

FOR: ALL: FROM: NF
RE: _____

TO: Safety Directors

FROM: T. G. Grumbles
DATE: September 26, 1988

Interoffice
Communication

SUBJ: REVISED OSHA ASBESTOS STANDARD

VISTA

OSHA has revised the current asbestos standard to include an excursion limit (EL) of 1 fiber/cc averaged over a sampling period of 30 minutes. As with the TWA-PEL engineering controls and work practices when feasible are the preferred methods to reach the excursion limit. Other provisions of the standard are being amended to also require ancillary protective actions when the EL is exceeded. For example, regulated areas and decontamination facility requirements are required when the EL is exceeded.

A copy of the preamble and standard is attached. The summary and explanation of the requirements starts on page 35620. The monitoring requirements discussion starts on page 35621. The actual standard begins on page 35625.

Please carefully review these new requirements in regards to your plants' current practices to determine additional actions needed for compliance.

We'll discuss this at the Industrial Hygiene Meeting in November.



T. G. Grumbles

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cc: Plant Managers, T. H. Huffman, J. A. DeBernardi, G. Draper

Attachment

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criteria; feasibility of the limit and further reduction of significant risk were raised by OSHA in its proposal (see 49 FR 14116, 14122), and were the subjects of data and comment submitted to the record as well as testimony at the hearing. Therefore all aspects of OSHA's statutory rulemaking requirements, consisting of notice, comment and hearing, have been compiled with concerning whether OSHA must issue an excursion limit (See section 6(b) of the Act).

Ample notice on all relevant issues was provided by OSHA. In its proposal the Agency stated it was considering reducing the prior "ceiling limit" of 10 f/cc to a limit based, in large part on the TWA-PEL which would be required. OSHA specifically mentioned the possibility of imposing a 5 f/cc limit measured over 15 minutes if a 0.5 f/cc TWA-PEL were chosen and a 2 f/cc "ceiling limit" if a 0.2 f/cc limit were chosen, and requested comments on these as well as "other suggested limits". OSHA noted that ceiling limits "may be necessary to ensure further that employees are not exposed to dangerous concentration(s) of asbestos fibers" and also asked for "(i) information concerning the feasibility of achieving (the limits mentioned or others) particularly in industries with variable exposures" (49 FR at 14123).

Comment and evidence submitted to the record responded to all relevant issues and provided an ample evidentiary base for OSHA to make determinations regarding a revised excursion limit for asbestos exposure. Participants representing both industry and employee groups recommended that OSHA adopt a "short term limit ranging from 0.5 f/cc measured over 30 minutes" (BCTD, Exh. 330 at 155), to 5.0 f/cc measured over 15 minutes (AIA/NA, P.H. brief, III-45).

Data introduced during the rulemaking, as discussed previously, shows the feasibility of the limit adopted. Most data relates to service industries and construction. The relative scarcity of data for general industry was explained by AIA/NA as resulting from the fact that "at least in manufacturing plants, there are few routine operations where exposures are episodic. Consequently, the occurrence of peak exposures is generally an unexpected event such as an equipment breakdown." (AIA/NA, P.H. brief III-44).

Data used in OSHA's risk assessment and regulatory analysis similarly show that the imposition of an excursion limit of 1 f/cc measured over 30 minutes will further reduce the significant risk

remaining after a TWA exposure limit of 0.2 f/cc is achieved.

OSHA finds pursuant to 5 U.S.C. 553(b), that additional notice and comment are unnecessary. OSHA believes that additional notice of the intent to consider an excursion limit would merely duplicate the prior notice. As discussed above, public participation has already taken place during the extensive rulemaking held to develop the 1986 standards.

VII. Summary and Explanation

The requirements set forth in this notice are those which, based on currently available data, OSHA believes are necessary and appropriate to provide additional protection to employees who are now exposed to airborne concentrations of asbestos at levels that pose a significant risk of material impairment to their health. OSHA has considered all data and recommendations on the short-term limit issue contained in the asbestos docket (H-033).

The following sections discuss new individual requirements of the asbestos standard. The final standard adopts an additional permissible exposure limit of 1 f/cc excursion limit averaged over a sampling period of 30 minutes. As with the TWA-PEL, engineering controls and work practices when feasible are the preferred methods to reach the excursion limit.

Other provisions of the revised standards are being amended to also require certain ancillary protective actions when the excursion limit is exceeded. For example, regulated areas must be established, and decontamination facilities be provided for employees whose exposure exceeds the EL. Employers must measure the exposure of employees to ascertain whether the EL is being exceeded. For purposes of this preamble, OSHA is combining the discussion of general industry and construction standard provisions which relate to the same subject matter. Of course, the respective regulatory texts remain separately designated and codified. For example, the discussion on both the general industry and construction revised requirements on monitoring is combined. Any differences in application or text between these industries will be noted in the discussion, as well as, where required, in the respective regulatory texts. OSHA believes that this combined discussion will aid interpretation of the requirements since a unified rationale, where appropriate, is presented, and differences are highlighted where they exist.

Permissible Exposure Limit, Paragraph (c)(2), (General Industry and Construction)

In the final amendment, OSHA establishes a 1 f/cc excursion limit for asbestos and revises existing paragraph (c) to incorporate an excursion limit and to clarify that the excursion limit is to be determined as a time-weighted average over a sampling time of 30 minutes.

In the proposed rule of 1984, OSHA stated that it was considering a ceiling limit of 2.0 f/cc for a 15-minute period if a TWA of 0.2 f/cc was established. The 1984 proposal specifically asked participants for recommendations for specific ceiling levels. In response, some participants recommended a 5 f/cc ceiling limit (Exs. 92-045, 90-180); a ceiling limit equivalent to 10 times the PEL (Ex. 127) and the AFL-CIO recommended that OSHA should lower the ceiling level for the asbestos standard proportionally to the reduction in the permissible exposure limit which would be 0.5 f/cc, based on the AFL-CIO recommended 0.1 f/cc time-weighted average PEL (Ex. 335, p. 46).

