

October 1986
EMPLOYEE TRAINING PROGRAM
FOR ASBESTOS

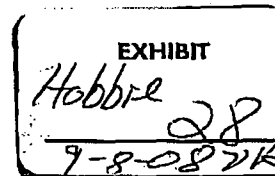
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ROGER REGILL

EATON CORPORATION
Gallatin, Tennessee

INTRODUCTION

Effective July 21, 1986, the Occupational Safety and Health Administration (OSHA) amended its standard regulating occupational exposure to asbestos. Among the changes, the permissible exposure limit was lowered from 2 fibers per cubic centimeter of air (fibers/cc) down to 0.2 fibers/cc. Through this facility's efforts prior to the standard being amended, the exposure levels for employees working with asbestos have been reduced to below the permissible exposure limit, as demonstrated by the semiannual exposure monitoring program conducted here. The purpose of this training program is to review the requirements of the standard, to discuss in detail certain parts of the standard pertinent to the employees of this facility, such as the facility's respirator policy and medical surveillance program, and to discuss the specific procedures, work practices, and engineering controls implemented by this facility in order to continue to achieve compliance with the OSHA Standard and to protect the health of employees. Additionally, this training program will present information on the health effects associated with asbestos exposure and the relationship between smoking and exposure to asbestos in producing lung cancer.

The standard as amended addressed asbestos and the non-asbestos forms of tremolite, anthophyllite, and actinolite. On October 17, 1986, OSHA issued a partial administrative stay of the revised standard, in which the regulation of non-asbestiform tremolite, anthophyllite, and actinolite under the revised standard was stayed and the provisions of the 1972 standard remained in effect for these non-asbestos forms. However, for the purpose of this training program, whenever the term "asbestos" is used, it may be considered to also include the non-asbestiform tremolite, anthophyllite, and actinolite.



P-EAT-0323

EAB 018689

SCF-EC-3225

HEALTH EFFECTS ASSOCIATED WITH ASBESTOS EXPOSURE

Asbestos is a widely used class of magnesium-silicate minerals that occur in fibrous form. It is used as a component of many products and materials because of its beneficial properties, such as durability and resistance to heat and chemicals. However, asbestos also has a detrimental property; it can cause disease.

The inhalation of asbestos fibers has been clearly associated with three clinical conditions: asbestosis, mesothelioma and lung cancer. Many studies have also observed increased gastrointestinal cancer risk. Risk from cancer at other sites, such as the larynx, pharynx, and kidneys, is also suspected.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is based on a history of exposure to asbestos, the presence of characteristic radiologic changes, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening are observed on X-rays taken during the early stages of the disease. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

Initial exposure limits for asbestos were based on efforts to reduce asbestosis, which was known to be associated with asbestos exposure. The reduction in the number of cases of asbestosis, however, resulted in workers living long enough to develop cancers that are now recognized as being associated with asbestos exposure.

The signs and symptoms of lung cancer and gastrointestinal cancer induced by exposure to asbestos are similar to non-asbestos-related cancers of these types, except that a chest X-ray of an asbestos-exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis. Lung cancer generally has a latency period of about 15 to 20 years; latency period means the amount of time necessary for symptoms of disease to become present after exposure.

Mesothelioma is a cancer of the mesothelial lining of the pleura, or chest, and the peritoneum, or abdomen. Symptoms characteristic of mesothelioma include shortness of breath, pain in the walls of the chest, or abdominal pain. Compared to lung cancer, mesothelioma generally has a much longer latency period of about 40 years. Mesothelioma is always fatal.

Clinical evidence of the adverse effects associated with exposure to asbestos is present in the form of several well-conducted epidemiological studies of occupationally exposed workers, family contacts of workers, and persons living near asbestos mines. These studies have shown a definite association between asbestos exposure and an increased incidence of the described diseases. Tables A and B present data from OSHA showing the relationship of cancer mortality to various exposure concentrations, various ages of first exposure, and various durations of exposure.

