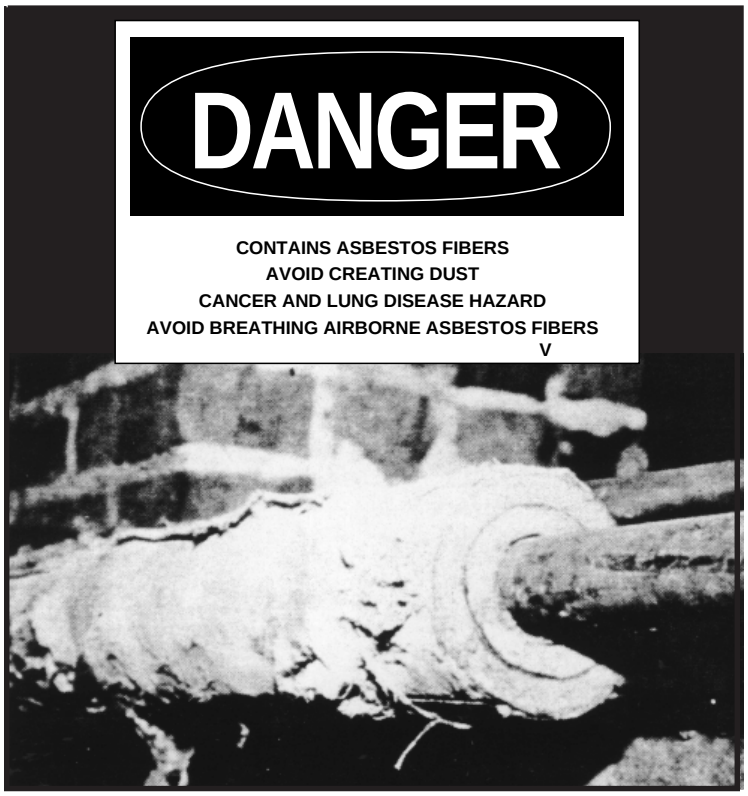
Asbestos Awareness



Los Alamos
NATIONAL LABORATORY

LA-UR 00-4547

Course Number: 8661

Date: September 2000

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Document Number: ESH13-410-ks-9/00

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Introduction

Course Overview

Since the early 1970s, the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) have been concerned with the health hazards associated with asbestos exposure. The concern is based on medical evidence associating the inhalation of airborne asbestos fibers with various types of cancer and other respiratory diseases.

This awareness-level course is designed for personnel who are required to work around asbestos-containing material (ACM), but whose job descriptions do not require them to work directly with asbestos (as in cases of abatement or repair).

Course Objectives

After completing this course, you will be able to recognize

- the properties, uses, and locations of asbestos;
- asbestos health concerns;
- asbestos regulations and exposure limits; and
- asbestos exposure controls.

History of Asbestos Use

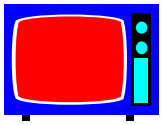
Humans have used asbestos since ancient times. The term asbestos is derived from a Greek adjective meaning "inextinguishable." In the 19th century, it was used as a fire retardant, because it could easily be woven into cloth. From 1890 to 1895, approximately 50 deaths were reported in a French asbestos weaving mill. At the time, the fibrous nature of asbestos was not identified with specific adverse health effects; however, evidence of problems among asbestos workers was beginning to surface.

In the late 1920's, x-ray technology revealed that two-thirds of all asbestos workers had abnormal lungs. The term asbestosis was coined to describe the disease. In 1935, asbestos was implicated in the formation of lung cancer.

The use of asbestos increased dramatically during World War II, especially for shipbuilding. After the war, builders and designers discovered that asbestos was a good thermal insulator. Asbestos use increased rapidly with this discovery, and new uses for asbestos-containing materials were developed.

In 1956, mesothelioma, another type of lung cancer caused by asbestos exposure, was diagnosed. In the late 1960s, it was determined that insulation workers exposed to high concentrations of asbestos were more likely to develop asbestos-related diseases. More recently, concern has focused on the potential exposures of occupants of buildings in which asbestos is present.

Video Worksheet



Watch the video and complete the following statements by filling in the blanks.

1. As long as asbestos remains _____ and stays where it belongs, there is little chance of exposure.

2. Asbestos is the general name for a family of _____ found in nature and mined throughout the world.

3. One form of asbestos covered by OSHA standards is _____.

4. When bonded together with other materials, asbestos fibers pose little hazard, but when installed asbestos products are _____ or _____, the fibers can escape from their bonded materials or matrix.

5. Asbestosis causes _____.

6. A cigarette smoker with heavy occupational exposure has _____ times more risk of contracting lung cancer than a nonsmoker who has not been exposed to asbestos.