Based on the rulemaking record of the revised standard, OSHA determined that the lowest feasible short term level which can be reliably measured using the OSHA Reference Method (ORM) is 1 f/cc measured over 30 minutes. OSHA has also determined that a 1 f/cc EL is effective at lowering total asbestos dose below that achievable through the 0.2 f/cc 8-hour TWA alone. OSHA has determined that, based on the evidence in the record, a 1 f/cc 30 minute EL is feasible and can be reliably and consistently monitored, using available monitoring methodology. There is insufficient evidence on the feasibility of monitoring and attaining lower short-term exposure levels.

With respect to the length of the permitted sampling period, OSHA believes that collection of asbestos over 30 minutes is necessary to ensure that a sufficient amount of asbestos is collected for accurate analysis. It should also be noted that the newly established ceiling limit of 1 f/cc over 30 minutes, in terms of dose exposure to asbestos, is similar to the limits that OSHA considered in the proposal, that is, a 2 f/cc ceiling for 15 minutes.

OSHA has determined that exposure to asbestos under the present standard still presents a significant risk of material impairment to employees. Based on the current record, OSHA believes that compliance with the excursion limit as set forth in this paragraph will further reduce such significant risk.

Exposure Monitoring: Paragraphs (d)(1)(i), (d)(1)(ii), (d)(2)(i), (d)(2)(ii), (d)(2)(iii), (d)(3), (d)(4), (d)(5), and (d)(7)(ii) (General Industry); Paragraphs (f)(1)(ii), (f)(1)(iii), (f)(2)(ii), (f)(4) (Construction)

Section 6(b)(7) of the Act (29 U.S.C. 655) mandates that any standard promulgated under section 6(b) shall, where appropriate, "provide for monitoring or measuring of employee exposures at such locations and intervals, and in such a manner as may be necessary for the protection of employees." The primary purpose of monitoring is to determine the extent of employee exposures to asbestos.

Exposure monitoring informs the employer whether the employer is meeting the obligation to keep employee exposures below the established permissible exposure limits. Exposure monitoring also permits the employer to evaluate the effectiveness of engineering and work practice controls and informs the employer whether additional controls need to be installed. In addition, section 8(c)(3) of the Act (29 U.S.C. 657(c)(3)) requires employers to notify promptly any employee who has been or is being exposed to toxic materials or harmful physical agents at levels that exceed those prescribed by an applicable occupational safety or health standard. Finally, the results of exposure monitoring are part of the information that must be supplied to the physician, and these results may contribute information on the causes and prevention of occupational illness.

Short-term monitoring is required whenever asbestos concentration will not be uniform throughout the workday and where high concentrations of asbestos reasonably may be expected to be released or created in excess of the EL. For example, in the manufacture of asbestos products, peak exposures could be expected during the dry handling of asbestos in manual bagging and charging operations, and during mechanical operations such as cutting, lathing, machining, sawing, drilling, and sanding. Peak exposures could also be expected during maintenance and repair activities where asbestos insulation is disturbed and in automotive repair during brake and clutch servicing.

Amended paragraphs (d)(1)(i) (general industry), and (f)(1)(ii) (construction), set out general requirements for monitoring required under the standards. They now require that the employer perform breathing zone sampling that is representative of the 30-minute short-term exposure of each employee as well as TWA exposures. Paragraphs (d)(1)(ii) (general industry), and (f)(1)(iii)

(construction), require that representative 30-minute short-term employee exposures be determined on the basis of one or more samples representing 30-minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

These exposure monitoring provisions require that the monitoring yield information enabling the employer to determine the short-term exposure for each employee. However, it does not necessarily require separate measurements for each employee. If a number of employees perform essentially the same job under the same conditions, it may be sufficient to monitor a fraction of such employees.

Representative personal sampling for employees engaged in similar work and exposed to similar short-term asbestos levels can be achieved by measuring the exposure of that member of the exposed group who can reasonably be expected to have the highest exposure. This result would then be attributed to the remaining employees of the group.

In many specific work situations, the representative monitoring approach can be more cost-effective in identifying the exposures of affected employees. However, employers may use any monitoring strategy that correctly identifies the extent to which their employees are exposed.

Paragraphs (d)(2)(i) (general industry), and (f)(2)(i) (construction), cover the duty to conduct "initial monitoring" so that employers have baseline data on which to determine whether they must conduct further periodic monitoring. Now employers must perform initial monitoring to determine accurately the short-term airborne concentrations of asbestos to which employees are exposed as well as TWA exposures. However, paragraph (d)(2)(ii) (general industry), contains a provision designed to eliminate unnecessary monitoring in general industry where employers have monitored short-term employee exposures to asbestos within a six-month period immediately preceding publication of this final rule in the Federal Register. In such cases initial monitoring may be excused, pursuant to paragraph (d)(2)(i) (general industry), if the results of the earlier monitoring show that their employees are not exposed to asbestos levels above the excursion limit.

The results of prior monitoring should be acceptable if such sampling was conducted in accordance with the monitoring provisions prescribed for excursion limit monitoring in this

standard: i.e., prior exposure determinations were made from breathing zone air samples that are representative of 30 minute short-term exposures (paragraph (d)(1)(ii) (general industry)), such determinations were associated with operations that are most likely to produce exposures above the excursion limit and if the monitoring method was accurate, to a confidence level of 95 percent, within plus or minus 25 percent for airborne concentrations of asbestos at the excursion limit of 1 f/cc.

Based on the discussion above, paragraph (d)(2)(ii) (general industry), permits the use of prior monitoring results to fulfill the initial monitoring requirements prescribed under paragraph (d), as long as such monitoring satisfies all other requirements of the new monitoring provisions.