Epidemiological studies indicate that the risk of lung cancer among exposed workers who smoke cigarettes is greatly increased over the risk of lung cancer among non-exposed smokers or exposed nonsmokers. These studies suggest that cessation of smoking will reduce the risk of lung cancer for a person exposed to asbestos, but will not reduce it to the same level of risk as that existing for an exposed worker who has never smoked.

Table A

Estimated asbestos related cancer mortality from a one
year exposure to various fiber concentrations

Asbestos fiber concentration (f/ml)	Cancer mortality /100,000 exposed			
	Lung	Mesothelioma	Gastrointestinal ¹	Total
<u>Age at first exposure: 20</u>				
0.1	7.2	9.5	.7	16.2
0.2	14.3	18.9	1.4	34.6
0.5	35.8	47.3	3.6	86.7
2.0	142.8	186.7	14.3	345.8
<u>Age at first exposure: 30</u>				
0.1	7.3	4.9	.7	12.9
0.2	14.5	9.8	1.4	25.7
0.5	36.3	24.4	3.6	64.3
2.0	144.9	97.4	14.5	256.8
<u>Age at first exposure: 40</u>				
0.1	7.1	2.1	.7	9.9
0.2	14.1	4.3	1.4	19.8
0.5	35.3	10.7	3.5	49.5
2.0	140.9	42.6	14.1	197.6
<u>Age at first exposure: 50</u>				
0.1	6.1	0.7	.6	7.4
0.2	12.2	1.5	1.2	14.9
0.5	30.4	3.7	3.0	37.0
2.0	121.7	14.7	12.2	148.6
<u>Age at first exposure: 60</u>				
0.1	4.0	0.2	.4	4.6
0.2	8.0	0.3	.8	9.1
0.5	19.9	0.9	2.0	22.8
2.0	79.6	3.4	8.0	91.0

¹ Estimated as 10% of lung cancer risk rather than calculated using dose-response information.

Table 8

Estimated Asbestos Related Cancer Mortality per 100,000
by Number of Years Exposed and Exposure Level.¹

Asbestos fiber concentration (f/ml)	Cancer mortality /100,000 exposed			Total
	Lung	Mesothelioma	Gastrointestinal ²	
1 year exposure				
0.1	7.2	6.9	0.7	14.8
0.2	14.4	13.8	1.4	29.6
0.5	36.1	34.6	3.6	74.3
2.0	144	138	14.4	296.4
4.0	288	275	28.8	591.8
5.0	360	344	36.0	740.0
10.0	715	684	71.5	1470.5
20 year exposure				
0.1	139	73	13.9	225.9
0.2	278	146	27.8	451.8
0.5	692	362	69.2	1123.2
2.0	2713	1408	271.3	4392.3
4.0	5278	2706	527.8	8511.8
5.0	6509	3317	650.9	10476.9
10.0	12177	6024	1217.7	13996.7
45 years exposure				
0.1	231	82	23.1	336.1
0.2	460	164	46.0	670.0
0.5	1143	407	114.3	1664.3
2.0	4416	1554	441.6	6411.6
4.0	8441	2924	844.1	12209.1
5.0	10318	3547	1031.8	14896.8
10.0	18515	6141	1851.5	26507.5

¹ Assumes exposure begins at age 25. Risks are calculated using U.S. male lung cancer background rates for 1977.

² Estimated as 10% of lung cancer risk rather than calculated using dose-response information.

BILLING CODE 1310-24-C

REVIEW OF THE STANDARD

Applicability: The general industry standard for asbestos applies to the exposure to asbestos of every employee in certain specified places of employment, of which this facility is included.

Permissible Exposure Limit (PEL): The PEL for asbestos is the airborne concentration, averaged over an eight-hour work period, that should not be exceeded. The current PEL for asbestos is 0.2 fibers per cubic centimeter of air, as determined by the prescribed method. The employer has the responsibility for ensuring that the PEL is not exceeded.

Another airborne concentration amount that also has significance in the standard is referred to as the action level, which is an airborne asbestos concentration of 0.1 fiber/cc as an eight-hour time-weighted average. Concentrations at this action level, even though the PEL standard is not exceeded, cause certain requirements or responsibilities for the employer.

