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Occupational Exposure to Asbestos;
Emergency Temporary Standard

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1910

(Docket No. H-0330)

Occupational Exposure to Asbestos

AGENCY: Occupational Safety and Health Administration (OSHA), Labor.**ACTION:** Emergency temporary standard.

SUMMARY: OSHA is issuing an emergency temporary standard (ETS) to reduce the permissible exposure limit (PEL) for asbestos from 2 fibers (longer than 5 micrometers) per cubic centimeter (2 f/cc) as an eight-hour time-weighted average, to 0.5 f/cc. During the period of the emergency standard, employers may use all practicable control methods, such as engineering controls, work practices and personal protective equipment to meet the new limit of 0.5 fibers per cubic centimeter (0.5 f/cc). Training programs are also required to be instituted within 30 days.

The basis for this ETS is OSHA's determination that continued employee exposure to asbestos under current conditions that exceed 0.5 f/cc presents a grave danger of developing asbestos-induced cancer and asbestosis to exposed employees, and that an emergency standard is necessary to protect them. The ETS serves also as a proposal to revise the current asbestos standard pursuant to section 6(b) and 6(c) of the Act.

This notice also requests comments on the appropriateness of including the provisions of the ETS as permanent revisions to the asbestos standard. In addition, OSHA will soon publish a separate notice of proposed rulemaking that further explains the issues under consideration for the permanent standard and which raises some additional issues regarding the application of certain provisions of the asbestos standard to the construction industry. That notice will invite public comments and will schedule a rulemaking hearing pursuant to Section 6(b) of the Act concerning the proposed permanent revision to the asbestos standard.

DATES: The effective date for this ETS is November 4, 1983. Comments and evidence concerning the proposed revisions to the permanent standard made by the ETS must be received on or before January 3, 1984. As noted, OSHA will publish a notice of proposed rulemaking shortly that will set due dates for submissions to the asbestos docket for the issues raised therein.

ADDRESSES: Written comments should be submitted to the Docket Officer, Docket No. H-0330, Room S-6212, U.S. Department of Labor, Third Street and Constitution Avenue, N.W., Washington, D.C. 20210.

FOR FURTHER INFORMATION CONTACT: James F. Foster, Director, Office of Information and Consumer Affairs, OSHA, U.S. Department of Labor, Room N-3637, 200 Constitution Avenue, NW, Washington, DC 20210. Telephone (202) 523-0151.

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I. Introduction

This is an emergency temporary standard (ETS) issued pursuant to section 6(c) of the Occupational Safety and Health Act of 1970 (the Act) (84 Stat. 1596; 29 U.S.C. 655), the Construction Safety Act (Pub. L. 91-54; 40 U.S.C. 333), the Longshoremen's and Harbor Workers Compensation Act (33 U.S.C. 941), the Secretary of Labor's Order No. 9-83 (48 FR 35736), and 29 CFR Part 1911. This emergency standard consists of revisions to the existing standard covering occupational exposure to asbestos, 29 CFR 1910.1001, in order to protect employees from a grave danger from continued exposure to asbestos at current exposure levels.

OSHA has determined that workers exposed to asbestos under exposure conditions existing under the current standard face a grave danger of developing incurable cancer and asbestosis. Further, OSHA has found that an immediate reduction in exposure levels to 0.5 f/cc or below is necessary to protect such employees from this grave danger. Therefore OSHA is issuing this ETS to compel reduced exposures to respond to this emergency situation.

OSHA's determination that a grave danger currently exists is predicated upon quantitative risk estimates in this record which point to a large number of excess deaths from cancer (and

asbestosis) among currently exposed workers which are attributable to continued exposures under present working conditions. OSHA estimated the number of cancer deaths avoided through lowering of the exposure to 0.5 f/cc, based on 6 months, 1-year, 20-year and 45-year periods of exposures at current levels.* The predicted cancer deaths avoided that result from these periods of exposure are respectively 210, 426, 5725 and 7815. A more detailed discussion of these estimates is found in the sections, Quantitative Risk Analysis (Section V), Grave Danger (Section III A), and Need for an ETS (Section III B). Risks of this magnitude at permitted and actual exposure levels defined a situation which demanded immediate regulatory action. Evaluation of the relevant scientific data, policy considerations and exposure patterns of workers has convinced OSHA that continued exposure at the current PEL and under actual workplace conditions constitutes a "grave danger" to employees, and that an ETS is needed to protect them.

The ETS requires that employees may not be exposed to concentrations of asbestos exceeding 0.5 f/cc on an 8-hour time-weighted average basis, and permits the employer to choose among engineering controls, work practices and respirators to reduce exposures to the new PEL. However, the requirement in § 1910.1001(c) to utilize feasible engineering controls and work practices to reduce exposure levels to 2 f/cc remains in effect under this temporary standard. The ETS also requires employers to institute a training program within thirty days of the effective date of this emergency standard. The training program will include instruction on respirator fitting and use, handling of asbestos, medical information, the relationship between smoking and lung cancer, and a review of the asbestos standard. The ETS applies to all industries covered by the Act, including "general industry", construction and maritime industries.