In addition, paragraph (f)(2)(iii) (construction) provides an exemption from new initial monitoring for construction employers who have historical monitoring data (prior monitoring results). This exemption prevents these employers from having to repeat monitoring activity for construction jobs that are substantially similar to previous jobs for which monitoring was conducted. The data the employer uses, upon which judgments are based, must be obtained under workplace conditions closely resembling the process, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations. Additionally, paragraph (d)(2)(iii) (general industry), and (f)(2)(ii) (construction), excuse initial monitoring, when the employer can demonstrate, on the basis of "objective data", that the asbestos-containing product or material being handled cannot cause exposures above the action level and/or excursion limit under those work conditions having the greatest potential for releasing asbestos.

"Objective data" is limited to information demonstrating that a particular product or material containing asbestos or a specific process, operation, or activity involving asbestos, cannot release fibers in concentrations above either the action level or Eleven under worst-case release conditions. Objective data can be obtained from an industry-wide study, from manufacturers of asbestos-containing products or materials, or from laboratory test results of an asbestos containing product. For the employer who relies upon an industry-wide study, the data he uses must be obtained under workplace conditions closely resembling the processes, type of material, control

methods, work practices, and environmental conditions used and prevailing in the employer's current operations. Sampling and analytical procedures must conform to NIOSH and/or OSHA approved methods. The following three examples illustrate how an employer may use "objective data" to avoid the burden of initial monitoring.

In the automotive brake and clutch repair industry (the largest group of exposed workers) OSHA has determined that employers can successfully reduce their employees' exposures to asbestos to below the EL by employing the enclosed cylinder/HEPA vacuum system method as described in Appendix F to § 1910.1001. This determination is based on evidence in the rulemaking record (NIOSH Report 32.4, Ex. 84-283). The effectiveness of the vacuum/enclosure is dependent upon the mechanic being adequately trained so that he/she can perform the manufacturer's recommended sequence of steps with care and skill. OSHA therefore believes that employers in the brake and clutch repair industry will be able to avail themselves of exemption from initial monitoring in this amended standard if they conscientiously employ the enclosed cylinder/HEPA vacuum system.

In construction, where certain operations are short-term, intermittent in nature and generate peak exposures, data show that the use of shrouded tools may limit peak exposures to below the EL. An example of a detailed study, which can be used as objective data in lieu of exposure monitoring is Ex. 84-279. This study by the A/C Pipe Producers Association shows that under certain conditions (e.g. experienced workmen, properly maintained equipment, strict adherence to recommended work practices), cutting and machining A/C pressure and sewer pipe, using wet methods and a shrouded Doty tool will limit exposures to below 0.5 f/cc.

Small-scale, short-duration maintenance or renovation activities where the use of glove bags and wet methods are capable of keeping employee exposures to asbestos below the 0.1 f/cc action level and 1 f/cc EL is another situation where objective data could be used to obviate the need for exposure monitoring. The success of glove bag asbestos removal operations relies heavily on the use of workers specially trained in asbestos abatement working under well controlled conditions. Generally, two persons are required to perform removal especially with the use of heavy bags or in elevated locations. Diligence on the part

of management and employees is essential for minimizing contamination. Appendix G to § 1926.58 (51 FR 22785)—"Work Practices and Engineering Controls for Small-Scale, Short Duration Asbestos Renovation and Maintenance Activities", provides requirements for glove-bag procedures which when followed by employers, will satisfy the requirements for relying on "objective data" to be relieved from monitoring duties.

In general industry the amended provisions regarding initial monitoring, periodic monitoring, and termination of monitoring requirements relative to the excursion limit are found in paragraphs (d)(2)(i), (d)(3), and (d)(4). These provisions do not change the frequency and termination of monitoring provisions as they apply to the action level.

Where the employer has kept exposures below the applicable action level and excursion limit, the regulatory scheme normally excuses periodic monitoring. Existing paragraph (d)(5) (general industry) of OSHA's asbestos standard requires a new exposure determination for TWA exposures whenever there has been a change in production, process, control equipment, personnel or work practices that may result in new or additional asbestos exposures. With the adoption of an excursion limit, revised paragraph (d)(5) will also require additional excursion limit monitoring or determination where the employer suspects that workplace changes may increase short-term exposures. Short-term monitoring or an allowable determination should be repeated whenever situations arise or workplace changes occur which could increase employee short-term exposure.

In construction, initial monitoring and termination of monitoring requirements are found in paragraph (f)(2)(i) and (f)(4). As in general industry, the excursion limit does not change the current frequency of initial monitoring and termination of monitoring provisions.

The construction employer can lessen the burden of daily monitoring in a regulated area during removal, demolition and renovation operations, by providing all employees, within the regulated area, supplied-air respirators operated in the positive-pressure mode (§ 1926.58(f)(3)).

Paragraphs (d)(6) (general industry) and (f)(5) (construction) of the current asbestos standards require that monitoring methods be accurate to within plus or minus 25% of the OSHA Reference Method (ORM) results with a 95% confidence level as demonstrated by a statistically valid protocol. It is

clear to OSHA, based on data in record, that adoption of excursion limit accuracy requirements are necessary to ensure that employees exposures are adequately determined. OSHA also finds that the record supports adoption of accuracy parameters of plus or minus 25 percent at the 95 percent confidence level (See discussion *supra*).

OSHA, therefore, adopts in final paragraph (d)(6)(ii), the requirement that monitoring to a confidence level of 95 percent, shall be accurate, to within plus or minus 25 percent for airborne concentrations of asbestos at the 30 minute excursion limit of 1 f/cc.

Paragraph (d)(7)(i) (general industry) and (f)(6)(i) (construction) require that employers notify employees of the results of excursion limit monitoring performed pursuant to the standard. Such notification has been determined to be appropriate where TWA monitoring is performed, and is believed to be appropriate where excursion limit monitoring is performed.

Regulated Areas: Paragraph (e)(1), (General Industry and Construction)

The amended provision of paragraph (e) in the general industry standard now will require employers to designate as regulated areas any locations in their workplaces where occupational exposures to airborne concentrations of asbestos exceed the excursion limit as well as the TWA-PEL. This regulated area concept is consistent with other OSHA toxic substance standards.

