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6-9354

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Asbestos Exposure Criteria*

PLAINTIFF'S EXHIBIT

DOW-1318

Requirement:

The employer shall ensure that no employee is exposed to airborne asbestos concentrations that exceed the Permissible Exposure Limit or the Excursion Limit. If employee exposure exceeds the action level for thirty days or more per year, medical surveillance must be implemented.

Permissible Exposure Limit (PEL)	0.2 f/cc**
Excursion Limit	1.0 f/cc***
Action Level	0.1 f/cc**

ST0198889

- * Occupational Safety and Health Administration (OSHA), Safety and Health Standards; 29 CFR 1910.1001 (c).
- ** Based on an eight-hour time-weighted average concentration in fibers per cubic centimeter of air (f/cc).
- *** Based on a sample concentration averaged over thirty-minutes.

Federal Requirements for Asbestos Handling*

SCOPE

- Who:**
1. Owners of buildings in which asbestos-containing material (ACM) is present.
 2. Employers that have employees who may be exposed to asbestos.
- What:** Must develop and implement an asbestos maintenance program for small-scale short-duration asbestos renovation and maintenance activities.
- When:** July 21, 1986.

Asbestos Maintenance Program Provisions:

1. Develop inventory of all ACM in the building.
2. Periodically inspect all ACM to detect deterioration.
3. Develop written work procedures for handling ACM.
4. Develop written procedures for proper disposal of ACM waste.
5. Develop written asbestos-related emergency response procedures.
6. Provide adequate asbestos awareness/handling training and Hazard Communication training for workers who may be exposed to asbestos.
7. Provide communication of asbestos hazards (i.e., signs and labels) to employees and contractors who may be exposed to asbestos.
8. Provide medical surveillance, respiratory protection and respiratory protection training (which includes medical approval and respirator fit test) for workers who handle ACM.
9. Maintain records of compliance with federal and state regulations pertaining to asbestos for a minimum of 30 years.

* Occupational Safety and Health Administration (OSHA), Construction Industry Standard; 29 CFR 1926.58 (e)(6)(iv) and Appendix G.

**Small-Scale Short-Duration
Asbestos Renovation
and Maintenance Activities**

The Occupational Safety and Health Administration (OSHA) offered the following interpretation for compliance purposes of what constitutes a "small-scale short-duration asbestos renovation and maintenance activity":

All four conditions must apply:

1. Maintenance or renovation tasks, where the removal of asbestos-containing materials is not the primary goal of the job (e.g., repairing a valve which entails the removal of asbestos, installing electrical conduit which must be fastened to asbestos-cement siding, etc.).
2. Activities where employees' exposures to asbestos can be kept below the action level (0.1 f/cc) via worker isolation techniques, such as glove bag or other methods described in 29 CFR 1926.58, Appendix G.
3. An operation which has been included in the employer's asbestos maintenance program (as required in Appendix G) of all employers who are claiming an exemption from the requirements of 29 CFR 1926.58 (e)(6).
4. Nonrepetitive operations (viz.: not a series of small-scale jobs, which if performed at one time would have resulted in a large-scale removal).

ST0198891

**Prohibited Activities during
Small-Scale Short-Duration
Asbestos Renovation and Maintenance
Activities***

The maintenance staff employees should be instructed:

- *Not* to drill holes in asbestos-containing materials (ACM);
- *Not* to hang plants or pictures on structures covered with (ACM);
- *Not* to sand asbestos-containing floor tile;
- *Not* to damage (ACM) while moving furniture or other objects;
- *Not* to install curtains, drapes, or dividers in such a way that they damage ACM;
- *Not* to dust floors, ceilings, moldings or other surfaces in asbestos-contaminated environments with a dry brush or sweep with a dry broom;
- *Not* to use an ordinary vacuum to clean up asbestos-containing debris;
- *Not* to remove ceiling tiles below ACM without wearing the proper respiratory protection, clearing the area of other people, and observing asbestos removal waste disposal procedures;
- *Not* to remove ventilation system filters dry; and
- *Not* to shake ventilation system filters.

* Occupational Safety and Health Administration (OSHA),
Construction Industry Standard; 29 CFR 1926.58 Appendix G.

ST0198892

**State of Michigan
Asbestos Abatement Requirements***

1. For asbestos abatement projects exceeding 10 linear feet or 15 square feet, the Department of Public Health must be notified in writing at least 10 days before beginning the project. A fee equal to 1 % of the price of the asbestos abatement project shall be paid to the Department of Public Health. (The licensed asbestos abatement contractor is usually responsible for insuring compliance).
2. Only asbestos abatement contractors licensed by the Department of Public Health may abate (i.e., remove) quantities greater than 160 square feet or 260 linear feet of friable asbestos materials.
3. For asbestos abatement projects exceeding 25 linear feet or 50 square feet, a post abatement air monitoring sample must be taken by a neutral third party and the sample must not exceed 0.05 fibers per cubic centimeter (0.05 f/cc).
4. Janitorial and maintenance staff who may be involved with removing, altering or otherwise disturbing asbestos-containing materials must receive 2 hours of awareness training on the health and safety aspects of asbestos. (The state is currently considering a proposal that would increase the training requirement to 16 hours of training).
5. All asbestos abatement project records must be maintained for at least 30 years.
6. Small-scale short-duration asbestos renovation and maintenance activities must comply with federal requirements (OSHA 29 CFR 1926.58 (e)(6) and Appendix G).

* Public Acts of 1986, Act Numbers 135, 147 and 154.
Public Acts of 1988, Act Number 440.
Public Acts of 1990, Act Numbers 2 through 6.