* OSHA is aware, of course, that Section 6(c) of the Act limits the effective time of an ETS to 6 months and OSHA concludes that a grave danger exists and an ETS is necessary even if OSHA focuses exclusively on this six month period. However, the Agency believes it is appropriate to calculate benefits deriving from an ETS using lifetime risks from 20 and 45 years of exposure to the PEL of 0.5 f/cc established by the ETS. Although the ETS expires within 6 months, Section 6(c) requires that rulemaking on a permanent standard also be completed within 6 months, so that there will be no gap in protection for exposed employees. In OSHA's experience and judgment, complying with this statutory directive and completing rulemaking for a permanent standard within 6 months of an ETS has and can be done.

As provided in 29 CFR 1953.22, the 24 States with their own OSHA-approved occupational safety and health plans are expected to adopt a comparable standard within 30 days of this publication date. These States 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.

Also, in response to the emergency conditions faced by exposed workers, OSHA is stepping up its enforcement activities in targeting workplaces where asbestos is handled.

The temporary provisions that are being added to the existing asbestos standard prescribes the major components of an occupational safety and health standard. In general, most of the current requirements remain unaffected by the emergency temporary standard. However, compliance with some requirements will be triggered by the new exposure limit of 0.5 f/cc instead of the former PEL of 2 f/cc. For example, requirements such as change rooms remain unaffected by the ETS and the trigger level for change rooms remains the former PEL of 2 f/cc (§ 1910.1001(d)(4)). However, the ETS requires that where concentrations may exceed the new PEL, the employer must post signs indicating such locations (§ 1910.1001(k)(6)).

OSHA based its decisions concerning appropriate provisions for the ETS on its determinations of the kind and degree of protective action needed to protect against a grave danger and the feasibility of instituting these provisions during the period of the ETS.

Under section 6(b) of the Act, OSHA will shortly schedule an informal rulemaking hearing on the proposed permanent changes to the standard. OSHA will also propose other revisions to the asbestos standard that will be explained in the separate notice of proposed rulemaking. Application of certain provisions of the asbestos standard to the construction industry will be raised at that time. OSHA anticipates that this notice will be published shortly. OSHA is now accepting written comments on those issues raised in the ETS which are relevant to revising the permanent rule. The Secretary must promulgate a section 6(b) standard no later than six months after publication of the emergency standard.

II. Legal Authority and Background

A. Legal Authority

Section 6(c) of the Act provides for immediately effective emergency temporary standards in certain circumstances. The Secretary has the authority to issue such a standard, without rulemaking, "if he determines (A) that employees are exposed to grave danger from exposure to substances or agents determined to be toxic or physically harmful or from new hazards, and (B) that such emergency standard is necessary to protect employees from such danger." 29 U.S.C. 655(c)(1). Thus, the danger must be "from" worker exposure and it must be "grave," not merely significant and the regulation must be "necessary" to address "such danger," not merely reasonably necessary or appropriate to provide safe employment. In addition, as in section 6(b) permanent standards, OSHA may impose requirements in the emergency standard only to the extent that they are "feasible" within the meaning of section 6(b)(5) of the Act.

The Fifth Circuit has emphasized the importance of the severity of health effects in OSHA's consideration of whether an ETS is appropriate:

... the danger of incurable, permanent, or fatal consequences to workers, as opposed to easily curable and fleeting effects on their health, becomes important in the consideration of the necessity for emergency measures to meet a grave danger." *Florida Peach Growers Association, Inc. v. United States Department of Labor*, 489 F.2d, 132 (CA5).

OSHA also has interpreted relevant judicial decisions to require that its evaluation of the gravity of the danger and the necessity for emergency action must be made in the context of actual workplace conditions.

B. Background

1. *Events Leading to the ETS.* In June, 1983, OSHA received a petition for an ETS from the International Association of Machinists and Aerospace Workers (Exs. 84-244). Subsequently letters supporting this petition were received from 16 other unions (Ex. 84-284 to 84-294, 84-387 to 84-391). The petition requested an ETS to reduce the PEL to 0.1 f/cc, to modify some existing work practice requirements, and to require other protective provisions regardless of exposure level. The main reasons set forth in the petition and supporting letters are that continued exposure under current workplace conditions constitutes a grave danger and that delaying remedial action until a permanent standard is promulgated would cost large numbers of currently-

exposed workers their lives. OSHA shares the genuine concern expressed by the petition and letters from unions representing thousands of employees who are directly faced with the threat of asbestos-related disease from continued exposure. And OSHA concludes that failure to issue this ETS may cost a number of exposed workers their lives.

In August 1983, OSHA completed a comprehensive risk assessment based on numerous human studies which estimated the number of excess deaths from the three major asbestos-related cancers, i.e., lung cancer, mesothelioma and gastrointestinal cancer, at the current permissible exposure level of 2 f/cc and at various reduced exposure levels. OSHA placed this document, "Quantitative Risk Assessment for Asbestos-Related Cancers", in the Asbestos docket in August 1983 (Ex. 84-349). OSHA subsequently revised this document (Sec Ex. 84-392).

2. *History of the Asbestos Standard.* OSHA has regulated asbestos since 1971. A 12 f/cc limit for asbestos was included in the initial promulgation of OSHA standards pursuant to section 6(a) of the Act, on May 29, 1971 (36 FR 10466). In response to a petition by the Industrial Union Department of the AFL-CIO, OSHA issued an ETS on asbestos on December 7, 1971, which established a PEL of 5 f/cc on a time-weighted average basis and peak exposures of 10 f/cc.