The intent of OSHA's regulated area requirement is to protect employees from unknowingly entering areas where their exposures exceed either PEL. They will be warned of the need to wear respirators and to keep out if they have no need to be present.

Only authorized persons may enter regulated areas, which are required to be clearly marked to ensure that employees are aware of these locations. Warning signs are to be posted at each regulated area and at all approaches to regulated areas so that an employee can take the necessary protective steps before entering the area. The final standard gives employers an option of whether to use, for example, ropes, markings, temporary barricades, gates or more permanent enclosures to demarcate and limit access to these areas.

Paragraph (e) of the construction standard now requires employers to establish regulated areas whenever the PELs are exceeded. Regulated areas required by the standard can take two forms. For most employers who perform asbestos removal, demolition, or

renovation operations (other than small-scale short-duration), the regulated area must consist of a negative-pressure enclosure that will confine the asbestos fibers being generated to the area within the enclosure and will thus protect other employees and bystanders on the site from exposure to excessive levels of asbestos. For small-scale, short-duration removal, demolition and renovation operations and for asbestos work operations that do not involve asbestos removal, demolition, or renovation, the employer may simply demarcate the regulated area by posted signs that limit the number of employees entering the area.

Regulated areas do not have to be established when engineering and work practice controls reduce employee exposures to asbestos to levels below the standard's TWA and excursion permissible limits.

Methods of Compliance: Paragraphs (f)(1)(i), (f)(1)(ii), (f)(2)(i) and (f)(2)(iv) (General Industry); Paragraphs (g)(1)(i), (g)(2)(ii), and (g)(3) (Construction)

As discussed previously (see section on Summary of Regulatory Flexibility and Impact Analysis) OSHA believes that compliance with both the excursion limit and 8-hour TWA PELs can be accomplished by the majority of the asbestos industry through implementation of feasible engineering and work practice controls. OSHA, therefore, requires in paragraph (f)(1)(i) (general industry), and (g)(1)(i) (construction), of the amended asbestos standards, that the employer institute engineering and work practice controls to reduce and maintain employee exposure to or below the PELs except to the extent that such controls are not feasible. The amended rule further requires, in paragraph (f)(1)(ii) (general industry) and (g)(1)(ii) (construction), that wherever feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them to reduce exposure to the lowest levels achievable by those controls, and shall supplement them by the use of respirators. Based on available evidence, OSHA believes that the use of engineering and work practices controls will reduce employer exposure to or below the PELs for many work situations.

The methods used to control the EL will of course vary with the operation. In the revised general industry standard employers in the automotive brake and clutch repair industry can successfully reduce their employees' exposures to asbestos to below the EL by employing

the enclosed cylinder/HEPA vacuum system method as detailed in Appendix F to § 1910.1001.

In the revised construction standard, OSHA listed general categories of work practices and engineering controls acceptable for meeting the PEL (§ 1926.58(g)(1)). One activity likely to be impacted by this EL is maintenance and repair operations. These employers can use either singly or in combination: local exhaust ventilation equipped with HEPA filter dust collection systems, general ventilation systems, wet methods, vacuum cleaners equipped with HEPA filters, enclosure or process isolation, and prompt disposal of asbestos waste, all of which are listed in the previous cited provision.

In the installation of new construction materials such as A/C pipe and sheet the use of tools fitted with local exhaust shrouds connected to a HEPA vacuum have been demonstrated to reduce airborne asbestos concentrations significantly. Such shrouded tools are capable of reducing exposures below the excursion limit (Ex. 84-279).

OSHA in general believes that the imposition of the EL will not require the purchase of new controls or the development of new or different processes. Since many firms already use adequate controls in order to comply with the existing provisions of the asbestos standards, OSHA believes that meeting the EL will often require increased diligence in the application of existing controls and work practices implemented for the 8-hour TWA-PEL. These measures include such items as, but not limited to: (1) Frequently checking the effectiveness of exhaust systems, (2) increased attention to good housekeeping, employing a regular cleanup schedule using HEPA filtered vacuum cleaners, (3) periodic inspection and maintenance of process and control equipment to prevent system failure, (4) better trained workers to carry out their job functions with greater care and skill, and (5) improved supervision ensuring that work practices are carried out properly. In addition to the above measures the employer should consider shutting-off or temporarily modifying the air-hauling system to prevent the distribution of asbestos fibers to areas outside the work site and to other areas in the building.

Amended paragraph (f)(2)(i) (general industry) requires, where either PEL is exceeded, that the employer establish and implement a written program to reduce employer exposure to or below the excursion limit, by means of engineering and work practice controls,

and by the use of respirators when permitted.

It is OSHA's belief that the written plan for achieving the excursion limit is as essential as the written plan requirement adopted for achieving the TWA, in ensuring that the employer implement the necessary controls to reduce exposure. The plan also provides the information that would allow OSHA, the employer, and employees to examine the excursion limit control methods chosen and to evaluate the extent to which these planned controls are being implemented. As with the TWA written plan, the excursion limit compliance plan will be accessible to individuals designated in paragraph (f)(2)(iii) (general industry) for inspection and copying.

Final paragraph (f)(2)(iv) (general industry) and (g)(3) (construction), prohibits employee rotation as a means of compliance with the excursion limit for the same reasons that employee rotation is not permitted for compliance with the TWA. This prohibition is consistent with OSHA's view that this control strategy is not appropriate in occupational environments involving exposure to potential carcinogens. It results in exposure of a larger number of employees to levels of asbestos which still present a significant risk.

Respiratory Protection: Paragraph (g)(1) (General Industry); Paragraph (h)(1)

The amended standards provide that respirators be used to limit short-term employee exposure to asbestos in the following circumstances:

- (i) During the interval necessary to install or implement feasible engineering and work practice controls;
- (ii) In work operations such as maintenance and repair activities or vessel cleaning or other activities for which the employer establishes that engineering and work practice controls are not feasible;
- (iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the excursion limit.