7. Name three possible exposure locations.

   _____

   _____

   _____

8. _____ is the tendency of asbestos to fall apart and release fibers into the air.

9. _____ exposure standards are based on the type of asbestos work, the type of ACM involved, and the likelihood that fibers will become airborne.

10. If you are notified that you may be working near asbestos products, you should (name two actions)

    _____

    _____

Answers

1. undisturbed
2. minerals
3. Any of the following are correct: chrysotile, amosite, crocidolite, and compounds of asbestiform minerals that bond chemically with asbestos
4. damaged, disturbed
5. oxygen starvation, severe physical disability or death
6. 90
7. Any of the following are correct: buildings, waste from asbestos abatement activity, abatement projects identified by warning signs, thermal system insulation (TSI), sprayed- or troweled-on surfacing materials on ceilings or walls, resilient asphalt and vinyl flooring, regulated areas with restricted entry or warning signs indicating the presence of asbestos, exterior siding shingles, suspended ceiling tiles, roofing materials, and sprayed-on fireproofing or metal beams and columns
8. Friability
9. OSHA
10. Any of the following are correct: pay attention to asbestos warning signs, follow safety practices, heed the labels on asbestos products or waste, use good housekeeping practices, avoid disturbing any building materials that may contain asbestos, and stop smoking

Unit 1: Asbestos and Asbestos-Containing Material

Unit Objectives

When you have completed this section you will be able to recognize

- definitions and acronyms associated with asbestos,
- the forms and properties of asbestos, and
- uses and locations of asbestos and ACM.

Definitions of Terms

The term. . .	is defined as. . .
asbestos	a family of naturally occurring minerals whose crystals form into long, thin fibers, unlike most other minerals. The fibrous, crystalline makeup gives asbestos many desirable physical properties for use in construction and industry. Asbestos is abundant, easily obtained, relatively cheap, and found throughout the world. Primary production sites include Canada, the former Soviet Union, South Africa, and the United States (California and Vermont). (Since 1971, more than 4.5 million tons of asbestos fibers have been produced each year, and asbestos has been used in approximately 3,000 products.)
asbestos-containing material (ACM)	any material that contains more than one percent asbestos. The majority of ACMs are construction materials. Materials that contain one percent asbestos or less are not considered ACM and are not regulated.
presumed asbestos-containing material (PACM)	material *thought* to contain more than one percent asbestos. Thermal system insulation (TSI) and surfacing material awaiting the results of sample analysis are treated as PACM until the analytical results are received. ***Note:*** *PACM is designated only for TSI and surfacing material found in buildings built before 1980.*

Definitions of Terms—continued

The term. . .	is defined as. . .
friable	a type of ACM that, when dry, can be easily crushed, crumbled, pulverized, or reduced to powder by hand pressure. Examples of friable ACM include • spray-on acoustic or fire coatings, • acoustical ceiling tiles, and • TSI.
nonfriable	a type of ACM that cannot be easily crumbled, pulverized, or reduced to powder with hand pressure and generally does not emit fibers. Nonfriable ACM may emit fibers when subjected to aggressive operations such as sanding or sawing. Examples of nonfriable ACM include • vinyl floor tiles, • transite sheet and pipe, • some wall plasters and joint compounds, • asphalt products such as asbestos-reinforced tars, • mastics and tar papers, and • friction materials such as brake and clutch linings.* ** Asbestos-containing friction products, such as clutches or brakes, release fibers during normal operations, and asbestos-containing dust can be retained within these devices. For this reason, service of such devices should be left to qualified individuals with proper equipment.*
thermal system insulation (TSI)	is ACM applied to pipes, fittings, boilers, tanks, ducts, or other structural components to prevent heat loss or gain. TSI is usually friable.

Forms of Asbestos

Asbestos minerals are divided into two groups—serpentines and amphiboles. The two groups are distinguished by their crystalline structure. Serpentine minerals have a sheet or layered structure, whereas amphiboles have a chain or spike-like shape. The table below describes six asbestos minerals that are members of these two groups.

Group	Mineral	Description and Properties
serpentine	chrysotile	green, gray, amber, or white fibers with a silky luster very high tensile strength good electrical insulator under dry conditions ***Note:*** *Chrysotile accounts for 95 percent of asbestos in buildings and commercial products.*
amphibole	amosite	gray, yellow, or dark brown fibers with a pearly luster course texture low tensile strength ***Note:*** *Amosite is the second most likely type of asbestos to be found in buildings.*
	crocidolite	blue fibers with a silky or dull luster good acid resistance excellent thermal insulator
	tremolite	gray-white, green, yellow, or blue fibers with a silky luster moderately high degree of hardness excellent acid and chemical resistance
	actinolite	hard, green fibers with a silky luster harsh texture and poor flexibility low tensile strength
	anthophyllite	yellow brown, gray, or white fibers with a harsh texture poor flexibility and low tensile strength good heat and acid resistance, and a good electrical insulator under humid conditions

Properties and Uses of Asbestos

The table below depicts some of the properties of asbestos and gives examples of how it is used.