ST0198893

Inventory of Asbestos-Containing Material

Requirement:

Development of an inventory of all asbestos-containing materials (ACM) in the facility in accordance with Appendix G of OSHA 29 CFR 1926.58.

Options:

1. Contract with a consultant to conduct an ACM identification survey. Develop written identification specifications (specifications have been developed by Michigan Division Industrial Hygiene).

Benefits

- a) insure compliance with federal and state regulations.
- b) help building owners identify and locate asbestos insulation.
- c) minimize possible worker exposure to asbestos.
- d) provide useful information to aid asbestos abatement projects.

Disadvantages

- a) survey project is expensive (approximately c. \$80,000 to \$160,000 for a survey of all corporate office buildings).

2. Assume all insulating material in corporate buildings is composed of ACM.

Benefits

- a) minimal cost involved in ACM survey.

Disadvantages

- a) all insulating material is assumed to contain asbestos and must be handled and disposed in accordance with federal and state regulations.
- b) specific information in regard to the quantity and location of ACM within the facility will not be available. Without this information, asbestos abatement projects must rely on ambiguous specifications in regard to location and amount.

ST0198894

Asbestos Abatement

Options:

1. Removal of asbestos-containing material (ACM).

ACM must be removed in accordance with federal and state regulations.

Benefits:

- a) ACM is permanently removed and may be deleted from the asbestos maintenance program.
- b) potential employee exposure to the ACM is negated.

Disadvantages:

- a) ACM removal is typically the most costly abatement option (\$15/sq. foot for spray-on and \$5/linear foot of pipe insulation).

2. Encapsulation of ACM with an encapsulant.

An encapsulating material is applied (i.e., sprayed or brushed) onto the ACM in order to minimize fiber release.

Benefits:

- a) potential for asbestos fiber release episode is reduced.
- b) cost for encapsulating ACM is typically less than removal costs (c. \$1 to \$2/sq. foot).

Disadvantages:

- a) ACM must be periodically inspected for deterioration and must be included in the asbestos maintenance program.
- b) encapsulated ACM will likely be required to be removed in the future due to aging of material.

3. Enclosure of ACM by a barrier.

ACM is enclosed by an air-tight barrier (i.e., 6-mil plastic sheeting) which physically separates the ACM from occupied areas.

Benefits:

- a) potential for asbestos fiber release episode is reduced.
- b) cost for enclosing ACM is typically less than removal costs.

Disadvantages:

- a) ACM must be periodically inspected for deterioration and must be included in the asbestos maintenance program.
- b) enclosed ACM will likely be required to be removed in the future due to aging of material.

ST0198895

**Summary of Past Asbestos Air
Monitoring Endeavors in
Corporate Office Buildings 1986 - 1989**

Bldg.	Report Date	Project Description	Potential Exposure Asbestos Concentration Range (f/cc) ¹
2040	1/11/89	Monitoring during electrical cable installation near spray-on asbestos	0.12 - 0.19 (personal)* 0.03 - 0.10 (area)*
2040	1/11/89	Monitoring during ceiling panel removal near spray-on asbestos	0.03 - 0.33 (personal)* 0.01 - 0.60 (area)*
2040	11/22/88	Monitoring of office personnel in areas near renovation areas	0.01 - 0.04 (area)**
2040	10/18/88	Monitoring following remodeling near spray-on asbestos	ND(0.001) - 0.015 (area)**
2040	8/25/88	Monitoring during remodeling near spray-on asbestos	0.016 - 0.725 (personal)** 0.002 - 0.109 (area)**
2040	6/8/88	Monitoring during remodeling near spray-on asbestos	0.03 (personal)** 0.03 - 0.1 (area)**
2040	5/24/88	Monitoring of office areas near spray-on asbestos	ND(0.003) - 0.007 (area)**
2040	5/20/88	Monitoring during remodeling near spray-on asbestos	0.02 - 0.73 (personal)** 0.03 - 0.26 (area)**
2020 & 2040	10/29/87	Monitoring during electrical cable installation near spray-on asbestos	ND(0.01) - 0.17 (personal)* ND(0.01) - 0.29 (area)*
2020	10/29/87	Monitoring during installation of air handling duct work near spray-on asbestos	0.6 (personal)* 0.01 - 0.08 (area)*
2010	2/27/86	Monitoring during demolition refrigeration unit	1.16 - 1.80 (personal)** ND(0.048) (area, outside containment)**
OSHA: Permissible Exposure Level = 0.2 f/cc;			Action level = 0.1 f/cc

¹ f/cc = fiber per cubic centimeter of air

* 8-Hour time weighted average concentration

** Measured concentration

ST0198896

Recommendations

1. Contract with a consultant to conduct a thorough asbestos identification survey in all corporate buildings.
2. Designate an asbestos coordinator for COBA. The coordinator should receive the contractor supervisor asbestos training course (40 hours of training). The individual should oversee all aspects of the asbestos maintenance program and should be the focal person who communicates with COBA employees and contractors regarding asbestos and controls activities that may cause disturbance.
3. Develop in conjunction with the industrial hygienist a comprehensive asbestos maintenance program.
4. Place asbestos warning labels on all pipe and tank insulation composed of asbestos-containing material. All other non-asbestos insulation should also be appropriately labeled.
5. Establish a policy in which anyone (COBA employee or contractor) who must access the area above the drop ceilings must first receive approval from the asbestos coordinator. Include a provision for emergency access procedures in the policy.
6. Evaluate the physical condition of all asbestos-containing material and prioritize which material should be removed, encapsulated or enclosed. It is recommended that any asbestos-containing material that is severely damaged (i.e., delaminated from substrate), friable and in or adjacent to occupied areas should be removed. Consult with industrial hygiene on a case-by-case situation.

ST0198897



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ST0198888