Exposure Monitoring: Whenever exposures to asbestos may be foreseen to exceed the action level of 0.1 fiber/cc, exposure monitoring is required to be conducted at intervals no greater than six months. Determinations of employee exposure are to be made from breathing zone air samples that are representative of the eight-hour time-weighted average of the various employees in various job classifications in various work areas, for each shift if different.

At this facility, certain employee exposures can be foreseen to be above the action level. Therefore, representative employee monitoring at six-month intervals will continue to be conducted as usual.

The standard requires that the employer shall, within 15 working days after receipt of the results of any monitoring performed under the standard, notify the affected employees of these results in writing. Whenever monitoring results indicate that the permissible exposure limit has been exceeded, the written notification is required to contain the corrective action being taken by the employer to reduce employee exposure to or below the permissible exposure limit.

Observation of Monitoring: The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with the Exposure Monitoring paragraph of the standard. Where any protective equipment is required in any area in which the observation of monitoring will take place, the observer shall be provided with and required to use such protective equipment.

Regulated Areas: Wherever airborne concentrations of asbestos are in excess of the permissible exposure limit, the employer shall establish regulated areas, demarcate and limit access to these areas, provide and require the use of respirators for each person entering these areas, and prohibit certain activities in these areas. Currently, exposure monitoring data for this facility has indicated that there are not any areas that are above the permissible exposure limit of 0.2 fiber/cc. Therefore, regulated areas are not required by the standard in this facility. However, in the work area in which brake shoes are riveted and grinded, signs have been erected demarcating this work area, as facility policy. Also, warning signs have been provided at the opening to the enclosure around the baghouse hopper. Although not required by the standard because the permissible exposure limit is not exceeded, it is strongly recommended that the prohibited activities that would be a requirement for regulated areas still be adhered to by employees in the brake shoe riveting and grinding work area. These prohibited activities are eating, drinking, smoking chewing tobacco or gum, or applying cosmetics in the area. Additionally, access to this area should be limited only to those persons authorized or with a work-related need.

Methods of Compliance: In order to reduce and maintain employee exposure to or below the permissible exposure limit of 0.2 fiber/cc, the standard requires that the employer institute engineering controls and work practices, except to the extent that such controls are not feasible. Respiratory protection cannot be used as a means of compliance with the permissible exposure limit, except in certain specified circumstances. An example of engineering controls would be local exhaust ventilation and dust collection systems, designed, constructed, installed and maintained in accordance with good practice. Examples of work practices would be the use of wet methods

where feasible and the prohibition of the use of compressed air to remove asbestos or clean. Prior to the effective date of this amended standard, this facility undertook a program to upgrade engineering controls and work practices. As demonstrated by recent results from exposure monitoring, it has been indicated that the program has achieved compliance with the permissible exposure limit. A description of the specific engineering controls and work practices installed or implemented at this facility will be discussed in detail later.

* Housekeeping: The standard requires that the following housekeeping procedures and practices be followed:

- (1) All surfaces shall be maintained as free as practicable of accumulations of dusts and waste containing asbestos.
- (2) All spills and sudden releases of material containing asbestos shall be cleaned up as soon as possible.
- (3) Surfaces contaminated with asbestos may not be cleaned by the use of compressed air.
- (4) HEPA-filtered vacuuming equipment shall be used for any vacuuming.
- * (5) Shoveling, dry sweeping and dry clean-up of asbestos may be used only where vacuuming and/or wet cleaning are not feasible.
- * (6) Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with asbestos consigned for disposal, shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

It is facility policy that these housekeeping procedures be followed.

Respiratory Protection: In cases where the permissible exposure limit of 0.2 fiber/cc is exceeded, the employer is required by the standard to provide respirators and ensure that they are used. Respirators, where required, are to be selected for degree of protection in accordance with Table 1 of the standard, relative to the extent that the permissible exposure limit is exceeded. Respirators are required by the standard to be used in the following circumstances:

- (1) During the interval necessary to install or implement feasible engineering and work practice controls.
- (2) In work operations, such as maintenance and repair activities, or other activities for which engineering and work practice controls are not feasible.
- (3) In work situations, where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the exposure limit.
- (4) In emergencies.