Properties	Uses	Examples
noncombustible and fire resistant	fireproofing	firefighter's clothing fire-retardant additive for roof shingles siding and flooring spray-on ACM ceiling foam theater curtains
insulation	insulator against heat, cold, noise, and electricity	acoustic tiles for ceilings spray-on material for automobile undersealing electrical wire insulation air conditioning and stove-lining insulation
flexibility	woven into textiles	fire blankets
durability	used in friction products	brake linings clutch plates pavement surfacing
high tensile strength	structural and reinforcing agent	asbestos cement and plastic cement pipes shingles clapboard vinyl floor tiles grouts spackling

Asbestos-Containing Material at the Laboratory

The Laboratory was constructed at a time when the use of ACM was routine and often required. Many work areas at the Laboratory contain ACM, including attics, basements, ventilation areas, tunnels, vaults, and boiler rooms. Over time, ACM may release microscopic asbestos fibers because of damage, disturbance, or degradation. Work in any of these areas where fibers have been released may potentially expose Laboratory workers to asbestos. Generally, structures that were built or purchased after 1980 do not contain ACM.

Suspect Asbestos-Containing Material

If your job requires you to work in areas containing ACM or PACM, you should become familiar with what such materials look like and where they are located. The table below lists some of the types of ACM and PACM that may be found at the Laboratory.

Suspect ACM at the Laboratory

acoustical plaster	heating/electrical ducts
adhesives (mastics)	HVAC duct insulation
asphalt floor tile	joint compounds
blown-in insulation	laboratory gloves
boiler insulation	laboratory hoods
bulding siding (transite)	pipe insulation
caulking/putties	roof materials (shingles, tar paper)
ceiling tiles and lay-in panels	sealants
cement pipes	spackling compounds
cement wallboard	spray-applied insulation
decorative plaster	textured paints/coatings
electric wiring insulation	vinyl floor tile
elevator equipment panels	vinyl sheet flooring
fireproofing materials	vinyl wall coverings
flooring backing	wallboard

Note: *Do not disturb, remove, or try to repair any ACM without additional required asbestos training.*

Asbestos-Containing Material at the Laboratory—continued

How Can You Be Exposed to Asbestos-Containing Material?

If you are working in areas that contain ACM, you may be at increased risk of being exposed to airborne ACM if

- you are inadvertently creating airborne fibers from your own operations (even if you are not working directly with ACM),
- other workers are unknowingly creating airborne ACM from their operations (even if they are not working directly with ACM),
- you are working near damaged ACM that has deteriorated and is releasing airborne fibers, and
- you accidentally disturb ACM in accessing your operations.

Incident in a Pipe Chase

In January 1998, a pipefitter entered a pipe chase during a bathroom repair job. Before the work began, the pipe chase was evaluated and the insulation was inspected. Because the insulation was in good condition and because the work did not involve cutting into the insulation or piping, the pipefitter was not required to wear PPE when he entered the pipe chase.

Dust and construction debris were present, presumably from the original building construction. When remodeling work occurred in the opposite end of the pipe chase, insulation was cleaned out of half the chase because the pipefitters had cut into the pipes. However, the remainder of the insulation appeared untouched since being installed in the 1950s.

The pipefitter noticed white powdery material on his knees after working in the pipe chase for about twenty minutes. Realizing that the material could be asbestos, the pipefitter contacted the building manager. It was subsequently confirmed to be ACM. Fortunately, the work activities had not stirred up any significant respirable material, and only a small amount of fibers were found on the fitter's knees.

Asbestos-Containing Material at the Laboratory—continued

Although the asbestos-containing insulation had been inspected, the possibility that the construction debris might contain friable asbestos was not recognized before the pipefitter entered the pipe chase. Personnel conducting the environment, safety, and health (ES&H) survey viewed the pipe chase only from the access panel entryway, where no insulation was visible. Additionally, the access panel was not labeled to indicate that asbestos was present.

Because asbestos concerns were not identified during the inspection and review, the Laboratory-wide asbestos survey database was not utilized to determine whether asbestos hazards were present in the pipe chase. Before the repair work was allowed to resume, the debris was cleared out of the pipe chase and the area was thoroughly cleaned with a high-efficiency particulate air (HEPA) filtered-vacuum.

Self-Assessment

Answer the following questions as a review of Unit 1. Answers are on page 31.