These same requirements apply under the current standard with respect to respirator use in complying with the TWA, and are based on OSHA's established policy on compliance methodology (see preamble discussion in the current asbestos standard, 51 FR 22892).

OSHA has estimated that respirator use will be required to meet the excursion limit in a number of general industry operations as well as routine maintenance and repair in general industry and construction. So that respirator use will be effective OSHA

has incorporated the requirements of § 1910.134 into the revised standards supplemented by requirements such as fit testing protocols for respirator use. OSHA is concerned about relying on respirator use to meet the EL in the maintenance and repair sector of the construction industry. Although maintenance crews employed by larger building maintenance firms may often be specialized for asbestos work and trained accordingly, smaller building firms where work with asbestos is spotty and perhaps not always recognized may not institute adequate respirator programs.

The imposition of an EL hopefully will fill lapses in respirator programs in such firms, if only because a specific short-term limit corresponds with the asbestos exposure of most maintenance employees and thus highlights the need for protection, i.e., respiratory control.

Of course, engineering and work practice controls are still preferred, but as discussed earlier, for these operations respiratory protection often will be the feasible control strategy.

Other requirements under these paragraphs dealing with "Respirator selection" and "Respirator program," remain unchanged and apply where respirators are used to achieve the excursion limit.

Protective Work Clothing: Paragraphs (h)(1), (h)(3)(iii), (h)(3)(iv) (General Industry); Paragraphs (i)(1), (i)(2)(i), (i)(2)(ii) (Construction).

Existing paragraphs (h)(1) (general industry), and (i)(1) (construction), require that the employer provide to employees and ensure that the employees use appropriate protective clothing and equipment whenever the employees are exposed above the 8-hour TWA-PEL.

OSHA adopts in this rule, a similar requirement relative to the excursion limit, that protective clothing such as coveralls or similar full-body work clothing, gloves, head coverings, foot coverings, and face shields or other appropriate eye protection (when necessary to prevent eye irritation) be provided to employees exposed above the excursion limit.

It is OSHA's belief that protective clothing and foot coverings be required above the EL to prevent contamination of the employee's street clothing and shoes, so that exposure is not extended both beyond the time period and work area when the excursion limit was exceeded and beyond the workday and workplace.

The amended standards (h)(3)(iii), (h)(3)(iv) (general industry), and (i)(2)(i), (i)(2)(ii) (construction) require that the employer ensure that laundering of

contaminated clothing be done in a manner that prevents the release of airborne asbestos fibers in excess of the PELs, and to inform those who launder or clean the contaminated protective clothing to exercise caution to prevent the release of fibers in excess of the PELs. These provisions are designed to make clear the need to use proper care in handling of the contaminated clothing.

Hygiene Facilities and Practices: Paragraphs (j)(1)(i), (j)(2)(i), (j)(3)(i), (j)(3)(iii), (General Industry); Paragraph (j)(1)(iii), (Construction).

The amended provisions in general industry, require that the employer provide hygiene facilities and ensure that employees engage in good personal hygiene when asbestos exposures exceed both the 8-hour TWA-PEL and excursion limit. Specifically, employers are required to provide clean changerooms, showers, and lunchroom facilities and ensure that employees that work in areas where their exposures exceed either PEL, wash their hands and faces prior to eating, drinking and smoking and shower at the end of the work shift.

Similar provisions for hygiene facilities and good personal hygiene practices are found in the construction standard and are required whenever the 8-hour TWA-PEL or excursion limit is exceeded. However, unlike the general industry standard that requires the lunchroom be provided with a positive-pressure filtered air supply, the construction standard requires that airborne asbestos concentrations within lunchrooms be kept below the action level and excursion limit.

Communication of Asbestos Hazards to Employees: Paragraph (j)(5)(i) (General Industry); Paragraph (k)(3)(i) (Construction).

Existing paragraphs (j)(3)(i) (general industry) and (k)(3)(i) (construction) require that information and training concerning asbestos be provided to employees exposed at or above the action level. OSHA adopts in this rule, a requirement that information and training on asbestos be also provided to employees exposed at or above the excursion limit.

OSHA is adopting this provision based on the determination that informing employees through training, that high levels of asbestos might be released into the workplace, will better enable affected employees to take precautionary measures to protect themselves.

Medical Surveillance: Paragraphs (l)(1)(i), (l)(4)(i) (General Industry); Paragraph (m)(1)(i) (Construction)

The amended standard for general industry requires each employer to institute a medical surveillance program for all employees who are or will be exposed to asbestos at or above the action level and/or excursion limit.

The amended standard for construction requires employers to implement the medical surveillance program only for employees required by the standard to wear negative-pressure respirators and for employees exposed to levels of asbestos at or above the action level and/or above the excursion limit for 30 or more days per year.

Since significant health risks are likely to be present at the excursion limit OSHA believes that it is essential that workers are provided medical surveillance whenever worker exposure exceeds the EL as well as at or above the action level. The initial and annual medical examination and evaluation is an important tool in protecting the worker exposed to asbestos by: detecting changes in a worker's physical condition, detecting biological effects of inhalation of asbestos as early as possible, providing a way to re-evaluate the workplace conditions, and evaluating the worker's suitability to continue doing the same job. For these reasons OSHA feels that the amended standards should require medical surveillance triggered above the excursion limit as well as by the action level.

Dates, Paragraph (o), (General Industry and Construction)

Effective Date

The amendments to the asbestos standards will become effective thirty (30) days following publication in the Federal Register. OSHA believes that a 30 day period between issuance of these standards and their effective date provides sufficient time for employers and employees to become informed of the existence of the standards and their requirements.

Start-up Dates

Since there was little record evidence on this issue, OSHA is using its experience in making a determination on the startup dates for these standards. The start-up dates discussed below provide the time required for employers to implement training programs and medical surveillance; to order and receive protective equipment and respirators; to construct changerooms, showers, lavatories, and lunchrooms;

to plan, order, receive and install engineering controls; and to implement work practice controls. OSHA believes that the dates set in this standard should be adequate in all but unusual circumstances.

