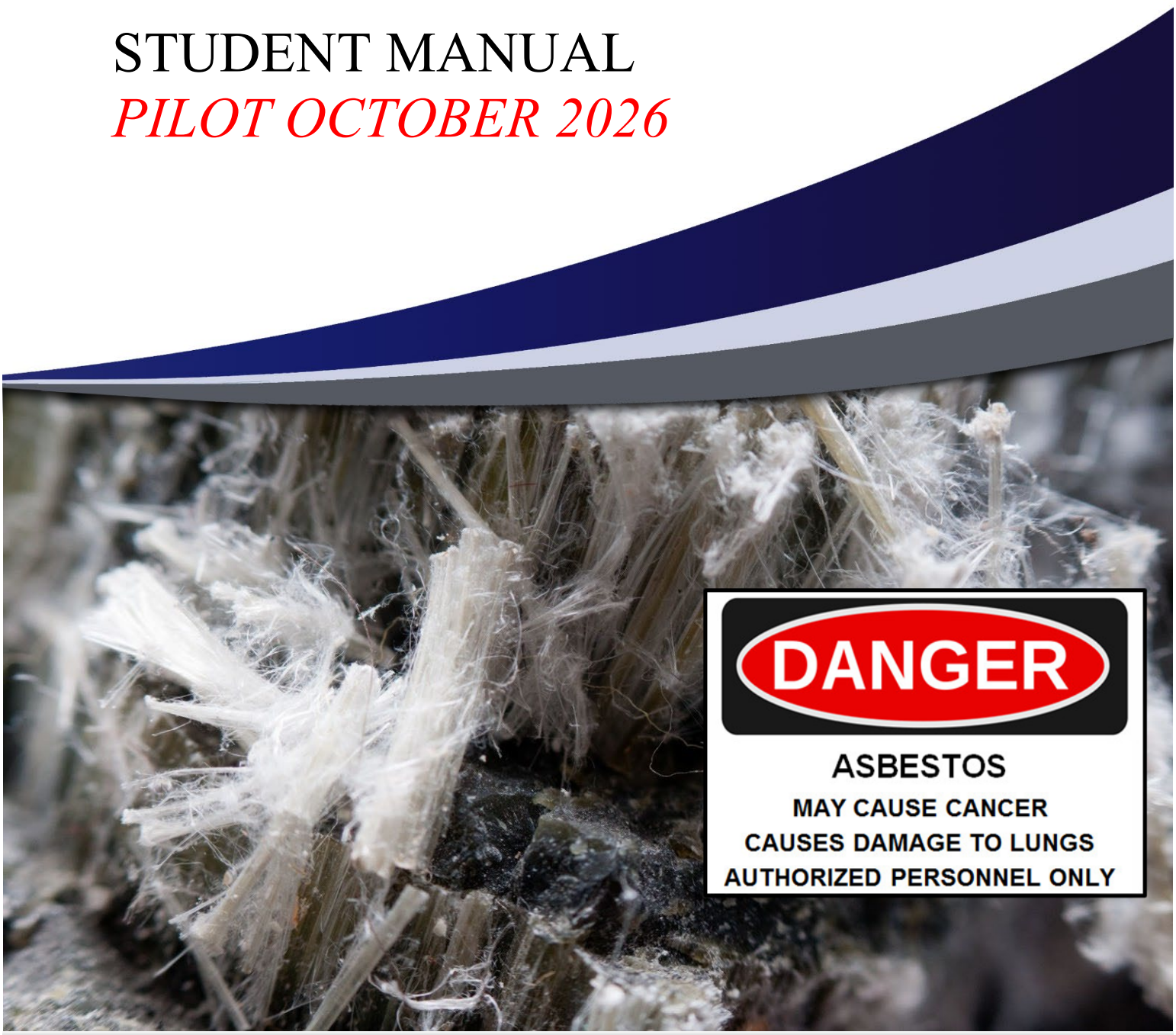
Los Alamos
NATIONAL LABORATORY

ASBESTOS AWARENESS LIVE

#8661

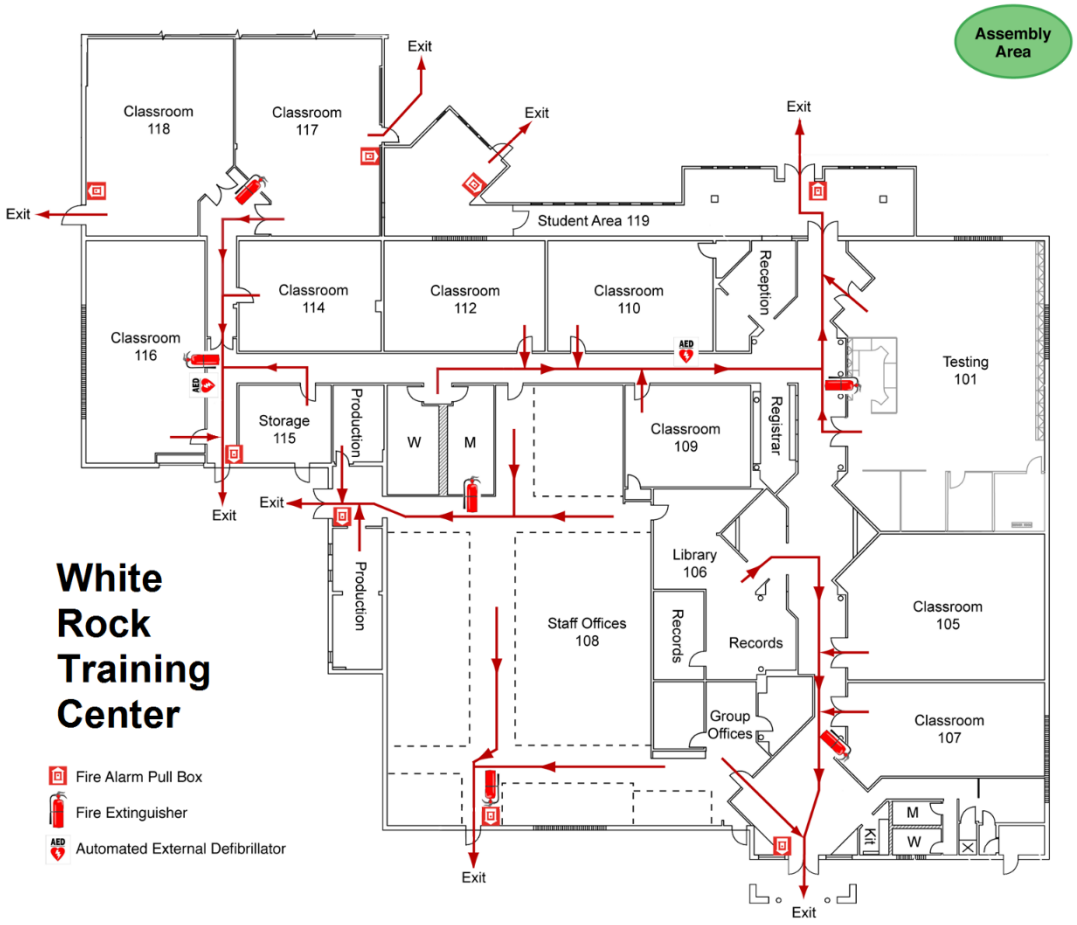
STUDENT MANUAL

PILOT OCTOBER 2026



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Asbestos Awareness Live #8661
October 2026 LA-UR-XX-XXXX
Controlled Document Number: ESHQ-SM-8661,R3.0

ASBESTOS AWARENESS LIVE

STUDENT MANUAL

Cover image: Chrysotile asbestos fibers

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Introduction and Orientation

Course Overview, Purpose, Objectives

Overview

Asbestos Awareness is an awareness-level course for personnel who may work in or around facilities where asbestos-containing materials (ACM) or presumed asbestos-containing materials (PACM) may be present. Many LANL facilities were constructed when asbestos was commonly used in building materials, and legacy ACM may still be present today.

This course provides information on asbestos minerals, the history of asbestos use, asbestos hazards, health effects, recognition of suspect materials, applicable requirements, exposure controls, and appropriate response actions. **This training does not authorize personnel to disturb, remove, repair, or clean up ACM or PACM.**

Purpose

The purpose of this course is to increase awareness of asbestos hazards and employee responsibilities for recognizing, avoiding, and reporting potential asbestos-containing materials at LANL. This training does not authorize employees to perform work that disturbs asbestos-containing materials.

Objectives

After completing this course, you will be able to recognize:

- basic properties, common uses, and typical locations of asbestos
- potential health effects associated with asbestos exposure
- key asbestos regulations and requirements, including:
    - applicable exposure limits
    - construction activities covered by asbestos regulations
    - classes of asbestos work
    - competent person roles
    - training requirements
    - employer responsibilities.
- visual characteristics of damaged or deteriorated ACM/PACM;
- methods used to control asbestos exposure; and
- appropriate response actions when asbestos fibers are released or ACM/PACM is suspected.

Target Audience