1. What is ACM?

   _____

   _____

2. What is the difference between friable ACM and nonfriable ACM?

   _____

   _____

   _____

3. What are two types of asbestos minerals?

   _____

   _____

4. What are three properties of asbestos?

   _____

   _____

   _____

5. Where might you find ACM at the Laboratory?

   _____

   _____

   _____

6. Can you be exposed to ACM if you are not working directly with it? If so, how?

   _____

   _____

   _____

Unit 2: Health Concerns of Asbestos

Unit Objectives

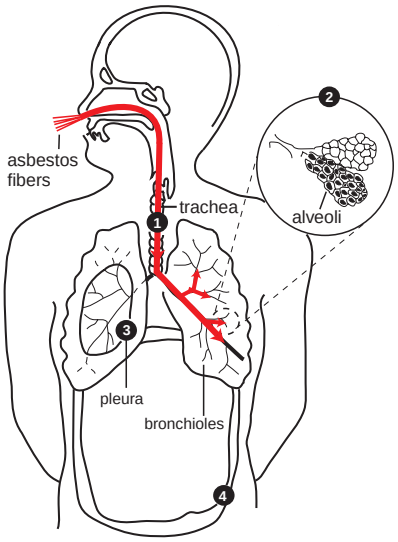
When you have completed this section, you will be able to recognize

- the health effects associated with asbestos exposure and
- the relationship between smoking and asbestos exposure.

Asbestos-Related Diseases

Asbestos-related diseases are chronic diseases, and symptoms usually do not appear for 15 to 40 years after initial exposures to airborne asbestos fibers. In nearly all cases, many years of exposure to high levels of airborne ACM is necessary for personnel to contract asbestos-related diseases.

The primary exposure route is inhalation. Inhaled fibers may become embedded in the bronchial tubes or alveoli, or they may pass through to the pleura—the lining of the chest cavity. Asbestos-related diseases include asbestosis, lung cancer, mesothelioma, and gastrointestinal cancers.



1. Asbestos fibers embedded in airways may cause lung cancer.
2. Fibers that reach the alveoli may cause asbestosis.
3. Fibers that migrate to the pleura may cause mesothelioma.
4. Mesothelioma can also occur in the peritonium, the lining of the abdominal cavity.

Asbestos-Related Diseases—continued

Asbestosis

Asbestosis is a respiratory disease that appears after chronic exposure to asbestos fibers. Inhaled fibers trapped in the lungs cause irritation and inflammation and lead to scarring and fibrosis. Eventually, the lungs stiffen, breathing becomes more difficult, and transfer of oxygen to the blood is affected. The disease is progressive and irreversible in nature. Currently, no effective treatment exists. Symptoms of asbestosis may include

- shortness of breath—initially after strenuous exertion and eventually while at rest,
- irritated dry cough (particularly in smokers),
- chest tightness or pain,
- a dry crackling sound in lungs during inhalation, and
- fibrotic scarring of lung tissue.

Lung Cancer

Lung cancer is a malignant tumor within the lung that may arise from exposure to asbestos fibers, smoking, or a combination of both. Tumors within the lung can impede airflow and may become infected. Symptoms of asbestos-related lung cancer may include

- persistent chest pain unrelated to coughing,
- development of a persistent cough,
- change in a chronic cough, and
- coughing up blood.

Mesothelioma

Mesothelioma is a rare cancer of the chest and abdominal lining that spreads rapidly over the surface of the lungs, abdominal organs, and heart. Mesothelioma has a latency period of about 10 years. It has no known cure, and death occurs within one to two years of diagnosis. Symptoms of mesothelioma may include

- pleural effusion (fluid in the lungs),
- shortness of breath,
- dull and aching chest pain, and
- progressive weight loss.

Asbestos-Related Diseases—continued

Gastrointestinal Cancers

Gastrointestinal cancers may occur when inhaled asbestos fibers enter the bloodstream and/or lymphatic system and are carried to other parts of the body. Gastrointestinal cancers from exposure to asbestos may develop in the esophagus, larynx, oral cavity, stomach, colon, rectum, and kidneys. The risk increases with chronic exposure to asbestos fibers. Symptoms of gastrointestinal cancers may include

- blood in the feces and
- anemia.

Note: *If you have worked with asbestos in the past, and you suspect you may have some of the signs or symptoms described above, see your doctor. If you feel the exposure is work-related, contact Occupational Medicine (ESH-2) at 7-7839. Early detection of asbestos-related diseases is possible by a medical examination.*

Smoking and Asbestos Exposure

Medical research indicates that the risk of developing lung cancer is about 90 times greater for smokers who are exposed to asbestos than for nonsmokers who are not exposed to asbestos. Research also indicates that smoking cessation can reduce this risk. For information on how you can stop smoking, contact any of the organizations listed in the table below.