Where respirators are required by the standard, the employer is required to select and provide the appropriate type of respirator as specified in Table I of the standard. Where respiratory protection is required, the employer is required to institute a respirator program and perform respirator face fit testing in accordance with the procedures and requirements of the standard.

For all employees in which this training program is intended, conducting their assigned duties using installed engineering controls and following implemented work practices, respiratory protection is not required by the standard because data from previous exposure monitoring has indicated that the permissible exposure limit of 0.2 fiber/cc is not being exceeded. However, as facility policy, a degree of respiratory protection is required for certain job classifications for additional protection for affected employees. For employees whose job assignments include riveting or grinding brake shoes, 3M Brand 8710 single-use respirators are provided by the facility. New respirators are provided at the beginning of each shift, as desired by the affected employee during the shift, or when breathing becomes difficult. The used respirators are appropriately discarded as asbestos-contaminated waste. There is no need for a sanitation program for these disposable respirators.

Although short-term, the duties assigned to the employee responsible for the daily baghouse hopper inspection and cleanout, as necessary, subject that employee to a potentially increased concentration of airborne asbestos. However, based on current exposure monitoring data, when the eight-hour time-weighted average for this employee is calculated from the short-term concentration during baghouse cleanout and the concentration for the remainder of the work shift, the permissible exposure limit is not exceeded. As facility policy, however, during baghouse hopper duties, the employee is required to use a Willson Brand 1210 reusable air-purifying respirator with R10 replacement filters. The respirator, assigned for the exclusive use of the employee, and replacement filters are provided by the facility. ^{Now} replacement filters are provided at the beginning of each daily use, as desired by the employee, during the use, or when breathing becomes difficult. The used filters are appropriately discarded as asbestos-contaminated waste.

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For any affected employee who desires an additional degree of protection, any one of the following reusable respirators will be provided and assigned for the exclusive use of the employee, although not required by the standard:

- (1) Willson Brand 1210 with replacement filters.
- (2) Half-mask or full facepiece air-purifying respirator equipped with high efficiency filters.
- (3) Powered air-purifying respirator equipped with high efficiency filters.

UPDATE *

Respirators, where applicable, are selected, assigned, maintained, fitted and inspected in accordance with this facility's written Respirator Protection Program.

Protective Work Clothing and Equipment: If an employee is exposed to asbestos above the permissible exposure limit, or where the possibility of eye irritation exists, the standard requires that the employer shall provide to the affected employees appropriate protective work clothing and equipment, such as:

- (1) Coveralls or similar full-body work clothing.
- (2) Gloves, head coverings, and foot coverings.
- (3) Face shields, vented goggles, or other appropriate protective equipment.

If the protective work clothing and equipment are required by the standard, there are associated requirements for removal, storage, cleaning and replacement of the clothing and equipment.

For all employees in which this training program is intended, conducting their assigned duties using installed engineering controls and following implemented work practices, protective work clothing and equipment should not normally be required by the standard because data from previous exposure monitoring has indicated that the permissible exposure limit is not being exceeded. However, for the previously stated reasons, the employee assigned to daily baghouse hopper inspection and cleanout is required by facility policy to wear disposable protective clothing during the short-term interval in which baghouse hopper duties are taking place. Upon completion of these duties, the

protective clothing is appropriately discarded as asbestos-contaminated waste. For any other affected employee who desires an additional degree of protection, protective work clothing and equipment will be provided to the employee, although not required by the standard.

Hygiene Facilities and Practices: For employees who work in areas where their airborne exposure to asbestos is above the permissible exposure limit, the standard requires that the employer provide clean change rooms, showers, and lunchroom facilities meeting specific requirements. Where the permissible exposure limit is exceeded, the employer is required to ensure that affected employees do not leave the workplace or enter the lunchroom facilities wearing any clothing or equipment worn during the work shift, and that affected employees wash their hands and faces prior to eating, drinking, or smoking.

