

monitoring of employees who are, or may reasonably be expected to be exposed to airborne concentrations at or above the action level. Thus, for example, because office buildings generally have air concentrations less than the action level, an employer would not be required to perform initial monitoring unless there is reason to believe that conditions exist that may expose employees to asbestos at or above the action level. Such conditions include visible evidence of deterioration of asbestos materials and construction or maintenance activities which would disturb asbestos materials.

The final rule does not require periodic monitoring and measurement for the TWA when initial monitoring data reveal exposures below the 0.1 f/cc action level because exposures below the action level provide a margin that makes it unlikely that minor changes in processes, materials or environmental conditions will result in exposures above the PEL.

Many commenters addressed the specifications for monitoring frequency contained in the proposed standard [Exs. 84-379, 86-4, 90-140, 90-168, 90-173, 127, 263, 428]. Several commenters requested that OSHA not specify a frequency for monitoring employee exposure levels [Exs. 86-4, 90-173, 263]. For example, the American Iron and Steel Institute stated:

Required exposure sampling should have a valid basis. An automatic preset sampling frequency is burdensome, wastes scarce industrial hygiene resources, and provides no direct benefit to exposed employees who follow proper work practices and use prescribed personal protective equipment. . . . Requiring sampling on a quarterly basis serves little purpose if the jobs performed are essentially the same and no changes have occurred in the operation [Ex. 283].

Bell Communications Research also addressed this point:

The requirements for exposure monitoring should be written in terms of performance oriented language that will allow employers to structure their monitoring program to fit their specific work situation. . . . Overall employee protection is more dependent on training, work procedures, and in some cases personal protective equipment than a rigid workplace monitoring program [Ex. 90-173].

OSHA has maintained the monitoring frequency in the existing standard. However, OSHA believes that the monitoring frequency specified in the final standard is a minimal requirement, and that many employers will wish to conduct more frequent monitoring to ensure employee protection and compliance with the standard. Although the final standard contains a minimal sampling frequency, the final standard

requires the employer to sample based on performance criteria. That is, the employer must sample with such frequency and pattern as to represent, with reasonable accuracy, the levels of exposure of the employees. This performance provision is contained in the existing standard and is maintained in the final standard. In this provision, the employer decides how often to monitor, depending upon the conditions in the employer's operation; some employers may monitor more than others providing the monitoring is at least on a semiannual basis for all. Clearly, the more frequent the measurements, the greater the reliability of the resulting employee exposure profile.

A number of submissions to the record supported a requirement for monitoring every three months if the airborne concentration of asbestos was at or above the action level [Exs. 84-379, 127]. For example, the European Economic Community, Labour and Social Affairs Council (1983), stated:

The concentration of asbestos shall be measured as a general rule at least every three months and, in any case, whenever a technical change is introduced [Ex. 84-379].

And, Marshall H. Marcus, certified industrial hygienist, supported the change in monitoring frequency, commenting that exposure monitoring should be reduced to once every three months, with provisions for additional monitoring if necessary [Ex. 127].

The standard requires that whenever there has been a production, process, or control change that may result in new or additional exposures to asbestos above the action level, or whenever the employer has any other reason to suspect an increase in employee exposures above the action level, the employer shall again initiate the required monitoring for those employees affected by such change or increase. The final standard also provides that an employer may discontinue periodic monitoring for those employees for whom measurements statistically show exposures to be below the action level.

The final standard also differs from the existing standard in that the requirement to conduct environmental monitoring has been eliminated in the final standard, and the frequency of personal monitoring is increased. The purpose of the OSHA standard is to reduce worker exposure. Only air samples collected at the worker's breathing zone truly reflect the level of exposure of a worker to a given contaminant throughout a work day. Therefore, OSHA believes that personal air sampling is more useful than

environmental sampling for determining compliance for the OSHA standard.

Environmental samples can be useful. When the purpose of a survey is to determine sources of contamination or to evaluate engineering controls, a network of area sampling (environmental monitoring) would be appropriate. The new standard permits this type of sampling. OSHA has not required, however, that the employer conduct environmental sampling in other toxic substance regulations, and has found that personal air sampling is adequate as a mandatory requirement. In addition, the elimination of environmental sampling permits the employer to make more efficient use of resources.

Methods of Measurement

In the April proposal (49 FR 14128), OSHA considered requiring a specific sampling and analytical protocol to measure and analyze airborne concentrations of asbestos fibers. Currently, the existing asbestos standard (29 CFR 1910.1001(e)) requires that all measurements of asbestos fibers be made by a membrane filter method using phase contrast illumination at 400-500 X (magnification). While acknowledging that airborne asbestos measurement procedures using phase contrast microscopy inherently contain several sources of error, OSHA stated that "phase contrast microscopy errors can be reduced if improved and standardized procedures are followed, perhaps by adding requirements to the standard" (49 FR 14126). Although the Agency did not propose mandating a specific monitoring procedure at that time, the proposal discussed the desirability of adopting, verbatim or with modification, procedures recommended by the Asbestos Information Association (AIA) (Ex. 86-002), Chatfield (Ex. 84-319), the British government, (Ex. 84-446), NIOSH (Ex. 84-444).

Need for Standardization of the Monitoring Method

Evidence submitted to the record clearly demonstrates that the use of different sampling and analytical protocols for phase contrast microscopic analysis of asbestos concentration leads to different monitoring results, and that monitoring results can vary according to the equipment used (particularly the graticule), mounting and clearing procedures, and rules for counting fibers (Exs. 101G, 101H; Tr. 6/20, p. 13; Tr. 6/20, pp. 38-39; Tr. 7/6, pp. 79-81). For example, use of the AIA's recommended counting rules generally leads to lower