Smoking Cessation Resources		
Group	**Phone**	**Web Site**
Laboratory Employee Assistance Program (EAP)	7-7339	drambuie.lanl.gov/~eap/
National Cancer Institute	(800) 4-CANCER	www.nci.nih.gov
American Cancer Society	(800) 227-2345	www.cancer.org
American Heart Association	(800) 242-8721	www.americanheart.org
American Lung Association	(800) 586-4872 or (800) 221-LUNG	www.lungusa.com

Self-Assessment

Answer the following questions as a review of Unit 2. The answers are on page 31.

1. Name two asbestos-related diseases.

   _____

   _____

2. How long does it usually take for asbestos-related diseases to develop?

   _____

3. Do cigarette smokers who are exposed to asbestos have an increased or decreased risk of developing lung cancer?

   _____

   _____

4. If you are a cigarette smoker who has been exposed to asbestos, what can you do to lower your risk of developing lung cancer?

   _____

   _____

   _____

Unit 3: Regulatory Requirements

Unit Objectives

When you have completed this section, you will be able to recognize

- organizations and documents that address asbestos,
- occupational exposure limits for asbestos in the workplace, and
- employer responsibilities and housekeeping requirements according to OSHA asbestos regulations.

Regulatory Drivers

Primary Drivers

The Department of Energy (DOE) requires the Laboratory to comply with those asbestos standards that are applicable to its operations. OSHA and the EPA provide the primary regulatory control over asbestos exposure, although various states may have more stringent requirements. The table below summarizes the standards from each agency.

Agency	Standard	Intended for
OSHA*	Code of Federal Regulations 29 CFR 1910.1001†	general industry personnel who work with or around ACM
	29 CFR 1926.1101†	construction personnel who work with ACM
EPA*	40 CFR 61 (National Emissions Standards for Hazardous Air Pollutants [NESHAP])	waste disposal and environmental release of ACM
	40 CFR 763 (Asbestos Hazard Emergency Response Act [AHERA])	handling and removal of ACM in schools and public buildings

**These regulations, along with their appendices, are accessible online at* http://www.osha.gov *and* http://www.epa.gov*. The EPA site also contains information about where you might find asbestos in your home and what you should do if you find it there.*

†*These standards and their appendices are listed in the appendix of this manual.*

Regulatory Drivers—continued

The New Mexico Environment Department (NMED) Air Quality Bureau administers the asbestos NESHAP. The NMED receives notification of all asbestos removed at the Laboratory, reviews such operations for compliance, and inspects Laboratory facilities under asbestos NESHAP guidelines.

Laboratory Requirements

When published, Laboratory Implementation Requirement (LIR) 402-570-01, *Asbestos*, will specify Laboratory requirements and worker roles related to asbestos. According to this LIR, workers must

- immediately notify the safety- and environmentally-responsible line manager and/or the building manager if damaged or deteriorated ACM or PACM is found, and
- submit documentation of off-site asbestos-related training to the designated training generalist.

Note: *Currently, Administrative Requirement (AR) 6-10,* Asbestos*, outlines requirements related to asbestos.*

Asbestos Management Program Plan

The Asbestos Management Program (AMP) Plan documents the approach for the management of ACM at the Laboratory. The plan outlines the safe management and removal of asbestos at the Laboratory and establishes a systematic approach to controlling environmental and health hazards associated with asbestos exposure while maintaining compliance with applicable regulatory standards.

Occupational and Safety Health Administration Specifications

Classifications of Asbestos Work

OSHA regulations classify four types of asbestos work, summarized in the table below. Each class may require different levels of training, some as long as 40 hours in length.

Note: *Facility-specific training identifying locations of ACM and facility-specific controls is also required by OSHA. If this information is not communicated to you, contact your supervisor.*

OSHA Classifications of Asbestos Work	
Class	**Activities Addressed**
I	removal of TSI removal of surfacing ACM and PACM
II	removal of ACM that is not TSI or surfacing material removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics
III	repair and maintenance operations in which ACM, including TSI and surfacing ACM and PACM, is likely to be disturbed
IV	maintenance and custodial activities during which workers contact but do not disturb ACM or PACM dust, waste, and debris cleanup resulting from Class I, II, and III activities

Note: *This awareness-level training is only sufficient to allow authorized personnel to perform "maintenance and custodial activities during which workers contact but do not disturb ACM or PACM" (the first bullet of class IV work). Any other class work, including "dust, waste, and debris cleanup resulting from Class I, II, and III activities" (the second bullet of class IV work) requires additional training.*

Permissible Exposure Limit and Excursion Limit

OSHA has established permissible exposure limits (PELs) and excursion limits for all workers. These limits are designed to prevent workers from being exposed to concentrations of ACM that are suspected to cause adverse health effects. Sampling and analytical methods used to determine whether these limits are being met or exceeded are found in Appendix A of 29 CFR 1926.1101 and 1910.1001.