LANL Procedure P101-23, *Occupational Exposure to Asbestos*, requires custodial, maintenance, and craft personnel assigned to facilities where asbestos-containing materials (ACM) or presumed asbestos-containing materials (PACM) are present to complete **Asbestos Awareness Self-Study (#14727)** or **Asbestos Awareness Live (#8661)**. This training is required **annually**.

Procedure P101-23 also recommends that personnel with responsibilities identified in the procedure complete this course or **Asbestos Awareness Self-Study (#14727)**.

Program Owner

This course was developed under the direction and technical oversight of the Industrial Safety and Hygiene Group (ISH), the functional program owner for this training.

Additional Training Requirements

Completion of **Chemical Hazard Communication Introduction Live (#25418)** is required once for all authorized workers who may use, handle, store, or dispose of chemicals or substances that may be or become hazardous in their workplaces. After initial completion, Chemical Hazard Communication Self-Study (#25997) or an accepted substitute is required on a three-year refresher cycle.

Course Limitations

This Asbestos Awareness course provides **awareness-level training only**. It does not authorize personnel to disturb, remove, repair, clean up, or otherwise perform work on ACM or PACM. Personnel must have the training and authorization required for the class and type of asbestos work they perform.

This course is intended to support hazard recognition, exposure prevention, and proper reporting and does not replace task-specific training required for asbestos operations, maintenance, or abatement activities.

The responsible line manager (RLM) must ensure that each worker whom they manage has all required training and authorization for his or her work.

Registration and Attendance

To receive credit, all participants must attend and actively participate in the course, and sign the attendance roster for the course in ink.

Delivery Methods

Course delivery consists of lecture and presentation, group discussion, and participant activities.

Evaluation Strategy

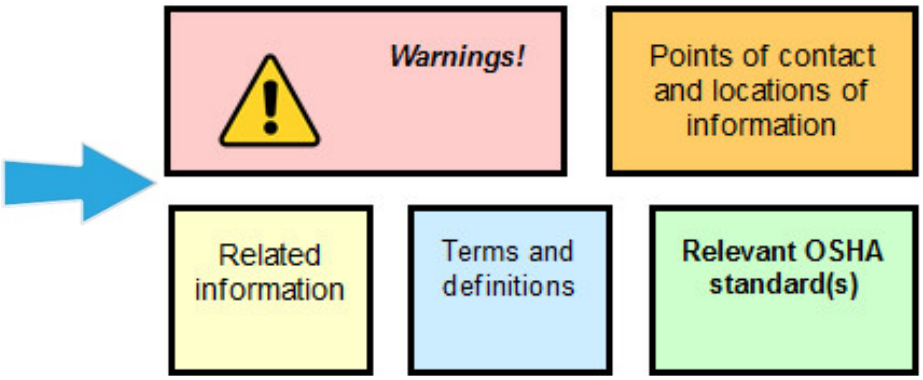
Participants will be evaluated through classroom discussions and participant activities. The instructor will use oral questioning during the presentation of each module and observation of activity completion to assess participants' mastery of the material. Problem areas identified during questioning will be reviewed in further detail.