The current standard, promulgated in June 1972, first established an 8-hour time-weighted average PEL of 5 f/cc and a ceiling limit of 10 f/cc. The limits were intended primarily to protect employees against asbestosis, and it was hoped that they would provide some incidental degree of protection against cancer. Effective July 1976, the TWA limit was reduced by the standard to 2 f/cc. This limit has remained in effect since that time. The standard also includes provisions covering methods of compliance, monitoring, medical surveillance and housekeeping.

Court review of this standard upheld all major provisions, but remanded two issues for OSHA's reconsideration. *JUD v. Hodgson*, 499 F.2d 467 (CA DC 1974). These issues were whether the July 1976 date for the 2 f/cc standard should be accelerated for some industries and the adequacy of the 3 year retention period for exposure monitoring records. Subsequently, OSHA increased this retention period to 20 years (41 FR 11504) and the acceleration issue became moot.

After reviewing the then available scientific data, in October 1975 OSHA published a notice of proposed

rulemaking to revise the asbestos standard because OSHA believed that "sufficient medical and scientific evidence had been accumulated to warrant the designation of asbestos as a human carcinogen" and that advances in monitoring and protective technology made reexamination of the standard "desirable." This proposal would have reduced the time-weighted average to 0.5 f/cc and imposed a ceiling limit of 5 f/cc for 15 minutes (40 FR 47652).

The basis for the 1975 proposal's reduced permissible level of 0.5 f/cc was OSHA's then current policy for carcinogens that no safe threshold level was demonstrable and, therefore, the Act required OSHA to set the PEL as low as technologically and economically feasible. This policy was rejected by the Supreme Court in the benzene decision (*UD vs. API*, 448 U.S. 607 (1980)). OSHA limited the proposed revisions in the 1975 notice to all industries except construction. No hearing was scheduled on the 1975 proposal. Also, although OSHA announced its intention to develop a separate proposed revision applicable to the construction industry, no such proposal has been published to date.

OSHA is basing its present decision to issue an ETS, and to propose revisions to the permanent standard covering all employees, on information and analyses which postdate the 1975 proposal. Therefore, this ETS marks a new regulatory initiative, related to, but not part of the 1975 proceeding. On May 24, 1983, OSHA consulted the Construction Advisory Committee for Occupational Safety and Health (CACOSH) concerning applicability of a new asbestos standard for the construction industry. CACOSH endorsed OSHA's position that changes in the PEL made for general industry should also apply to the construction industry. OSHA is also including the comments and data received in response to the 1975 notice in the record of this proceeding, with the understanding that some commenters may have changed their positions based on intervening scientific developments and policy shifts.

In the decision to issue an ETS, the Agency has reviewed this regulatory history of asbestos. However, the Agency bases the decision to issue an ETS on the actual emergency conditions which now confront exposed workers, on epidemiologic studies that provide data to make numerical estimates of risks and on interpretations of these studies using quantitative risk analysis.

3. *The Rulemaking to Revise the Permanent Standard.* The 6(b) rulemaking initiated by this proposal is intended to be limited to the revisions

made by the ETS and the additional proposed amendments raised in the notice of proposed rulemaking to be published soon. The major subjects of the 6(b) rulemaking will be: reducing the permissible exposure limit, revising the definitions of asbestos and asbestos fibers, reassessing the methods of compliance to achieve such limits, revising the provisions regarding respirator selection, revising the sampling and analytical method to improve reliability, and adding a training requirement. OSHA will also raise issues regarding the application of the permanent standard to the construction industry. As previously stated, OSHA will soon publish a separate notice of proposed rulemaking to further explain these issues.

The medical, epidemiological and statistical studies cited by OSHA to support their issuing this ETS are not included in this copy. The sections not in this copy are:

- III OSHA Rationale for the ETS 51088
 - A Grave Danger 51088-51091
 - B Need for an ETS 51091-51099
- IV Occupational Health Data 51099-51122
- V Quantitative Risk Analysis 51122-51132

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at Page 51132:

VI. Technical and Economic Feasibility

Based on an evaluation of evidence contained in the record, OSHA finds that the provisions required by the ETS are technically and economically feasible. OSHA has examined the various industries and work operations impacted by the standard and their ability to comply with the provisions of the ETS. Because the ETS requires prompt reduction of risk, OSHA

assessed the industry's ability to implement the required controls immediately.

The ETS allows considerable flexibility in achieving the PEL. As a result, three options are available to lower the asbestos fiber concentrations to which workers are exposed: (1) Engineering controls such as automatic bag opening devices, specialized vacuum equipment and increased ventilation; (2) work practices, such as wet treatment of the asbestos material and increased clean-up of the work place, and (3) use of approved respirators. Due to the emergency nature of this action which requires immediate response to reduce worker exposure, OSHA assumes that respirators will be the initial method used to comply with the ETS. A full discussion of the technological and economic feasibility of the alternative methods for each industry and for the various PELs under consideration for revising the permanent standard will accompany the proposal which will be published separately.