Occupational and Safety Health Administration Specifications —continued

A quart-size container (such as a milk carton) that contained 100 airborne asbestos fibers would have a concentration approximately equal to 0.1 f/cc.

The *PEL* of airborne asbestos is a concentration of 0.1 fiber per cubic centimeter (f/cc) of air as averaged over eight hours.

The *excursion limit* for airborne asbestos is a concentration of 1.0 fiber per cubic centimeter of air as averaged over a period of 30 minutes.

Note: *Airborne concentrations that exceed the exposure limits may not be visible to the naked eye. Never assume airborne concentrations are below the established limits just because you cannot see fibers in the air.*

Employer Responsibilities

OSHA asbestos regulations require that employers provide workers with hazard and exposure information. The Laboratory is required to

- notify you of the presence, quantity, and location of ACM and PACM;
- inform you of the information presented in 29 CFR 1910.1001 and 29 CFR 1926.1101, including
  - — methods of recognizing asbestos,
  - — health effects associated with asbestos exposure,
  - — the relationship between smoking and asbestos in causing lung cancer,
  - — the importance of postings and labels for identifying asbestos,
  - — safe work practices, and
  - — the correct use of personal protective equipment (PPE);
- determine if you are being exposed to asbestos;
- notify you of exposure;
- notify you of actions taken if exposure is above the permissible limit;
- maintain your exposure records for at least 30 years and your medical records for the duration of your employment plus 30 years; and
- release your exposure and medical records to your physician or designated representative upon your written request.

Self-Assessment

Answer the following questions as a review of Unit 3. The answers are on page 32.

1. Name two government agencies involved in asbestos regulations.

   _____

   _____

2. What is the difference between the PEL and the excursion limit for asbestos?

   _____

   _____

   _____

   _____

3. What are three responsibilities that OSHA requires your employer to perform if you work in the area of ACM?

   _____

   _____

   _____

Notes. . .

Unit 4: Control Methods

Unit Objectives

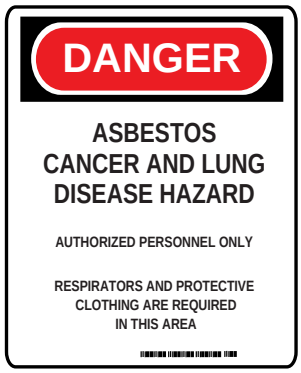
When you have completed this section, you will be able to recognize

- controls, safe work practices, and housekeeping requirements to minimize potential asbestos exposure and
- what to do if you find asbestos in poor condition.

Controlling Exposure to Asbestos

Controls used to minimize potential exposures to asbestos may include

- wet methods, in which liquids are used to prevent asbestos fibers from becoming airborne during repair or abatement activities;
- ventilation, to capture or prevent the spread of airborne asbestos fibers during repair or abatement activities;
- encapsulation, in which ACM is treated with a substance to lock the fibers into place, preventing them from becoming airborne.
- signs, labels, or caution tape warning of asbestos work or ACM;
- approved plans and procedures, such as hazard control plans (HCPs) and activity hazard analyses (AHAs) that describe activity-specific controls for ACM hazards; and
- training, which familiarizes personnel with the hazards of working around ACM, the controls available to minimize potential exposures, and the actions to take when potential exposures to ACM are anticipated or recognized.



Note: *OSHA regulations require asbestos awareness refresher training every year for workers who perform housekeeping operations in areas that contain ACM or PACM.*

Safe Work Practices

If you disturb ACM, asbestos fibers may be released into the air, increasing your risk of acquiring an asbestos-related disease. Although working with or near nonfriable ACM is less hazardous than working with or near friable ACM, fibers can still be released from nonfriable ACM, depending on the operations performed. To prevent nonfriable ACM from becoming airborne, the following operations should be avoided (unless adequate controls are in place):

- cutting,
- drilling,
- sanding,
- filing,
- abrading,
- driving nails or screws into ACM, and
- any other operation that might cause ACM to crumble.

Note: *In areas where ACM has been disturbed, contact site ES&H personnel to assess the situation and take appropriate action.*

Integrated Safety Management

Integrated Safety Management (ISM) steps (shown in the figure below) are effective methods of developing controls for ACM, as well as all other types of workplace hazards. Anticipation of ACM hazards before work begins (step 2) and recognition of unanticipated ACM hazards during work (step 4) are essential to help prevent exposure.

Safe Work Practices—continued

Housekeeping Requirements

Housekeeping requirements when working with or around ACM are very specific in OSHA standards. The following requirements are selected from 29 CFR 1910.1001 (k).