Administrative Details

The instructor will use this portion of the course for introductions and to familiarize participants with facility safety and convenience features, the location of the facility's designated break area(s), and any additional resources or equipment available. Participants must adhere to all safety requirements during training sessions. They should see their instructor immediately if they have any questions or concerns about safety.

OSHA PELs (Permissible Exposure Limits)				
Limits	Abbrev.	In words	Approximation	Applies to
TWA: Time Weighted Average	0.1 f/cc	0.1 fibers per cubic centimeter	Correlates to approx. 400 fibers per gallon of air or 100,000 per cubic meter	Employee airborne exposure
EL: Excursion Limit	1.0 f/cc	1.0 fibers per cubic centimeter	Correlates to approx. 4000 fibers per gallon of air or 1 million fibers per cubic meter	Employee airborne exposure

Information is provided in color-coded boxes throughout this course as shown at the right.



Acronyms and Abbreviations

ACM	**Asbestos-Containing Material**
ALDESHQ-PO	**Associate Laboratory Directorate for Environment, Safety, Health, and Quality- Program Office**
CFR	**Code of Federal Regulations**
DOE	**Department of Energy**
EAP	**Employee Assistance Program (LANL)**
EL	**Excursion Limit**
EPA	**Environmental Protection Agency**
ESHQ	**Environment, Safety, Health, and Quality**
HEPA	**High-Efficiency Particulate Air**
IARC	**International Agency for Research on Cancer**
ISM	**Integrated Safety Management**
IWD	**Integrated Work Document**
LANL	**Los Alamos National Laboratory**
NESHAP	**National Emission Standards for Hazardous Air Pollutants**
NIH	**National Institutes of Health**
NIOSH	**National Institute for Occupational Safety and Health**
NMAC	**New Mexico Administrative Code**
NMED	**New Mexico Environment Department**
NNSA	**National Nuclear Security Administration**
OSHA	**Occupational Safety and Health Administration**
PACM	**Presumed Asbestos-Containing Material**
PCM	**Phase Contrast Microscopy**
PEL	**Permissible Exposure Limit**
PLM	**Polarized Light Microscopy**
PPE	**Personal Protective Equipment**
QIHSP	**Qualified Industrial Hygiene and Safety Professional**
RACM	**Regulated Asbestos-Containing Material**
RCT	**Radiological Control Technician**
RPP	**Respiratory Protection Program**
SDS	**Safety Data Sheet**
SME	**Subject Matter Expert**

TA	**Technical Area**
TEM	**Transmission Electron Microscopy**
TSI	**Thermal System Insulation**
TWA	**Time-Weighted Average**
USGS	**United States Geological Survey**
WMC	**Waste Management Coordinator**

Glossary

Asbestos Terms and Definitions*	
asbestos	A family of minerals whose crystals form long, thin fibers, unlike most other minerals. The fibrous, crystalline makeup gives asbestos many desirable physical properties for use in construction and industry.
asbestos-containing material (ACM)	OSHA defines ACM as material containing more than 1% asbestos. Materials containing 1% or less do not meet this definition of ACM; other asbestos requirements may still apply.
excursion limit (EL)	The airborne asbestos concentration to which a person can be exposed for a time-weighted 30-minute period per OSHA regulations.
friable	A type of ACM that, when dry, can be easily crushed, crumbled, pulverized, or reduced to powder by hand pressure. Examples of typically friable ACM include sprayed-on acoustic or fire coatings, acoustical ceiling tiles, thermal system insulation (TSI), and some deteriorated non-friable materials.
non-friable	A type of ACM that is NOT easily crumbled, pulverized, or reduced to powder with hand pressure and is less likely to release fibers when intact and undisturbed; cutting, sanding, sawing, abrasion, deterioration, or other damage can release fibers.
permissible exposure limit (PEL)	The airborne concentration to which a person may be exposed per OSHA regulations. The PEL is 0.1 fiber per cubic centimeter (f/cc) of air averaged over an 8-hour workday.
presumed asbestos-containing material (PACM)	Thermal system insulation (TSI) and surfacing material found in buildings constructed before 1981 and presumed to be asbestos until proven otherwise by laboratory analysis or suitable documentation, such as construction documents or a safety data sheet (SDS).
qualified industrial hygiene and safety professional (QIHSP)	A person within OSH division who meets the LANL qualification requirements to perform hazard assessments or, if a subcontractor, has equivalent knowledge or experience as approved by OSH-ISH.
surfacing material	ACM that has been sprayed, troweled, or otherwise applied to surfaces such as plaster on ceilings, fireproofing materials on building beams, or other materials on surfaces for acoustical or thermal insulation.
thermal system insulation (TSI)	Insulation applied to pipes, boilers, tanks, ducts, or other components to prevent heat loss or gain. TSI is often friable and commonly regulated as PACM in older buildings.

*See LANL Definition of Terms for detailed definitions and examples.





Above: Chrysotile asbestos mineral.
Left: Asbestos miners, circa 1876

Module 1

What is Asbestos and Why Was It Used?

Module Objectives



After completing this module, you will be able to:

- Define asbestos and describe its key physical properties.
- Explain why asbestos was commonly used in building materials and equipment.
- Recognize that asbestos may still be present in older facilities.