OSHA believes that, consistent with the estimates of current exposure levels, engineering controls are currently in place and work practices, in operation which, if applied conscientiously, would immediately result in concentrations at least as low as 0.5 in many industries (Ex. 84-282; Ex. 84-283; Ex. 84-9 and Ex. 84-295). For purposes of assessing the technological and economic feasibility, however, OSHA assumed a worst-case scenario in which each industry segment would have to implement a respirator program in order to achieve immediate reduction in worker exposure levels below the estimated current

concentrations. Furthermore, for purposes of worst-case analysis, OSHA assumed that none of these industries has any respirator program except for the shipbuilding and construction segments. OSHA makes this assumption because OSHA estimates that most workers in industries other than shipbuilding and construction are exposed to eight-hour time-weighted averages less than 2 f/cc, and the OSHA standard issued in 1972 only requires a respirator program when engineering controls and work practices cannot bring exposures to 2 f/cc. To the extent that some firms do have an existing respirator program the costs are overestimated.

A. Technical Feasibility

The following table presents the assumptions OSHA made regarding the respirator program elements required by each industry to obtain a PEL of 0.5 f/cc. The types of respirators needed for each industry sector were determined using the respirator selection table in the ETS with reference to the estimated current exposure conditions. OSHA assumed that the least costly approved respirator would be selected. For example, where industries have exposures less than ten times the PEL, OSHA anticipated that disposable respirators would be purchased, because of their lower short-term costs. When exposures exceeded ten times the PEL, OSHA assumed that some plants would either use air line respirators, or full facepiece respirators, depending upon the operation. To the extent that firms choose a higher-cost respirator to increase the protection factor or durability, respirator costs may

be understated. Furthermore, OSHA has not included in the cost analysis a consideration for lost worker productivity due to wearing respirators. Costs may be understated by whatever amount productivity is reduced. Other anticipated respirator program elements required to determine costs for the ETS are listed below. These elements are derived from the existing provisions found in the Asbestos Standard, 29 CFR 1910.1001 and the standards for respirators, 29 CFR 1910.134.

All of the required respirators and filters are readily available and can be purchased through local distributors. Since the program relies mostly on disposable respirators, OSHA considers that there will be no supply constraints. As the worst-case (or high) estimate, OSHA assumes that approximately 50,000 workers will wear respirators because of the ETS who did not previously wear respirators. OSHA has concluded that the use of respirators will be effective in providing improved worker protection during the period of the ETS. In addition to encouraging generally more widespread use of respiratory protective measures, the ETS will stimulate a heightened understanding of the health hazards from asbestos exposure and will result in more effective use programs and strategies. Issues involving the appropriateness of respirator use as a long-term solution to controlling asbestos exposures are raised in the section 6(b) rulemaking proceeding (see Ex. 84-345, 84-346, 84-347, 84-348).

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TABLE 16
Anticipated Respirator Program Elements Required to Meet PEL

Industry Segment	Anticipated Type of Respirators Used to Meet the PEL	Other Program Elements
<u>Primary Manufacturing</u>	1 disposable/worker/day	Full admin. costs ^b
A/C Pipe & Sheet	2 air-line/plant (for high concentration situations) ^a	Fit Test ^c
Friction Materials		Training ^d
Asbestos Paper Gaskets	1 disposable/worker/day for portions exposed at 0.75	50% admin. costs Fit Test Training
Floor Tile	(Nothing for PEL of 0.5)	
Paints, Coatings and Sealants	1 disposable/worker/day for 75% of workers	75% admin. costs Fit Test Training
<u>Textiles</u>		
Wet Process	1 disposable/worker/day	Full admin. costs Fit Test Training
Dry Process	1 disposable/worker/day	Full admin. costs Fit Test Training
<u>Secondary Fabricators</u>	1 disposable/worker/day	1% admin. costs
Cement Sheets, Paper Products, Packing and Gaskets	2 air-line/plant for high concentration situations	Fit Test Training
Textiles	1 disposable/worker/day	1% admin. costs Fit Test Training
<u>Automotive Aftermarket</u>	1 disposable/worker/day	1% admin. costs
Rebuilding and Refacing	1 air-line/plant	Fit Test Training

Respirator Program Requirements (Cont.)

Industry Segment	Anticipated Type of Respirators Used to Meet the PEL	Other Program Elements
Brake Repair Gasoline Stations	Nothing Nothing	
Shipbuilding/Repair Shipbuilding	Nothing	20% of admin. costs Fit Test
Ship Repair	1 disposable/worker/day for 20% of total workforce	Training
Construction Installation A/C Pipe A/C Sheet	1 disposable/worker/day	10% admin. costs Fit Test Training
Roofing Felts	Nothing	
Demolition/Renovation	1 HEPA full face for 25% of the workforce	25% admin. costs Fit Test Training
Repair & Maintenance	Nothing	

^aOSHA assumes that certain jobs such as cleaning of vacuum equipment will produce exposure levels greater than 10 times the PEL. Consequently, OSHA assumes 2 air line respirators will be required per plant except for small operations which will require only one air-line respirator per plant.

^bAdministrative costs represent the salary of one full time professional at \$30,000 per annum and one full time clerk at \$15,000 per annum. OSHA has adjusted administrative costs to represent expected reasonable time spent administering a respirator program in each industry. In the secondary fabrication and automotive aftermarket sectors, for example, OSHA anticipates that supervisors will spend 15 minutes a day distributing and monitoring the use of disposable respirators. These sectors have far less of a management burden than large firms, and thus, administrative costs are calculated at 1 percent of the full administrative amount. OSHA believes that administrative costs have been overstated in most segments in order to present a worst case scenario.

^cOSHA assumes that every employee must be fit tested for respirator use at a cost of \$21 per employee.

