter or can the top cover be left on and extra holes drilled in the cover to give an even distribution of the dust over the filter?

Ans. The open-faced filter is the only recommended method. This drilling of extra holes in the top cover can lead to very uneven distribution of dust on the filter.

7. How long should the air samples for asbestos be taken?

Ans. The length of sampling time requires a good deal of judgement. After a person has had considerable experience in sampling for airborne dust, he can usually judge the airborne loading by visual inspection and adjust his sampling period accordingly. However, when in doubt, it is preferable to take two samples at the same time and shorten the sampling time on one of the samples. Filters which have too much dust cannot be counted! Sampling periods up to four hours are possible in areas with very low dust concentrations. Samples of 30 to 45 minutes are about the average time which NIOSH personnel have taken. In areas where there is considerable airborne nuisance type dust in addition to asbestos, such as foundries, five minutes may be the maximum time period a sample can be taken.

Any UCC personnel planning to count asbestos and having limited or no experience in using the microscope would greatly benefit from attending this NIOSH course. Perhaps the major advantage in attending this course would be the basic microscope experience gained. The benefit to a person attending the course who is well-versed in the use of a microscope would be minimal. The directions for preparing, mounting and counting the slides for asbestos fibers are well documented in detailed, stepwise procedures which can be easily followed.

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