A Brief History of Asbestos



Asbestos has been used by humans for thousands of years because of its strength, flexibility, and resistance to heat and fire. Industrial use expanded rapidly during the late 19th and early 20th centuries. Medical reports of asbestos-related disease began appearing in the early 1900s, and later studies established links to asbestosis, lung cancer, mesothelioma, and other cancers.

OSHA issued its first federal workplace asbestos standard in **1971**. Worker protections were strengthened substantially in **1986**, and OSHA lowered the permissible exposure limit to the current **0.1 fiber per cubic centimeter (f/cc)** 8-hour time-weighted average in **1994**. The EPA has also restricted or prohibited many uses of asbestos, including additional restrictions and a phaseout process for ongoing uses of chrysotile asbestos finalized in **2024**. Despite these restrictions, legacy asbestos remains in many older buildings and equipment.

Vermiculite

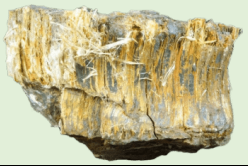
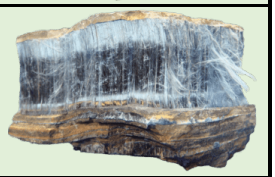
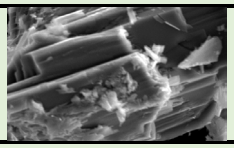
Vermiculite is a mineral that, when heated, pops like popcorn into a light-weight material used for insulation and packaging. Although vermiculite itself is not considered to be a health hazard, much of the vermiculite mined and sold in the United States during the 20th century came from mines near the town of Libby, Montana and contained tremolite asbestos. Tremolite-contaminated vermiculite from these mines was sold as Zonolite attic insulation (images, right)







Forms and Uses of Asbestos

Asbestos Type	Group	Description	Historic Uses	Image
Chrysotile "White asbestos"	Serpentine	Curly, bundled, flexible white, green, gray or amber fibers; most widely used form of asbestos	Insulation, flooring, roofing, brake linings, gaskets, pipe insulation wrap, vinyl floor tile, roofing materials, joint compound	
Amosite "Brown asbestos"	Amphibole	Straight, coarse, brittle brown, gray, or yellow fibers; strong heat resistance	Pipe insulation wrap, vinyl floor tile, roofing materials, joint compound, boiler insulation, cement panels, thermal system insulation (TSI)	
Crocidolite "Blue asbestos"	Amphibole	Very thin, straight blue fibers with a silky or dull luster; high tensile strength	Spray-on fireproofing, pipe insulation, some cement products, older spray-applied coatings, high-temperature insulation	
Tremolite	Amphibole	Needle-like fibers; often a contaminant rather than a commercial product	May occur as a contaminant in vermiculite, talc, or chrysotile. Some vermiculite insulation (e.g., Libby, Montana source)	
Other amphibole minerals: **Actinolite, anthophyllite**				

Textured ("popcorn") ceilings installed in older buildings may contain asbestos. EPA prohibited certain spray-applied asbestos-containing materials during the 1970s, but existing materials were not required to be removed. Older homes and facilities, including some in Los Alamos and White Rock, may still contain asbestos-containing textured ceiling material. The EPA recommends testing for ACM and actions to take before, during, and after the disturbance of such materials.



Properties and Examples of Asbestos Use		
Property	**Uses**	**Examples**
Fire Resistance	used for fireproofing	firefighter's clothing, fire-retardant additive for roof shingles, siding and flooring, sprayed-on ACM ceiling foam, theater curtains
Insulation	Installed as insulator against heat, cold, noise, and electricity	acoustic tiles for ceilings, sprayed-on material for automobile undersealing, electrical wire insulation, air conditioning and stove-lining insulation
Flexibility	woven into textiles	fire blankets, older heat-resistant lab mitts
Durability	used in friction products	brake linings, clutch plates, pavement surfacing
High tensile strength	structural and reinforcing agent	cement panels, cement pipes, shingles, clapboard, vinyl floor tiles, grouts, spackling, mastic

Important: You cannot determine whether a building material contains asbestos by its color or appearance. ACM is identified through reliable documentation or appropriate laboratory analysis.

Clockwise:
1. Friction lining on brake shoes
2. Acoustic ceiling tiles
3. Fire blanket
4. Fireproof coating
5. Fibrous wall materials







The condition of ACM must be considered.

Intact ACM that is in good condition and left undisturbed is less likely to release asbestos fibers. Fiber release becomes more likely when ACM is damaged, deteriorated, cut, drilled, sanded, scraped, torn, or otherwise disturbed.

At LANL, do not disturb ACM/PACM unless you are trained and authorized to perform the work.

Asbestos in Your Home:
https://www.epa.gov/asbestos/protect-your-family-exposures-asbestos

ACM at LANL

Many structures at LANL were built years ago when ACM was commonly used. Areas at LANL that may contain ACM include attics, basements, mechanical areas, tunnels, vaults, floors, walls, ceilings, and boiler rooms. The age of a building does not rule out the presence of ACM. Many older LANL facilities contain legacy ACM, but **building age alone cannot confirm or rule out asbestos**. ACM may also be present in some facilities constructed or remodeled after 1980.

If your job requires you to work in areas containing ACM or PACM, you should know what such materials look like and where they are found. This will be addressed in more detail in Module 4.

The table below lists some of the uses of ACM and PACM that may be found at LANL.

Possible ACM and PACM at LANL*		
acoustical plaster	electric wiring insulation	non-roofing coatings
adhesives (mastics)	elevator equipment panels	pipe insulation
asphalt floor tile	fireproofing materials	pipeline wrap
blown-in insulation	flooring backing	laboratory gloves
boiler insulation	gaskets	sealants
building siding (transite)	heating/electrical units	spackling compounds
caulking/putties	HVAC duct insulation	spray-applied insulation
ceiling tiles and lay-in panels	joint compounds	textured paints/coatings
cement pipes (transite)	roofing materials (shingles, tar paper, felt, coatings)	vinyl floor tile/vinyl sheet flooring
corrugated and flat sheet	laboratory hoods	vinyl wall coverings
decorative plaster	millboard	wallboard
* In the US, some products may continue to contain chrysotile during the EPA phaseout periods.		