OSHA believes that expeditious action by employers to achieve compliance with the provisions of these amended standards is warranted. Employees under the current standard are being exposed to asbestos at concentrations that present a significant risk of adverse health effects. Compliance with the excursion limit will further reduce total asbestos dose, and therefore the risk, to which employees are presently being exposed under the existing rule.

The information available to OSHA clearly indicates that, with few exceptions, affected employers can be reasonably expected to be able to implement feasible engineering and/or work practice controls that would bring their workplaces into compliance with the amended standards' excursion limit within 6-months from the effective date of this standard.

As stated earlier in this discussion OSHA believes that the imposition of the EL will not necessarily require the purchase of new controls or the development of new or different processes. Many firms already use adequate controls in order to comply with the existing provisions of the asbestos standards. Therefore, OSHA believes that meeting the EL will often require increased diligence in the application of existing controls and work practices implemented for the 8-hour TWA-PEL. Consequently, employers should be able to comply with this provision in the time-frame specified.

OSHA believes that employers should be able to achieve compliance with changerooms, showers, lavatories and lunchroom facilities within one year after the effective date. This time-frame appears to be reasonable, since it allows employers an additional six months after engineering controls are completed to install hygiene and lunchroom facilities, should engineering and work practice controls fail to reduce exposures below the EL. The amended standards like the current standards do not require the immediate installation of changerooms, showers, lavatories, and lunchrooms if installation of engineering controls would only make their use necessary for a few months.

Additionally, compliance with all the other requirements of the standard within ninety (90) days of the effective date also is believed by OSHA to be appropriate. In response to the

requirements set forth in OSHA's 1986 asbestos standard, asbestos employers have already instituted programs regarding training, compliance plans, respirators, exposure monitoring and work practices, recordkeeping, signs and labels, and regulated areas. Thus, compliance with new burdens imposed by adoption of the excursion limit within the periods specified is believed to be reasonable and appropriate.

If the time period for meeting any of these startup dates cannot be met because of technical difficulties, employers are entitled to petition the Assistant Secretary for a temporary variance under section 8(b)(6)(A) of the Act.

VIII. State Plan Applicability

Twenty-four states and U.S. territories have their own OSHA-approved occupational safety and health plans. These states and territories are: Alaska, Arizona, California, Connecticut (for state and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. These states and territories are to adopt a standard comparable to that of OSHA's within 6 months of the effective date of the Federal rule.

List of Subjects

29 CFR Part 1910

Asbestos, Cancer, Health, Labeling, Occupational safety and health, Protective equipment, Respiratory protection, Signs and symbols.

29 CFR Part 1926

Asbestos, Cancer, Construction industry, Hazardous materials, Health, Labeling, Occupational safety and health, Protective equipment, Respiratory protection, Signs and symbols.

IX. Authority

This document was prepared under the direction of John A. Pendergrass, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210. Accordingly, pursuant to sections 4, 6(b), 8(c) and 8(g) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), section 107 of the Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333), the Longshoremen's and Harbor Workers' Compensation Act (33 U.S.C. 941), 29 CFR Part 1911 and Secretary of

Labor's Order No. 9-83 (48 FR 35736), 29 CFR Parts 1910 and 1926 are hereby amended as set forth below.

Signed at Washington, DC, this 6 day of September, 1988.

John A. Pendergrass,
Assistant Secretary of Labor.

Parts 1910 and 1926 of Title 29 of the Code of Federal Regulations are amended as set forth below:

X. Amended Standards

Part 1910 of Title 29 of the Code of Federal Regulations is amended as set forth below:

PART 1910—[AMENDED]

1. The authority citation for Subpart Z of 29 CFR Part 1910 continues, in pertinent part, to read as follows:

Authority: Secs. 6 and 8, Occupational Safety and Health Act, (29 U.S.C. 655, 657); Secretary of Labor's Orders No. 12-71 (38 FR 8734); 8-76 (41 FR 25050), or 9-86 (48 FR 35736), as applicable; and 29 CFR Part 1911.

2. In § 1910.1001, paragraphs (c), (d)(1), (d)(2), (d)(3), (d)(4), (d)(5), (d)(7)(ii), (e)(1), (f)(1)(i), (f)(1)(ii), (f)(1)(iii), (f)(1)(v), (f)(1)(vi), (f)(1)(viii), (f)(2)(i), (f)(2)(iv), (g)(1)(iii), (h)(1) introductory text, (h)(3)(iii), (h)(3)(iv), (i)(1)(i), (i)(2)(i), (i)(3)(i), (i)(3)(iii), (j)(4)(i), (j)(5)(i), (j)(1)(i), (j)(4)(i), and the last sentence of (o)(1) are revised and (o)(3) is added to read as follows:

§ 1910.1001 Asbestos, tremolite, anthophyllite, and actinolite.

(c) *Permissible exposure limits (PELS)*—(1) *Time-weighted average limit (TWA)*. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of 0.2 fiber per cubic centimeter of air as an eight (8)-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A of this section, or by an equivalent method.

(2) *Excursion limit*. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals, in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes.

(d) * * *

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative

of the 8-hour TWA and 30-minute short-term exposures of each employee.

(ii) Representative 8-hour TWA employee exposures shall be determined on the basis of one or more samples representing full-shift exposures for each shift for each employee in each job classification in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

(2) Initial monitoring.

(i) Each employer who has a workplace or work operation covered by this standard, except as provided for in paragraphs (d)(2)(ii) and (d)(2)(iii) of this section, shall perform initial monitoring of employees who are, or may reasonably be expected to be exposed to airborne concentrations at or above the action level and/or excursion limit.

(ii) Where the employer has monitored after December 20, 1985, for the TWA and after March 14, 1988, for the excursion limit, and the monitoring satisfies all other requirements of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(2)(i) of this section.