Medical Surveillance: For all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the action level of 0.1 fiber/cc, the standard requires that the employer institute a medical surveillance program for these affected employees. The medical surveillance program is required to include preplacement examinations having certain requirements prior to an employee being assigned to an occupation exposed to airborne concentrations of asbestos, periodic examinations having certain requirements on an annual basis, and termination of employment examinations, similar to periodic examinations, given within 30 calendar days before or after the date of termination of employment. One point of interest in this revised standard pertaining to periodic annual examinations, chest roentgenograms (or X-rays) are no longer required to be conducted annually, but can be done at a frequency specified in Table 2 of the standard.

The standard requires that the employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee and at a reasonable time and place. The employer is required to provide specific information to the examining physician. The employer is required to obtain a written signed opinion from the examining physician, containing the results of the medical examination and other specific information. The employer is required to provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

At this facility, certain employee exposures can be foreseen to be above the action level. This facility has previously had and will continue to have a medical surveillance program for these affected employees.

Communication of Hazards to Employees: For regulated areas in which the airborne concentration of asbestos is above the permissible exposure limit, warning signs are required to be provided and displayed at all approaches to regulated areas. Exposure monitoring data has indicated that this facility is not required to have any areas designated as regulated areas. However, as previously described, warning signs have been provided as an extra precaution around the work area in which brake shoes are riveted and ground, and at the opening to the enclosure around the baghouse hopper.

Warning labels are required to be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos, or to their containers. The use of warning labels is the policy of this facility.

* Material Safety Data Sheets (MSDSs) are received from all manufacturers or suppliers of incoming asbestos-containing materials. MSDSs are provided by this facility with all asbestos-containing products supplied by this facility.

For all employees who are exposed to airborne concentrations of asbestos at or above the action level, the employer is required to institute a training program and ensure the participation of all affected employees in the program. The training program presented here includes all the elements required by the standards. The training program is required to be provided prior to or at the time of initial assignment and at least annually thereafter. The employer is required to make a copy of the OSHA general industry standard and its appendices readily available without cost to all affected employees.

Recordkeeping: The employer is required by the standard to keep certain records for specified periods of time:

- (1) Records of exposure measurements are required to be maintained for at least 30 years.
- (2) Objective data for exempted operations are required to be maintained for the duration of the employer's reliance on such data.

- (3) Medical surveillance records for each employee are required to be maintained for the duration of employment plus 30 years.
- (4) All employee training records are required to be maintained for one year beyond the last date of employment of that employee.

Upon request by subject employees or their designated representatives, exposure records and employee medical records are required to be made available for examination and copying.

Appendices to the Standards: The OSHA general industry standard contains several appendices for support to the standards. These appendices include the mandatory OSHA Reference Method and the non-mandatory, but recommended, detailed procedure for asbestos sampling and analysis. An appendix presents mandatory qualitative and quantitative fit testing procedures for respirators required by the standard. Appendices related to medical surveillance programs include mandatory medical questionnaires and mandatory interpretation and classification of chest roentgenograms procedures. Also included are non-mandatory substance technical information for asbestos and non-mandatory medical surveillance guidelines for asbestos.

ASBESTOS-CONTAINING MATERIALS USED IN MANUFACTURE

Certain types of brake linings used in this facility in the manufacture of brake shoes contain asbestos. The containers in which these brake linings are received from suppliers have asbestos warning labels affixed. Other types of brake linings used in this facility do not contain asbestos; the containers in which these linings are received do not have asbestos warning labels affixed. The amounts of the various types of brake linings used in manufacturing varies at any point in time, dependent upon the orders of the purchasers of the final product.

Certain job classifications have been identified as having potential employee exposures to asbestos above the action level. At this time, exposure monitoring has indicated that the exposure levels of these job classifications have been reduced through various means to below the permissible exposure

level. The following is a list of these job classifications, including a descriptions of the facility location and the manner of use, release and storage of asbestos-containing materials.