^dOSHA has allowed 3 hours for respirator and asbestos training. OSHA considers that this is very liberal, especially in industry segments characterized by small plants and by the use of disposable respirators. Costs for this element are therefore overstated to present the worst-case scenario.

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OSHA also examined the feasibility of analytical methods for measuring asbestos air concentrations at the 0.5 f/cc limit established by the ETS. OSHA's existing standard requires that all measurements of airborne concentrations of asbestos fibers be made by the membrane filter method at 400-450 $\times$ (magnification) (4 millimeter objective) with phase contrast illumination [29 CFR 1910.1001(e)]. After reviewing the relevant evidence made available since the 1975 proposal, OSHA finds that phase contrast microscopy is a feasible and effective method for measuring airborne asbestos fibers to determine compliance with the permissible exposure levels set by the Emergency Temporary Standard.

The most important issue raised by comments to the 1975 notice is whether phase contrast microscopy analysis is capable of reliably measuring airborne concentrations of 0.5 fibers/cc and less. OSHA acknowledges that asbestos airborne measurement procedures using phase contrast microscopy, as with any industrial hygiene analytical procedure, inherently contains several error sources. These errors have been statistically evaluated by Leidel et al. (Ex. 84-62), and, in 1979, by the Air Monitoring Committee of the Asbestos Information Association/North America, referred to herein as AIA (Ex. 86-002) both using round-robin sample exchange data. Chatfield also examined this question (Ex. 84-319). In the Leidel et al. and the AIA evaluations, the error, measured as a coefficient of variation (CV), was found to be related to the number of particles counted from the filter. For 100 fibers counted Leidel, et al. found a CV of 0.12, whereas the AIA report found a CV of 0.35¹ or errors associated with interlaboratory-intrafilter variability.

Based upon these studies, taken at their face value, it appears that the phase contrast microscope analysis is capable of reasonably reliable measurements at 0.5 fibers/cc. As stated in the AIA report (Ex. 86-002, p. AB-2), "The calculated results indicate that the

95% confidence limits on a measured 8-hour TWA can be relatively constant with a wide, but usable, range down to concentrations approaching 0.5 fibers/cc [less than] 5M."

The AIA report shows a higher error than does the Leidel et al. report. One possible reason for this difference may be that the AIA report assessed the variability in measurements as they are being made today by the many laboratories who are making the measurements. For example, only 27 of the 46 laboratories participated in the PAT program and no counting guidelines were given, whereas, the Leidel et al. report included only a small number of laboratories operated by Johns Mansville Company, that probably used very similar procedures and conducted similar training.

In late 1982, Chatfield prepared a report entitled "Measurement of Asbestos Fibre Concentrations in Workplace Atmospheres" for the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario (Ex. 84-319). Chatfield analyzed intra- and inter-laboratory variability and arrived at conclusions somewhat similar to those of AIA and Leidel. Chatfield also recommended methods by which the accuracy and precision of phase contrast microscopic analytical techniques could be improved. Significantly, he noted "in view of the number and frequency of measurements required, there is currently no fully developed alternative method [to phase contrast microscopy] which could be immediately implemented."

OSHA notes that the authorities cited above believe that it may be possible to reduce phase contrast microscopy errors if improved and standardized procedures are followed, perhaps by adding requirements to the standard. It does not appear, however, that improvements of this nature can be quickly made in the immediate format of this ETS. Therefore, based on the evidence before it at the time of issuance of this emergency standard, OSHA believes that it is generally not possible to measure asbestos concentrations below 0.5 f/cc reliably and reproducibly using phase contrast microscopy under current laboratory practices. OSHA finds that the phase contrast microscopy method can be feasibly used to measure asbestos air concentrations down to 0.5 f/cc.

B. Economic Feasibility

The industry costs based on the program elements described in Table 16 are presented in Table 17. For the ETS, the costs of asbestos training are included with respirator training. Costs for warning signs are not included, since, for the purposes of the ETS, these signs could be hand-made at very low costs. OSHA did not analyze costs associated with the alternate benefits scenario (See Table 4) since that scenario was constructed to show a lower range of benefits but does not represent an estimate of current industry practice.

The costs are overstated to the extent that some firms already have a current respirator program and to the extent that careful application of existing engineering controls and work practices would reduce concentrations to the PEL in some firms and thereby make respirator use unnecessary. Furthermore, the costs assume that dust masks and filters will have to be replaced every 8-hour day. Some of this cost (i.e., the disposable respirators, filters and administrative overhead) can be in fact spread over the period during which the ETS is in effect.

Finally, the costs assigned to the Shipbuilding/Repair and Construction-Demolition/Renovation segments represent cost which reflect increased compliance with current obligations (e.g. increased respirator use to meet the current standard as a result of the ETS training requirements) and are not directly attributable to the ETS.

Note.—OSHA anticipates that the ETS will spur many employees who previously were not in compliance to expend the necessary resources in order to come into compliance with the ETS.

The total cost is estimated at \$35,565,402 for 6 months. This translates into an average cost per employee of \$708. Average 6 month costs per worker presented on an industry basis in Table 17 range from \$251 in the automotive aftermarket segment to \$973 in the construction segment. These costs are not a large portion of industry shipments as presented in Table 18. Moreover, firms in these industries will be able to pass the costs forward because asbestos substitutes in most industries are not immediately available. For all these reasons, OSHA finds that the ETS is economically feasible.