- Maintain all surfaces as free as practicable of ACM waste, dust, and debris.
- Do not sand flooring that has ACM.
- To strip finishes, use low abrasion pads at speeds lower than 300 rpm and wet methods.
- Dry buff flooring that has ACM only if there is sufficient finish to prevent the pad from contacting the ACM.
- Do not dust, dry sweep, or vacuum in areas with accessible ACM or PACM or visibly deteriorated ACM without using a HEPA filter.

Note: *Asbestos housekeeping requirements apply to authorized personnel only. Unauthorized personnel must not work with or around ACM or PACM.*

Personal Protective Equipment

Selecting Personal Protective Equipment

When working with or near ACM, you should select PPE based on an exposure assessment that considers factors such as

- the type of work activity,
- the duration of the activity, and
- the type of ACM (friable or nonfriable) involved.

Personal Protective Equipment—continued

Types of Personal Protective Equipment

Types of PPE that may be used when working in areas with ACM or PACM may include, but are not limited to,

- respiratory protection,
- disposable coveralls with foot and head coverings,
- eye protection,
- gloves, and
- booties.

Remember: *This awareness-level course only permits authorized personnel to perform "maintenance and custodial activities during which workers contact but do not disturb ACM or PACM."*

Incident in a Beauty Salon

A beautician who operated a beauty salon for more than 20 years was environmentally exposed to asbestos through customers who worked at a large asbestos production facility in Manville, New Jersey. Routinely, she would have to brush the asbestos dust out of the hair of the weavers who worked in the textile division. As a result of this, both her fingers and toes became clubbed (clubbing of the extremities indicates impaired blood oxygenation resulting from advanced lung scarring.) Diagnosed with asbestosis in the early 1980s, she died in the summer of 1997 from an asbestos-related cancer.

Conditions to Watch For

While most ACM at the Laboratory has been identified and posted, ACM that is not posted with signs or labels may be present in some areas. In areas where ACM or PACM may be present, you should watch for the following conditions:

- torn or missing covers on insulated pipes, boilers, vessels, and other equipment;
- dust or debris on the floor under insulated pipes or other equipment, particularly if the cover is torn or missing;
- water damage from roof leaks, plumbing leaks, or high humidity; and
- deterioration, delamination, or physical damage of suspect ACM.

Actions to Take

If any of these conditions exist, and you think there may be a potential for exposure to asbestos, you should

- leave the area;
- notify your supervisor, the safety- and environment-responsible line manager and/or the building manager if damaged or deteriorated ACM or PACM is found;
- notify your safety officer; and
- call the Industrial Hygiene and Safety Group (ESH-5) at 7-5231, or if you are a Johnson Controls Northern New Mexico (JCNNM) employee, call Training Safety (JSFT) at 7-5771.

Note: *Don't try to repair damaged ACM, clean up ACM, or work around ACM if you are not authorized to do so. If you think there is an exposure hazard, leave the area immediately!*

Incident in the Chemistry and Metallurgy Research Building

In 1996 at the Chemistry and Metallurgy Research (CMR) Building, four electric workers contacted and disturbed ACM during work associated with the installation of communication conduits in an attic of the CMR facility. The workers wore their personal work clothes, including t-shirts and overalls for the job. To get on the roof, they had to periodically use a ladder located in the attic. Each time the workers climbed the ladder and squeezed through the gap between the TSI-wrapped piping and the ladder, they rubbed against the TSI with their backs, damaging the TSI and releasing ACM debris onto the floor. Additionally, one worker used a hammer and chisel to remove a 6” x 12” area of transite wallboard.

Although air samples collected after the incident indicated that no personnel were exposed above the PEL, subsequent analysis of the incident revealed that

- the work area was not adequately inspected prior to the job;
- the AHA was not submitted for review and approval until after work commenced; and
- only one of the four workers recognized the potential asbestos hazards, even though the TSI on the piping above the ladder and the transite wall-board near the work area were properly labeled with asbestos warning signs.

Occurrence Report (ALO-LA-LANL-CMR-1996-0019)

Self-Assessment

Answer the following questions as a review of Unit 4. The answers are on page 32.

1. What are three examples of controls used to minimize the potential for airborne ACM exposures?

   _____

   _____

   _____

2. What are two operations that should be avoided to prevent nonfriable ACM from becoming airborne?

   _____

   _____

3. What are two housekeeping requirements found in 29 CFR 1910.1001?

   _____

   _____

4. What are two conditions to watch for in areas where unlabeled ACM might be present?

   _____

   _____

5. What should you do if you discover damaged ACM?

   _____

   _____

   _____

   _____

Notes. . .