Legacy asbestos at LANL: Vinyl tile and fume hood lining





How You Can Be Exposed to ACM

If you are working in areas that contain ACM, exposure may occur when:



- **your work** unintentionally disturbs ACM;
- **another worker's activity** releases fibers nearby;





- **damaged or deteriorated ACM** releases fibers; or
- you **accidentally contact or disturb ACM** while accessing your work.



Pipefitter Recognizes Loose ACM



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 entering the pipe chase.

Dust and construction debris were present; probably 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 rest of the insulation looked 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 ACM, the pipefitter contacted the building manager. It was later 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.

Although the insulation had been inspected, the possibility that the construction debris might contain friable asbestos was not recognized. Personnel conducting the hazard 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 LANL Asbestos Inventory Database was not used to see if asbestos hazards were present in the pipe chase. Before work continued, the debris was cleared out of the pipe chase and the area was thoroughly cleaned with a high-efficiency particulate air (HEPA) filtered-vacuum by trained, authorized personnel.

Module 1 Self-Assessment

1. What is the meaning of the acronym ACM?

   _____ _____ _____

2. List two types of asbestos minerals.

   _____ _____

3. Explain the difference between friable and nonfriable ACM and provide 3 examples of friable ACM:

   _____

   _____

   _____

4. List three useful properties of asbestos.

   _____ _____ _____

5. List three items or materials at LANL that might contain asbestos.

   _____ _____ _____

6. Why might you still find ACM at LANL?

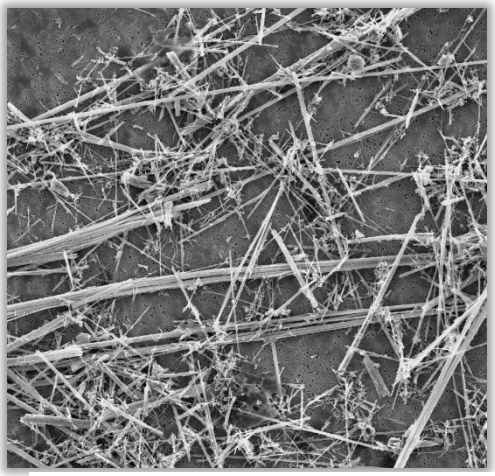
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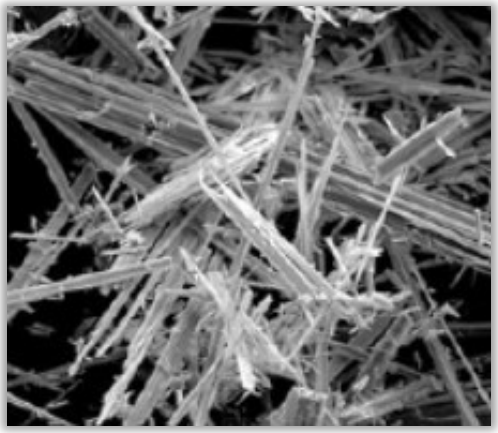
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Module

2





Micrographs of amosite *(above)* and crocidolite *(right)*
USGS Denver Microbeam Laboratory

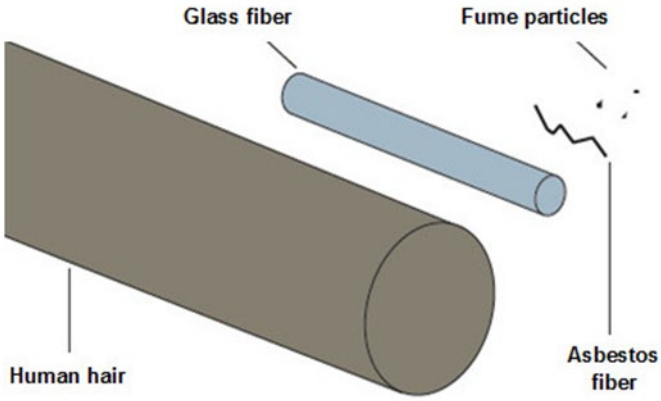
Health Effects of Asbestos Exposure

Module Objectives



After completing this module, you will be able to recognize:

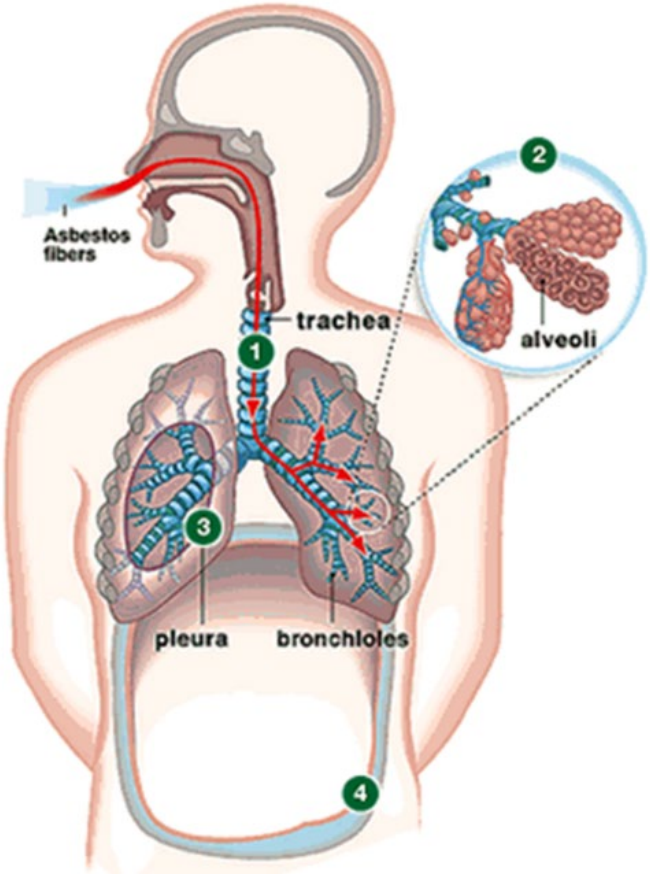
- the main route of exposure of asbestos,
- asbestos-related diseases caused by asbestos exposure
- the relationship between smoking and asbestos exposure