- (1) Cast Shoe Assembly: located in the cast shoe assembly area; cast shoes are assembled; asbestos fibers may be released during handling and assembly.
- (2) Riveting: located in the brake shoe riveting and grinding area; brake linings are riveted to shoes; asbestos fibers may be released during handling of linings and riveting linings to shoes; brake linings are received at the work area in cardboard containers and the riveted shoes are stacked onto pallets.
- (3) Grinding: located in the brake shoe riveting and grinding area; the linings on certain brake shoes require surface grinding; asbestos fibers may be released during handling of shoes and grinding on linings; brake shoes are received at the work area on pallets and are replaced onto pallets after grinding.
- (4) Baghouse Hopper Inspection and Cleanout: located adjacent to the exterior of the facility building at the close capture ventilation fabric filter baghouse; on a daily basis, a short-term duty includes inspecting the baghouse hoppers for bridging of collected dust and the plastic-lined waste drums under the hoppers for remaining capacity, and, as necessary, removing and sealing full waste drums and replacing empty drums; asbestos fibers may be released during the inspection and during the removing, sealing and replacement of drums.

RECORD OF PARTICIPATION IN THE OCTOBER 1986
EMPLOYEE TRAINING PROGRAM FOR ASBESTOS
EATON CORPORATION
Gallatin, Tennessee

As a necessary part of employee recordkeeping, this record documents participation of the employee designated below in the October 1986 Employee Training Program for Asbestos. The written material presented in this training program is on file at the Gallatin, Tennessee facility of Eaton Corporation. This training program included presentations of the following information:

- I. Health effects associated with asbestos exposure and the relationship between smoking and exposure to asbestos in producing lung cancer.
- II. A review of the OSHA general industry standard for asbestos (29 CFR 1910.1001), including appendices, with emphasis placed on the purpose, proper use, and limitations of respirators and protective clothing, and also the purpose and a description of the medical surveillance program.
- III. The quantity, location, manner of use, release, and storage of asbestos, and the specific nature of operations which could result in exposure to asbestos.
- IV. The engineering controls and work practices associated with the employee's job assignment.
- V. The specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment to be used.

I have attended the employee training program for asbestos outlined above and have received a copy of 29 CFR 1910.1001. I understand the requirements presented in the training program.

Participating Employee

Name: _____
Signature: _____
Date: _____

Verification

Name: _____
Signature: _____
Date: _____

Health Hazards Associated with Asbestos-Containing Materials

Certain materials used in the manufacturing process contain asbestos. Because there are health hazards associated with the use of asbestos, various precautionary measures have been implemented which require conscientious compliance.

Asbestos is the name of a naturally-occurring group of fibrous mineral substances, including chrysotile, amosite, crocidolite, anthophyllite, actinolite and tremolite. Asbestos has been used in a multitude of commercial products because of its beneficial properties: non-combustible, resistant to corrosion, high tensile strength, low electrical conductivity, and durability. However, there are certain health hazards associated with the use and handling of asbestos-containing materials, most notably associated with the breathing of asbestos fibers that may become suspended in the air. The potential of an asbestos-containing material to release fibers to the air is dependent upon the degree of friability, which means the ability of that material to be crumbled by hand pressure and thus to potentially emit fibers.

Exposure to asbestos is a serious health hazard. Anytime an asbestos-containing material is handled, disturbed or damaged, asbestos fibers may be released into the air. Fibers that are inhaled or swallowed can penetrate body tissues and cause diseases. Medical studies suggest that there does not appear to be a safe level of exposure below which there would be no chance of disease. As described by the Environmental Protection Agency, the following diseases can result from inhalation of airborne asbestos fibers:

Asbestosis - A noncancerous respiratory disease that consists of scarring of lung tissues. Symptoms of asbestosis include shortness of breath and rales, a dry crackling sound in the lungs during inhalation. Advanced asbestosis may produce cardiac failure and death. Asbestosis is rarely caused by neighborhood exposure.

Lung Cancer - Inhaled asbestos particles can produce lung cancer independent of the onset of asbestosis. In most lung cancer patients, a cough of a change in cough habit is found. A persistent chest pain unrelated to coughing is the second most common symptom.

Mesothelioma - This is a rare cancer of the thin membrane lining of the chest and abdomen. Most incidences of mesothelioma have been traced directly to a history of asbestos exposure. The earlier in life that one begins inhaling asbestos, the higher the likelihood of developing mesothelioma in later life. Thus, there is concern over exposure of school children to asbestos. The common symptoms are shortness of breath, pain in the walls of the chest, or abdominal pain. Mesothelioma is always fatal.