Self-Assessment Answers

Unit 1

1. ACM is any material that contains more than one percent asbestos.
2. Friable ACM can be easily crushed, crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM cannot be easily broken or crushed into fibers with hand pressure and generally does not emit fibers.
3. Any of the following are correct: chrysotile, amosite crocidolite, tremolite, actinolite, and anthophyllite
4. Any of the following are correct: noncombustible, fire resistant, insulative, flexible, durable, and high tensile strength
5. Many areas at the Laboratory contain ACM, including attics, basements, ventilation areas, tunnels, vaults, and boiler rooms.
6. Yes. You can be exposed to asbestos without working directly with it if other workers in the area are disturbing it or if it is deteriorated and emitting airborne fibers.

Unit 2

1. Any of the following are correct: asbestosis, lung cancer, mesothelioma, and gastrointestinal cancers
2. 15-40 years after initial exposures to airborne asbestos fibers
3. Cigarette smokers who are exposed to asbestos have an increased risk of developing lung cancer.
4. Stop smoking!

Unit 3

1. Any of the following are correct: OSHA, EPA, and NMED
2. The PEL of airborne asbestos is 0.1 fiber per cubic centimeter (f/cc) of air averaged over eight hours (480 minutes), while the excursion limit for airborne asbestos is 1.0 f/cc of air averaged over 30 minutes.
3. Any of the following employer responsibilities are correct: notify you of the presence and location of ACM and PACM, inform you of the information presented in OSHA standards, determine if you are being exposed to asbestos, notify you of exposure, notify you of actions taken if exposure is above the PEL, maintain your exposure and medical records, and release your records upon your written request.

Unit 4

1. Any of the following controls are correct: wet methods; ventilation; encapsulation; signs, labels, or caution tape; pipe insulation painted with gold-fleck paint; training; safe work practices; and personal protective equipment.
2. Any of the following are correct: cutting, drilling, sanding, filing, abrading, and any other operation that might cause ACM to crumble, unless adequate controls are in place.
3. Any of the following housekeeping requirements are correct:
   - Maintain all surfaces free of ACM waste, dust, and debris.
   - Do not sand flooring that has ACM.
   - To strip finishes, use low abrasion pads at speeds lower than 300 rpm and wet methods.
   - Dry buff ACM flooring only if there is sufficient finish to prevent the pad from contacting the ACM.
   - Do not dust, dry sweep or vacuum in areas with accessible ACM or PACM or visibly deteriorated ACM without using a HEPA filter.
4. Any of the following conditions are correct: torn or missing covers on insulated pipes, boilers, vessels, and other equipment; dust or debris on the floor under insulated pipes or other equipment; water damage; and deterioration or physical damage of suspect ACM.
5. If you discover damaged ACM, leave the area immediately and notify your supervisor and ESH personnel.

Appendix

Standard	Section	Information	Compliance
29 CFR 1910, General Industry Standard for Asbestos	1910.1001	asbestos	mandatory
	1910.1001 App A	OSHA reference method	mandatory
	1910.1001 App B	detailed procedure for asbestos sampling and analysis	non-mandatorv
	1910.1001 App C	qualitative and quantitative fit testing procedures	mandatory
	1910.1001 App D	medical questionnaires	mandatory
	1910.1001 App E	interpretation and classification of chest roentgenograms	mandatory
	1910.1001 App F	work practices and engineering controls for automotive brake and clutch inspection, disassembly, repair, and assembly	mandatory
	1910.100l App G	substance technical information for asbestos	non-mandatory
	1910.100l App H	medical surveillance guidelines for asbestos	non-mandatory
	1910.1001 App I	smoking cessation program information for asbestos	non-mandatory
	1910.1001 App J	polarized light microscopy of asbestos	non-mandatory
29 CFR 1926, Construction Standard for Asbestos	1926.1101	asbestos	mandatory
	1926.1101 App A	OSHA reference method	mandatory
	1926.1101 App B	sampling and analysis	non-mandatory
	1926.1101 App C	qualitative and quantitative fit testing procedures	mandatory
	1926.1101 App D	medical questionnaires	mandatory
	1926.1101 App E	interpretation and classification of chest roentgenograms	
	1926.1101 App F	work practices and engineering controls for Class I asbestos operations	non-mandatory
	1926.1101 App G	(reserved)	
	1926.1101 App H	substance technical information for asbestos	non-mandatory
	1926.1101 App I	medical surveillance guidelines for asbestos	non-mandatory
	1926.1101 App J	smoking cessation program information for asbestos	non-mandatory
	1926.1101 App K	polarized light microscopy of asbestos	non-mandatory

Notes

References

Code of Federal Regulations. 29 CFR Part 1910.1001. United States Government Printing Office, Washington, D.C.

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