(iii) Where the employer has relied upon objective data that demonstrates that asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals is not capable of being released in airborne concentrations at or above the action level and/or excursion limit under the expected conditions of processing, use, or handling, then no initial monitoring is required.

(3) *Monitoring frequency (periodic monitoring) and patterns.* After the initial determinations required by paragraph (d)(2)(i) of this section, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than six months for employees whose exposures may reasonably be foreseen to exceed the action level and/or excursion limit.

(4) *Changes in monitoring frequency.* If either the initial or the periodic monitoring required by paragraphs (d)(2) and (d)(3) of this section statistically indicates that employee exposures are below the action level and/or excursion limit, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(5) *Additional monitoring.* Notwithstanding the provisions of

paragraphs (d)(2)(ii) and (d)(4) of this section, the employer shall institute the exposure monitoring required under paragraphs (d)(2)(i) and (d)(3) of this section whenever there has been a change in the production, process, control equipment, personnel or work practices that may result in new or additional exposures above the action level and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposures above the action level and/or excursion limit.

(7) . . .

(ii) The written notification required by paragraph (d)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce employee exposure to or below the TWA and/or excursion limit, wherever monitoring results indicated that the TWA and/or excursion limit had been exceeded.

(e) . . .

(1) *Establishment.* The employer shall establish regulated areas wherever airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals are in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(f) . . .

(1) . . .

(i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to or below the TWA and/or excursion limit, prescribed in paragraph (c) of this section, except to the extent that such controls are not feasible.

(ii) Wherever the feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the TWA and/or excursion limit prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (g) of this section.

(iii) For the following operations, wherever feasible engineering controls and work practices that can be instituted are not sufficient to reduce the employee exposure to or below the TWA and/or excursion limit, prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to or below 0.5 fiber per cubic centimeter of air (as an eight-hour time-weighted average) or 2.5

fibers/cc for 30 minutes (short-term exposure) and shall supplement them by the use of any combination of respiratory protection that complies with the requirements of paragraph (g) of this section, work practices and feasible engineering controls that will reduce employee exposure to or below the TWA and to or below the excursion limit prescribed in paragraph (c) of this section: Coupling cutoff in primary asbestos cement pipe manufacturing; sanding in primary and secondary asbestos cement sheet manufacturing; grinding in primary and secondary friction product manufacturing; carding and spinning in dry textile processes; and grinding and sanding in primary plastics manufacturing.

(v) *Particular tools.* All hand-operated and power-operated tools with would produce or release fibers of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals so as to expose employees to levels in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section, such as, but not limited to saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems which comply with paragraph (f)(1)(iv) of this section.

(vi) *Wet methods.* Insofar as practicable, asbestos, tremolite, anthophyllite, or actinolite, shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers so as to expose employees to levels in excess of the TWA and/or excursion limit, prescribed in paragraph (c) of this section, unless the usefulness of the product would be diminished thereby.

(viii) *Particular products and operations.* No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos, tremolite, anthophyllite, or actinolite shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne fibers of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals so as to expose employees to levels in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(2) . . .

(i) Where the TWA and/or excursion limit is exceeded, the employer shall establish and implement a written

program to reduce employee exposure to or below the TWA and to or below the excursion limit by means of engineering and work practice controls as required by paragraph (f)(1) of this section, and by the use of respiratory protection where required or permitted under this section.

(iv) The employer shall not use employee rotation as a means of compliance with the TWA and/or excursion limit.

(g) * * *

(1) * * *

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the TWA and/or excursion limit; and

(h) * * *

(1) *Provision and use.* If an employee is exposed to asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals above the TWA and/or excursion limit, or where the possibility of eye irritation exists, the employer shall provide at no cost to the employee and ensure that the employee uses appropriate work clothing and equipment such as, but not limited to: * * *

(3) * * *

(iii) Laundering of contaminated clothing shall be done so as to prevent the release of airborne fibers of asbestos, tremolite, anthophyllite, and actinolite, or a combination of these minerals in excess of the permissible exposure limits prescribed in paragraph (c) of this section.

(iv) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in paragraph (h)(3)(iii) of this section to effectively prevent the release of airborne fibers of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the permissible exposure limits.

(i) * * *

(1) * * *

(i) The employer shall provide clean change rooms for employees who work in areas where their airborne exposure to asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals is above the TWA and/or excursion limit.

(2) * * *

(i) The employer shall ensure that employees who work in areas where their airborne exposure is above the

TWA and/or excursion limit shower at the end of the work shift.

(3) * * *

(i) The employer shall provide lunchroom facilities for employees who work in areas where their airborne exposure is above the TWA and/or excursion limit.

(iii) The employer shall ensure that employees who work in areas where their airborne exposure is above the TWA and/or excursion limit wash their hands and faces prior to eating, drinking or smoking.

(j) * * *

(4) * * *

(i) Asbestos, tremolite, anthophyllite, or actinolite fibers have been modified by a bonding agent, coating, binder, or other material provided that the manufacturer can demonstrate that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of fibers of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the action level and/or excursion limit will be released or

(5) * * *

(i) The employer shall institute a training program for all employees who are exposed to airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals at or above the action level and/or excursion limit and ensure their participation in the program.

(l) * * *

(1) * * *

(i) The employer shall institute a medical surveillance program for all employees who are or will be exposed to airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals at or above the action level and/or excursion limit.

(4) * * *

(i) The employer shall provide, or make available, a termination of employment medical examination for any employee who has been exposed to airborne concentrations of fibers of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals at or above the action level and/or excursion limit.

(o) * * *

(1) * * * The requirements in the amended paragraphs in this section which pertain only to or are triggered by the excursion limit shall become effective October 14, 1988.

(3) *Start-up dates for excursion limit.* Compliance with the excursion limit requirements in this section shall be as follows:

(i) Paragraphs (c), (d), (e), (g), (h), (j), (k), (l), (m) of this section, shall be complied with by December 13, 1988.

(ii) Paragraph (f) of this section, shall be complied with by March 13, 1989.