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¹ The AIA report also reports a separate CV for overall variability in the sample evaluation step plus "random variability in the sample collection step." This "random variability of sample collection" as described in this study may be a measure of the true difference in air concentrations from one location to the next and may not be a measure of random variability. A more carefully designed sampling strategy with precise control of instrumentation placement, air currents, and dust generation is necessary to eliminate differences in airborne dust concentrations from one location to another.

Table 17

Estimated Costs of Respirator Program
for ETS with PEL of 0.5

Industry Segment	Total Costs (\$)		6-mo. average Cost/employee
	1 - year	6 - months	
Primary manufacturing	6,404,965	4,143,242	461
Secondary Fabricators	13,547,224	9,435,532	546
Automotive Aftermarket	1,620,197	1,027,864	251
Shipbuilding/repair	626,286	324,526	533
Construction	<u>36,329,740</u>	<u>19,634,236</u>	<u>973</u>
Total	58,528,412	34,565,402	708

Table 18

ETS Compliance Costs Compared
to Sales by Industry Segment

Industry Segment	Cost/Sales
Primary Manufacturing	.003
A/C Pipe & Sheet	.002
Friction Materials	.008
Asbestos Paper	.003
Paints, Coatings and Sealants	.005
Gaskets, Seals and Packings	.001
Textiles	.014
Secondary Fabricators	.011
Cement Sheets	.072
Paper Products	.011
Packings and Gaskets	.010
Textiles	.014
Automotive Aftermarket	
Rebuilding and Refacing	.0004
Shipbuilding/Repair	.0001
Construction	.0004

Note: Sales values are for 1977 and 1978. Values for Primary Manufacturing and Secondary Fabricators were taken from 84-003; values for the Automotive Aftermarket were taken from U.S. Industrial Outlook, 1983; and values for Shipbuilding/Repair and Construction were taken from the 1982/83 Statistical Abstract. The value for Construction was adjusted by subtracting the value for Highway & Streets and Residential and adding the value for Demolition/Wrecking.

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VII. Environmental Impact, Requirements of Executive Order 12291, and the Regulatory Flexibility Act

The National Environmental Policy Act (NEPA) of 1969 (U.S.C. 4321 et seq.), as implemented by the guidelines (40 CFR Part 1500) of the Council on Environmental Quality (CEQ), requires that federal agencies assess their regulatory actions to determine if there is a potential for a significant impact on the quality of the human environment and, if necessary, to prepare an environmental impact statement.

In accordance with these requirements and DOI, NEPA regulations (29 CFR Part 11 [Subpart B, 11.30 (a) (4)]) OSHA had determined that because of the emergency nature of this standard, no environmental impact statement will be prepared for the ETS. The courts have held that NEPA does not require advance preparation of an environmental impact statement for an OSHA ETS (*Dry Color Manufacturing Association v. U.S. Department of Labor* 486 F.2d 98, 107 (3rd Cir. 1973)). OSHA will assess, however, the environmental effects of the proposed permanent regulation of asbestos. The results of this study will be available for review and comment prior to the hearings on the proposed permanent standard and will be an appropriate issue for discussion at the public hearing.

In the interim, OSHA welcomes any comments on any environmental effects that might occur as a result of promulgation of a rule on asbestos.

Pursuant to the authority of Section 8(a)(1) of Executive Order 12291 OSHA has not prepared a Regulatory Impact Analysis of this ETS. Preparation of such an analysis was not practicable for OSHA to perform in time to issue this ETS to respond to the grave dangers faced by asbestos exposed workers. OSHA, however, is completing a Preliminary Regulatory Impact Analysis of the proposal to revise the permanent standard which will be made public at the time the proposal is published.

The Regulatory Flexibility Act requires an agency to prepare a Regulatory Flexibility Analysis only for those rules for which a notice of proposed rulemaking is published. OSHA's issuance of an ETS therefore is not covered by the Regulatory Flexibility Act because the OSHA Act provides that ETS's be issued without regard to notice, public comment and other requirements in the Administrative Procedure Act. The proposal to revise the permanent asbestos standard, however is subject to the requirements of the Regulatory Flexibility Act and OSHA will evaluate

the proposal to ascertain whether analysis under the Regulatory Flexibility Act is required.

VIII. Summary and Explanation of the ETS

The requirements of this emergency temporary standard are set out in a new paragraph, § 1910.1001(k). They are limited to additional provisions to the existing asbestos standard which OSHA considers essential and feasible to protect employees from the grave danger resulting from asbestos exposure until OSHA can promulgate more comprehensive revisions in accordance with section 6(b) of the Act. The major changes in the standard made by the ETS are: (1) The new permissible exposure level; (2) methods of compliance permitted to achieve the new level; and (3) a requirement for the establishment of training programs within 30 days. The following section discusses the major provisions of the ETS, the necessity for including these provisions in the ETS, and some additional provisions to trigger certain requirements at the reduced permissible level of 0.5 f/cc.

1. *Paragraph (k)(1) Scope.* As part of the ETS, OSHA is adding a paragraph on the scope of the standard. The paragraph is intended to make clear that the emergency standard applies to all workplaces where employees may be exposed to asbestos in all industries covered by the current asbestos standard i.e. general industry, construction and maritime.