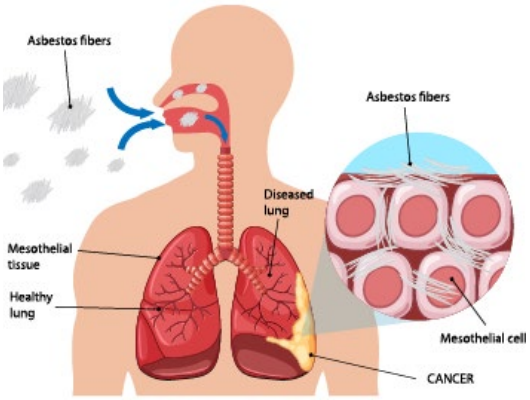


Warning! Airborne concentrations of asbestos fibers that exceed exposure limits might not be visible to the naked eye.

Route of Exposure



1. Asbestos fibers retained in lung tissue may contribute to the development of 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 peritoneum, the lining of the abdominal cavity.



Inhalation is the primary route of occupational asbestos exposure.
Airborne asbestos fibers may be inhaled deep into the respiratory system. Some fibers may remain in the airways or alveoli, while others may reach the pleura, the membrane surrounding the lungs. Over time, retained fibers can contribute to inflammation, scarring, and asbestos-related disease.

*The **pleura** is a thin, watery membrane that lines the chest cavity and helps to cushion the lungs.

Asbestos-Related Diseases

In 1906, the first documented asbestos-related death was reported in the United Kingdom, and by 1924, medical literature formally described asbestosis as a distinct occupational disease. In 1935, asbestos exposure was linked to lung cancer, and by the 1950s and 1960s, additional studies confirmed associations with mesothelioma and other cancers.

Asbestos-related diseases are chronic and usually develop slowly. Signs or symptoms may not appear until 10–40 years or more after exposure. Risk generally increases with the amount and duration of exposure, but asbestos-related disease has also been reported after shorter exposures. Asbestos-related diseases include asbestosis, lung cancer, mesothelioma, and certain other cancers.

Asbestosis

Asbestosis is chronic scarring of lung tissue caused by inhalation of asbestos fibers. As scarring progresses, the lungs become less flexible and breathing becomes more difficult. Symptoms may include

- shortness of breath
- persistent cough
- chest tightness
- finger clubbing (in advanced disease)



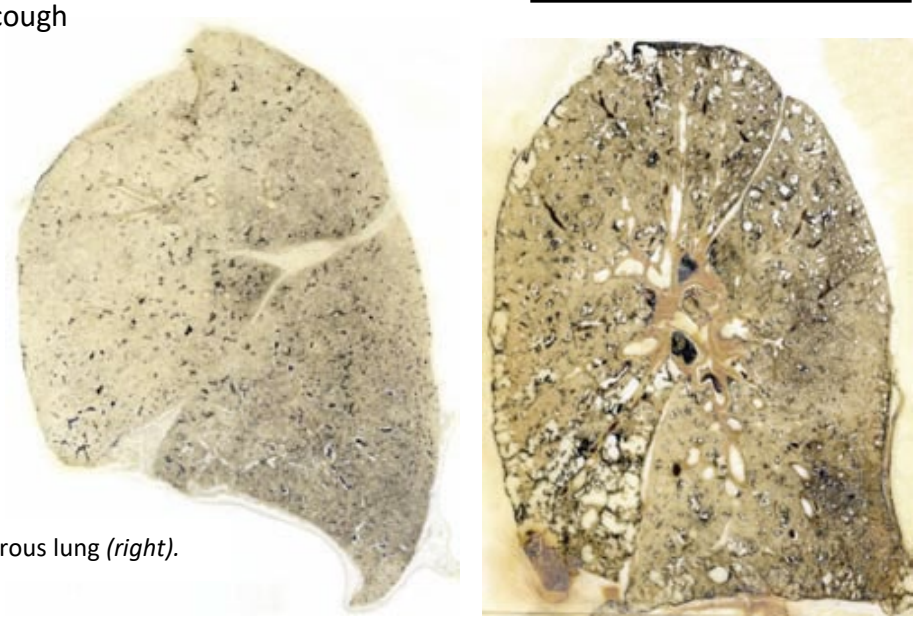
Finger clubbing may occur in asbestosis and is associated with more advanced disease. One study of 133 patients with asbestosis found finger clubbing in about 32% of patients, with clubbing occurring more often in those with advanced radiographic disease. https://doi.org/10.5271/sjweh.2699

Lung Cancer

Lung cancer can be a *malignant tumor within the lung caused by 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
- coughing up blood

***Malignant—**cancerous, and able to spread from the original site to other sites.



Normal lung *(left)*, cancerous lung *(right)*.