(iii) Paragraph (i) of this section, shall be complied with by September 14, 1989.

Part 1926 of Title 29 of the Code of Federal Regulations is amended as set forth below.

PART 1926—[AMENDED]

1. The authority citation for Subpart D of 29 CFR Part 1926 continues to read as follows:

Authority: Secs. 4, 8, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Sec. 107 Contract Work Hours and Safety Standards Act (Construction Safety Act), 40 U.S.C. 333, and Secretary of Labor's Orders 12-71 (36 FR 8754) 8-76 (41 FR 25059), or 9-83 (48 FR 35736) as applicable. Sections 1926.55(c) and 1926.58 also issued under 29 CFR Part 1911.

2. In § 1926.58 paragraphs (c), (e)(1), (e)(2), (f)(1)(ii), (f)(1)(iii), (f)(2)(ii), (f)(2)(iii), (f)(4), (g)(1)(i) introductory text, (g)(1)(ii), (g)(3), (h)(1)(iii), (i)(1), (j)(2), (j)(1)(iii), the first sentence of (k)(1)(i), (k)(2)(vi)(A), (k)(3)(i), (m)(1)(i), (n)(1)(i), the last sentence of (o)(1) and (o)(2) are revised to read as follows:

§ 1926.58 Asbestos, tremolite, anthophyllite, and actinolite.

(c) *Permissible exposure limits (PELS)*—(1) *Time-weighted average limit (TWA).* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of 0.2 fiber per cubic centimeter of air as an eight (8)-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A of this section, or by an equivalent method.

(2) *Excursion limit.* The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes.

(e) * * *

(1) *General.* The employer shall establish a regulated area in work areas where airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals exceed or can reasonably be expected to exceed the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(2) *Demarcation.* The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the TWA and/or excursion limit.

(f) * * *

(1) * * *

(ii) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

(iii) Representative 8-hour TWA employee exposure shall be determined on the basis of one or more samples representing full-shift exposure for employees in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30-minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each work area.

(2) * * *

(ii) The employer may demonstrate that employee exposures are below that action level and/or excursion limit by means of objective data demonstrating that the product or material containing asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals cannot release airborne fibers in concentrations exceeding the action level and/or excursion limit under those work conditions having the greatest potential for releasing asbestos, tremolite, anthophyllite, or actinolite.

(iii) Where the employer has monitored each asbestos, tremolite, anthophyllite, or actinolite job for the TWA, and where he has monitored after March 14, 1988, for the excursion limit, and the data were obtained during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy

the requirements of paragraph (f)(2)(i) of this section.

(4) *Termination of monitoring.* If the periodic monitoring required by paragraph (f)(3) of this section reveals that employee exposures, as indicated by statistically reliable measurement, are below the action level and/or excursion limit the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(g) * * *

(1) * * *

(i) The employer shall use one or any combination of the following control methods to achieve compliance with the TWA and/or excursion limit prescribed by paragraph (c) of this section: * * *

(ii) Wherever the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the TWA and/or excursion limit prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (h) of this section.

(3) *Employee rotation.* The employer shall not use employee rotation as a means of compliance with the TWA and/or excursion limit.

(h) * * *

(1) * * *

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the TWA and/or excursion limit; and

(i) * * *

(1) *General.* The employer shall provide and require the use of protective clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos, tremolite, anthophyllite, actinolite or a combination of these minerals that exceed the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(2) *Laundering.*

(i) The employer shall ensure that laundering of contaminated clothing is done as to prevent the release of airborne asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the TWA and/or excursion limit

prescribed in paragraph (c) of this section.

(ii) Any employer who gives contaminated clothing to another person for laundering shall inform such persons of the requirement in paragraph (i)(2)(i) of this section to effectively prevent the release of airborne asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(j) * * *

(1) * * *

(iii) Whenever food or beverages are consumed at the worksite and employees are exposed to airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the TWA and/or excursion limit, the employer shall provide lunch areas in which the airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals are below the action level and/or excursion limit.

(k) * * *

(1) * * *

(i) Warning signs that demarcate the regulated area shall be provided and displayed at each location where airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals may be in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(2) * * *

(vi) * * *

(A) Asbestos, tremolite, anthophyllite, or actinolite fibers have been modified by a bonding agent, coating, binder, or other material, provided that the manufacturer can demonstrate that, during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these mineral fibers in excess of the action level and/or excursion limit will be released, or

(3) * * *

(i) The employer shall institute a training program for all employees exposed to airborne concentrations of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals in excess of the action level and/or excursion limit and shall ensure their participation in the program.

(m) * * *

(1) * * *

(i) The employer shall institute a medical surveillance program for all employees engaged in work involving levels of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals at or above the action level and/or excursion limit for 30 or more days per year, or who are required by this section to wear negative pressure respirators.

(n) * * *

(1) * * *

(i) Where the employer has relied on objective data that demonstrates that products made from or containing asbestos, tremolite, anthophyllite, or actinolite are not capable of releasing

fibers or asbestos, tremolite, anthophyllite, or actinolite or a combination of these minerals, in concentrations at or above the action level and/or excursion limit under the expected conditions of processing, use, or handling to exempt such operations from the initial monitoring requirements under paragraph (f)(2) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

* * * * *

(o) * * *

(1) * * * The requirements in the amended paragraphs in this section which pertain only to or are triggered by the excursion limit shall become effective October 14, 1988.

(2) Start-up dates. The requirements of paragraphs (c) through (n) of this section, including the engineering controls specified in paragraph (g)(1) of this section, shall be complied with by January 16, 1987. Compliance with the excursion limit requirements in this section shall be as follows:

(i) Paragraphs (c), (d), (e), (f), (h), (i), (k), (l), (m), (n) of this section, shall be complied with by December 13, 1988.

(ii) Paragraph (g) of this section, shall be complied with by March 13, 1989.

(iii) Paragraph (j) of this section shall be complied with by September 14, 1989.

* * * * *

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