2. *Paragraph (k)(2) Permissible level of exposure.* As part of the ETS, OSHA is adding paragraph (k)(2) which sets a new PEL, effective immediately, of 0.5 f/cc on an 8 hour time weighted average basis. This reduced level may be achieved by any feasible combination of engineering controls, work practices and respiratory protection in order to allow employers to institute effective measures to reduce employee exposures immediately.

OSHA chose 0.5 f/cc as the permissible exposure level primarily because it believes that reducing employee exposures to 0.5 f/cc in all industries will greatly reduce the risk of developing asbestos induced cancers, primarily lung cancer, mesothelioma and gastrointestinal cancer. As set out in the discussion on "grave danger" and "benefits", the number of lives OSHA believes may be saved through an immediate reduction of exposure to 0.5 f/cc is substantial.

OSHA also believes that the 0.5 f/cc level is appropriate for several other reasons. First, because an emergency standard must be feasible, and

employers must be able to comply with the standard in a short period of time, OSHA has set a level which is likely to be achieved immediately, using equipment and control techniques that are currently available.

Second, OSHA believes, based on the data generated by OSHA's contractor, Research Triangle Institute, that some workplaces, especially in the manufacturing sector, may be close to achieving a 0.5 f/cc level through the more rigorous use of engineering controls, work practices and housekeeping methods which are now in place. OSHA encourages employers to continue their efforts to implement these methods in order to assure that, for the long term, the most comprehensive and effective program of protection from asbestos exposure will be provided.

Third, OSHA believes that reliability of the currently required asbestos measurement methods to measure asbestos exposures less than 0.5 f/cc should be open for discussion during a rulemaking hearing, rather than imposed through an ETS. OSHA has therefore not adopted the 0.1 f/cc level petitioned by the unions but instead is considering adding provisions to the asbestos standard that may improve the reliability of both sampling and analysis in the 6(b) rulemaking for the permanent standard and thus allow lower levels to be reliably measured.

3. *Paragraph (k)(3) Methods of compliance.* The ETS adds a new paragraph (k)(3), which permits employers to reduce the permissible exposure limit from the current 2 f/cc limit to the 0.5 f/cc limit by any feasible combination of engineering controls, work practices and respiratory protection. The current requirement in paragraphs (c)(1) and (c)(2) to first utilize engineering controls and work practices to reduce exposure levels to 2.0 f/cc remains unaffected by this ETS.

Flexibility in choosing compliance strategies for the period of an ETS has been incorporated in most other previously issued emergency standards. The policy reflects OSHA's determination to craft emergency standards that are truly responsive to emergency conditions and which afford immediately available protection to affected workers.

4. *Paragraph (k)(4) Employee information and training.* The ETS adds a paragraph to the asbestos standard requiring the employer to provide a training program within 30 days of publication of the emergency standard for all employees whose exposures are reasonably expected to exceed the PEL of 0.5 f/cc, without regard to the use of

respirators, and to assure that all such employees participate in the program and are informed of specified categories of information. OSHA considers this provision to be "necessary" within the meaning of section 6(c) of the Act, to reduce the grave danger faced by asbestos exposed employees. The absence of a training program requirement in the asbestos standard has been pointed out as one of the serious deficiencies of the current standard. OSHA believes that participation in an adequate training program is essential for the protection of employees because most protective provisions enlist the employee as an active participant. For example, many employees handling asbestos depend on effective work practices. Without training in applying these work practices, employee protection would be inadequate. Where the employee plays a more passive role in his protection such as where engineering controls are relied on, training is also essential, because the employee must know the sources of workplace asbestos contamination, and the health hazards of asbestos exposure, in order to assess his own exposure situation and to help recognize when engineering controls are not operating properly. Certainly where housekeeping plays an important role in control, instruction about housekeeping methods, for example, frequent vacuuming, is essential. Perhaps most importantly, where employee protection depends upon respirator use, OSHA's experience shows that training employees in the use, fitting and limitations of respirators is critical to the effectiveness of respirator protection. Accordingly this requirement applies where airborne concentrations are reasonably expected to exceed 0.5 f/cc, even if employees use respirators to reduce breathing zone concentrations and thereby comply with the ETS.

As set forth in paragraph (k)(4) the employer must inform the employee of the health effects of asbestos exposure; the relationship between asbestos and smoking in producing lung cancer; the operations exposing employees to asbestos fibers and necessary protective steps to minimize exposure; the purpose, proper use, fitting instructions and limitations of respirators, and the contents of all the provisions of the Asbestos Standard at 1910.1001.

5. Paragraph (k)(5) *Respiratory protection during the ETS.* The ETS adds a new paragraph (k)(5) which includes a table which ties respirator selection to the 0.5 f/cc PEL. Under the ETS, the concentration cut-offs for various kinds of respirators are

multiples of the reduced PEL of 0.5 f/cc, rather than multiples of the previous 2 f/cc permissible limit. For example, approved air purifying respirators may be used only where asbestos concentrations are not expected to exceed 5 f/cc (10 x the PEL). Before the ETS, because the PEL was 2 f/cc, such respirators could be used where asbestos concentrations would not have exceeded 20 f/cc (10 x the PEL of 2 f/cc).

Similarly, powered air purifying respirators may be used where asbestos concentrations do not exceed 100 times the PEL, which at the new level of 0.5 f/cc is 50 f/cc. Previously, employers could have used such respirators at concentrations up to 200 f/cc.