Other Cancers - Some medical studies have suggested that exposure to asbestos is responsible for some cancers of internal organs including the esophagus, larynx, oral cavity, stomach, colon, and kidney. It is theorized that inhaled asbestos fibers are absorbed into the blood stream and carried to these other parts of the body.

Generally, symptoms of asbestos diseases do not appear for many years after the initial exposure to asbestos. However, early disease detection is possible by medical examinations including medical histories, breathing capacity tests, and chest x-rays, which are provided to all employees who have an exposure potential to an airborne concentration above 0.1 fibers per cubic centimeter of air.

Medical studies have shown that exposure to asbestos and cigarette smoking combine to create a significantly higher risk of developing an asbestos-related disease. The combined effect of smoking and asbestos exposure appears to be more than the simple addition of the individual risks. In fact, statistics compiled by the National Institute of Occupational Safety and Health indicate that the risk of contracting lung cancer for a smoker exposed to asbestos is rather like a multiplication of the individual risks of exposure to asbestos and smoking. EPA reports that some information suggests that quitting smoking can reduce this high risk.

A standard for asbestos has been promulgated by the Occupational Safety and Health Administration (OSHA), which includes permissible exposure limits as an eight-hour time-weighted average concentration of 2 fibers, longer than five micrometers, per cubic centimeter of air (fibers/cc) and as a ceiling concentration of 10 fibers/cc. Because OSHA determined that workers exposed to asbestos under conditions existing under that standard faced a grave danger of developing incurable cancer and asbestosis, and that an immediate reduction in exposure levels to 0.5 fibers/cc, eight-hour, time weighted average was necessary to protect such employees from this grave danger, OSHA reduced the permissible exposure limit in an Emergency Temporary Standard (ETS) issued on November 4, 1983. Although this ETS has been stayed in the court, it is being followed pending a permanent revision of the standard. The current standard also presents requirement methods for compliance (engineering controls and work practices), personal protective equipment, exposure monitoring, caution signs and labels, housekeeping, recordkeeping, and medical examinations.

The asbestos-containing materials used in the manufacturing process are brake blocks and brake linings. These materials, as received from suppliers, are resin-bonded and are relatively non-friable, which reduces the potential for asbestos fibers to be released and become airborne. However, it is recognized that fibers may be released during various phases of the manufacturing process, such as unpacking, handling, installation, riveting, grinding, and repackaging. Therefore, various precautionary measures have been implemented in our manufacturing process to reduce the potential for exposure to airborne asbestos fibers.

These precautionary measures include engineering controls such as enclosure of certain operations, exhaust ventilation at work stations, and dust filtration of air from ventilation systems. For housekeeping, HEPA vacuuming equipment, dust suppressant agents, and properly labeled disposal containers have been provided. Respiratory protection meeting the requirements of the ETS is provided and required for all employees who work with asbestos-containing materials or wastes.

Personal and environmental monitoring for asbestos exposure concentrations are conducted semi-annually. The monitoring data are used to determine compliance with permissible exposure limits and to assess any work practices that might require correction. This data is available for review by

affected employees.

Employees whose work requires them to come in contact with asbestos-containing materials or wastes should properly utilize all equipment provided for minimizing asbestos exposure. In addition, the following work practices should be conscientiously adhered:

1. Appropriate personal protection equipment should be properly used at times in accordance with the directions provided in training programs.

2. All handling of asbestos-containing materials during unpacking, riveting, installing, grinding, stacking, and packing should be done in a manner to minimize disturbing or damaging surfaces, except under exhaust ventilation.

3. Exhaust ventilation systems provided for work stations should be properly used. Any problems observed with ventilation systems should be immediately reported to supervisors.

4. All activities in work areas where asbestos-containing materials are handled should be conducted in a manner to minimize the disturbance of settled dust. This includes stacking parts, moving pallets or equipment, and housekeeping.

5. Housekeeping in areas where asbestos-containing materials are handled should be conducted by HEPA vacuuming or surfactant wet wiping. Dry sweeping should not be conducted. Waste materials should be placed in properly labeled containers provided for disposal.