Mesothelioma

Mesothelioma is a rare, aggressive cancer of the mesothelium, most commonly the pleura surrounding the lungs. It may also occur in the lining of the abdominal cavity. Mesothelioma is usually not curable, although newer treatments can improve survival and disease control. Symptoms often do not appear until decades after asbestos exposure and may include:

- pleural effusion (fluid around the lung/in the pleural space)
- shortness of breath
- dull and aching chest pain
- progressive weight loss



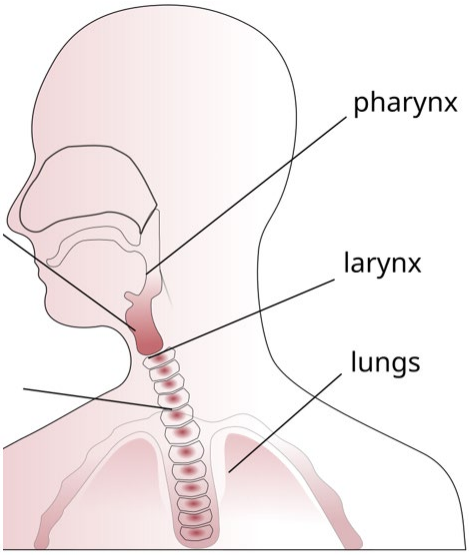
Lung with mesothelioma



Actor Steve McQueen died from mesothelioma in 1980. He was a heavy smoker; he also removed large amounts of asbestos from ships' boilers while in the Marines and wore asbestos suits while racing cars.

Other Asbestos-Related Cancers

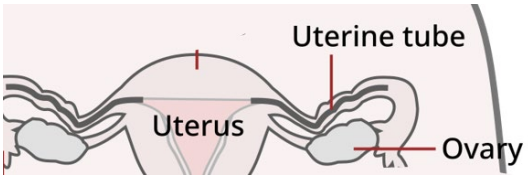
Asbestos is a known human carcinogen. In addition to lung cancer and mesothelioma, asbestos exposure can cause **cancer of the larynx and ovary**. Evidence also suggests possible associations with some other cancers, including cancers of the pharynx, stomach, and colorectum, but the evidence is more limited.



Indolences, Wikimedia Commons, CC BY-SA 3.0.

If you have worked with asbestos in the past, and you think you have some of the signs or symptoms shown on these pages, see your doctor. If you feel the exposure is LANL work-related, contact LANL Occupational Medicine at 505-667-0660.

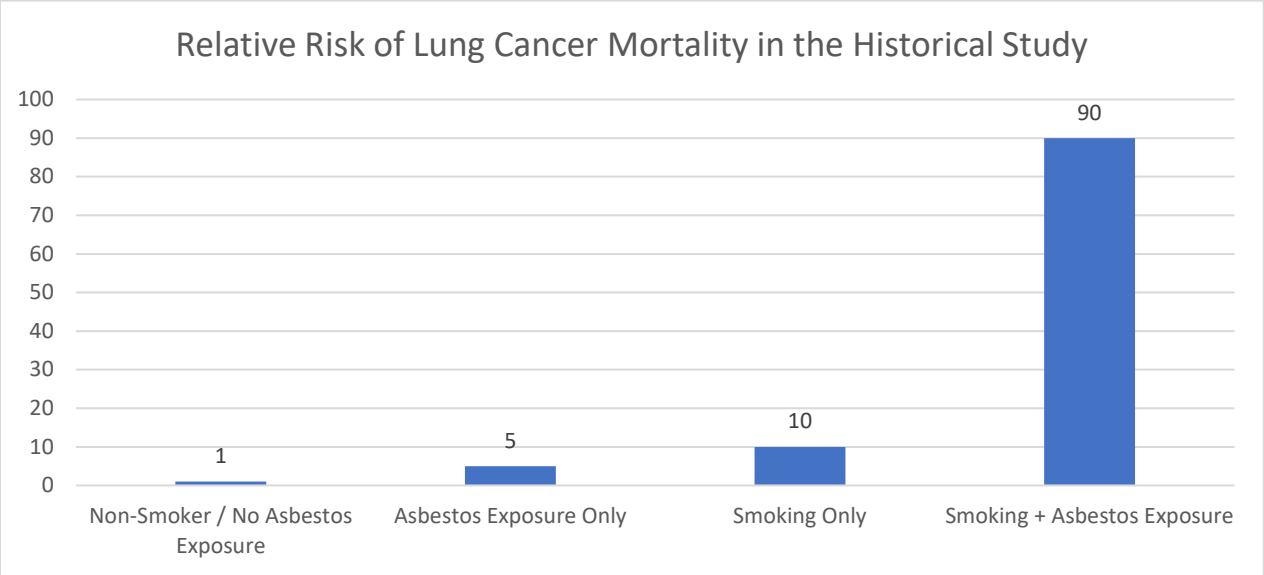
Medical surveillance may help identify asbestos-related health changes and allows appropriate medical follow-up.



Smoking and Asbestos Exposure

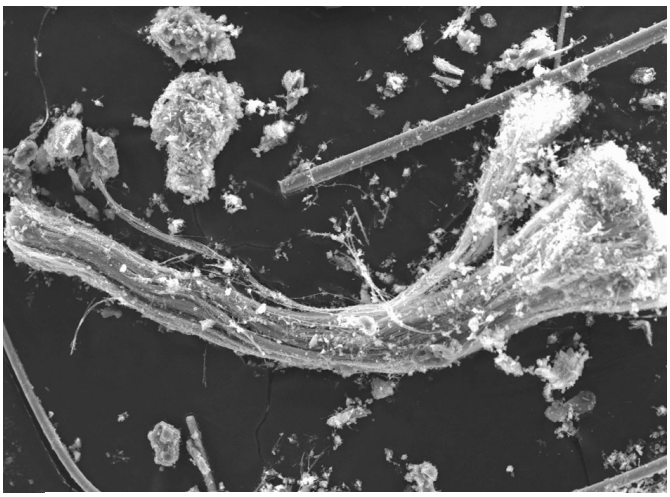


A landmark study of asbestos insulation workers found that workers who smoked had **approximately 92 times the risk of dying from lung cancer** compared with men who neither smoked nor worked with asbestos. Other studies have reported different risk estimates, but consistently show that smoking and asbestos exposure together greatly increase lung-cancer risk. 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.