It is likely that the main impact of the reduced PEL on respirator choice will be in operations and industries where exposure levels are between 5 f/cc and 20 f/cc. Formerly, employees exposed in this range could use half-mask air purifying respirators; now they must be protected by a powered air purifying respirator or a full facepiece respirator, or they may use a supplied air respirator.

6. Paragraph (k)(6). *Warning signs during the ETS.* The ETS requires that legible signs warning of the health hazards of asbestos be displayed at locations where airborne concentrations of asbestos fibers exceed the reduced exposure limit of 0.5 f/cc. No specific legend is required signs for newly posted during the ETS. OSHA wishes to make as practicable as possible the rapid posting of signs, especially in workplaces where there has been previous non-compliance and in areas where asbestos concentrations were formerly below the 2.0 f/cc PEL.

XI. Public Participation

Interested persons are invited to submit written data, views and arguments with respect to the revisions to the asbestos standard made by the ETS. These comments must be postmarked on or before January 3, 1984 and sent to the Docket Officer, Docket No. H-033C, Occupational Safety & Health Administration, U.S. Department of Labor, 200 Constitution Avenue, NW., Room S-6212, Washington, D.C. 20210.

The data, views and arguments that are submitted will be available for public inspection and copying at the above address. All timely written submissions will be made a part of the record of the proceeding.

List of Subjects in 29 CFR Part 1910

Occupational safety and health, Asbestos, Health, Emergency temporary standard, Cancer.

Authority and Signature

This document was prepared under the direction of Thorne G. Auchter, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210. Pursuant to Sections 6(b), 6(c), 8(c) and 8(g) of the Act, 29 CFR 1910.1001 is amended by adding a new paragraph (k) as set forth below.

(Secs. 6(b), 6(c), 8(c) and 8(g). Pub. L. 91-590, 84 Stat. 1593, 1596, 1599, 1800; 29 U.S.C. 655, 657; Sec. 107, Pub. L. 91-54, 83 Stat. 96 (40 U.S.C. 333); 29 CFR Part 1911; Secretary of Labor's Order No. 9-83 (48 FR 35738))

Signed at Washington, D.C., this 2nd day of November 1983.

Thorne G. Auchter,
Assistant Secretary of Labor.

PART 1910—[AMENDED]

Section 1910.1001 of Part 1910 of Title 29 of the Code of Federal Regulations is hereby amended by adding a new paragraph (k) reading as follows:

§ 1910.1001 Asbestos.

(k) *Emergency temporary standard effective November 4, 1983.*—(1) *Scope.* This emergency temporary standard is issued pursuant to section 6(c) of the Act and applies to all workplaces where employees may be exposed to asbestos in all industries covered by the Act, including, general industry, construction and maritime. Except to the extent modified by this emergency temporary standard all provisions of § 1910.1001 remain in effect.

(2) *Permissible levels of exposure.* The 8-hour time-weighted average airborne concentration of asbestos fibers to which any employee may be exposed shall not exceed one-half (0.5) fiber, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) *Methods of compliance with the emergency temporary standard.* Notwithstanding any other requirements of this section, compliance with the reduced exposure limit of 0.5 f/cc shall be achieved by any feasible combination of engineering controls, work practices, and personal protective equipment and devices.

(4) *Employee information and training.*—(i) As soon as possible, but not later than thirty (30) days from the effective date of this emergency temporary standard, the employer shall institute a training program for all employees exposed to airborne concentrations of asbestos in excess of

0.5 f/cc, without regard to the use of respirators and shall assure their participation in the program during the effective period of this emergency temporary standard.

(ii) The employer shall assure that each such employee is informed of the following:

(A) The health effects associated with asbestos exposure;

(B) The relationship between asbestos and smoking in producing lung cancer;

(C) The nature of operations which could result in exposure to asbestos and necessary protective steps to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping and protective clothing;

(D) The purpose, proper use, fitting instructions and limitations of respirators permitted by the standard; and

(E) A review of all the provisions contained in 1910.1001.

(5) *Respiratory protection during the ETS.* Notwithstanding any other requirement of this section, where respirators are used to achieve the permissible exposure limit of 0.5 f/cc they shall be selected according to Table 1.

(6) *Warning signs during the ETS.* In addition to the requirements of

paragraph (g)(1) of this section, legible signs warning of the health hazards of asbestos shall be provided and

displayed at each location where airborne concentrations of asbestos fibers may exceed 0.5 f/cc.

TABLE 1

Respiratory Protection

For Airborne Concentrations of Asbestos

Airborne Concentration of Asbestos (TWA)	Required Respirator ¹
Not in excess of 5 f/cc (10 X PEL)	Reusable or single use air purifying respirator
Not in excess of 50 f/cc (100 X PEL)	Full facepiece air purifying respirator, or a powered air purifying respirator
Greater than 50 f/cc	A type "C" continuous flow or pressure demand, supplied air respirator.

¹ Respirators specified for high concentrations may be used at lower concentrations of asbestos.

(Secs. 6(b), 6(c), 8(c) and 8(g), Pub. L. 91-596, 84 Stat. 1593, 1596, 1599, 1600; 29 U.S.C. 655, 657; Sec. 107, Pub. L. 91-54, 83 Stat. 98 [40

U.S.C. 333]; 29 CFR Part 1911, Secretary of Labor's Order No. 9-83 (48 FR 35736))

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