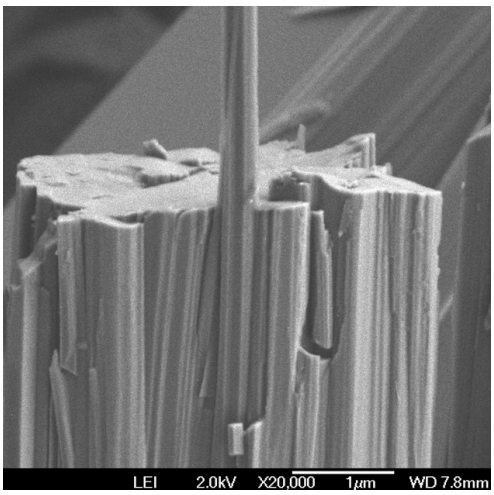


https://doi.org/10.1001/jama.1968.03140150010003

Smoking Cessation Help		
Organization	**Phone**	**Website/Contact**
LANL Employee Assistance Program (EAP)	505-667-7339	eap@lanl.gov
National Cancer Institute	(800) 4-CANCER	www.cancer.gov
American Cancer Society	(800) 227-2345	www.cancer.org
American Heart Association	(800) 242-8721	www.heart.org
American Lung Association	(800) 586-4872	www.lung.org



Chrysotile bundle, World Trade Center dust,
USGS Denver Microbeam Laboratory



Low voltage, high resolution image of fibrous amphibole from Libby, Montana,
United States Geological Survey (USGS) Denver Microbeam Laboratory

Module 2 Self-assessment

1. The acronym ACM can be used to help recall three asbestos-related diseases. List them below.

_____ _____ _____

2. Asbestos-related diseases do not occur immediately after exposure. Asbestos-related diseases may not appear until: (circle one)

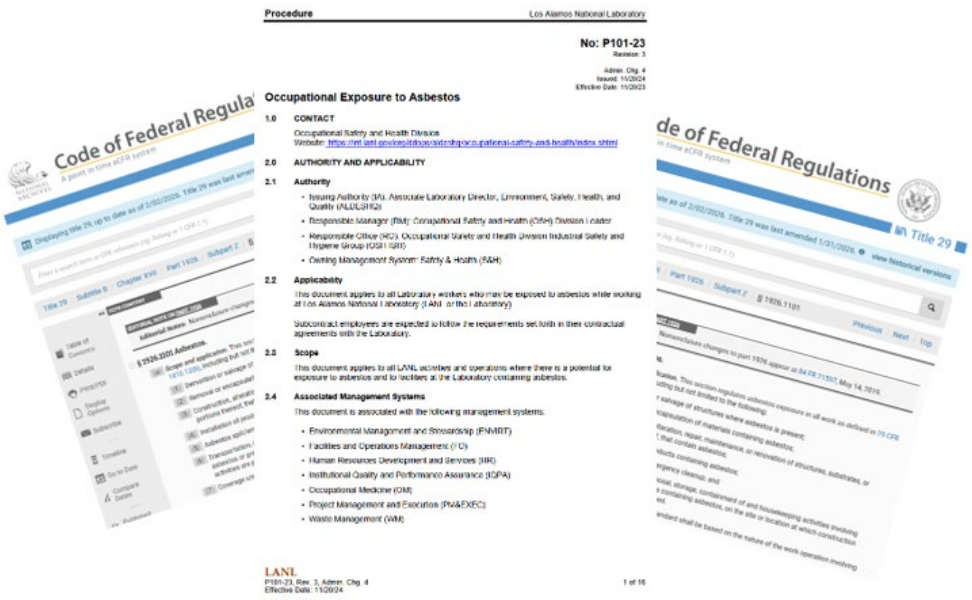
6 - 12 months 1 - 3 years 3 - 5 years 10 - 40 years or more

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

_____

4. Based on the historical study, about how many times more likely is a cigarette smoker with asbestos exposure to die from lung cancer, compared to a non-smoker who is not exposed to asbestos?

_____



Module 3

Asbestos Regulations and Responsibilities

Module Objectives

After completing this module, you will be able to recognize:

- regulations and requirements that address asbestos
- workplace exposure limits for asbestos
- activities specified in the OSHA construction standard for asbestos
- OSHA classes of asbestos work
- asbestos competent person responsibilities
- training requirements for persons working with or around asbestos
- ACM roles and responsibilities in the workplace



Asbestos Documents and Standards

Documents and standards that address exposures to asbestos in the workplace include

- 29 CFR 1910.1001, *Asbestos*: The OSHA standard for general industry personnel who work with or around ACM.
- 29 CFR 1926.1101, *Asbestos:* The OSHA standard for construction personnel who work with or around ACM.
- 40 CFR 763, *Asbestos*: The EPA standard for personnel who manage ACM in school buildings
- 40 CFR 61 (NESHAP), Subpart M, National Emission Standard for Asbestos: The EPA standard for release of asbestos fibers into air during activities such as demolition, renovation, waste handling, and disposal.
- P101-23, Occupational Exposure to Asbestos, the procedure for LANL workers who may be exposed to asbestos while working at LANL.

Asbestos Exposure Limits

1910.1001(c)

OSHA has established exposure limits designed to prevent workers from being exposed to airborne concentrations that are suspected to cause adverse health effects. The OSHA **permissible exposure limits (PELs)** for asbestos are as follows:

8-hour time-weighted average (TWA): 0.1 fiber per cubic centimeter (f/cc), averaged over an 8-hour period.

30-minute Excursion Limit (EL): 1.0 fiber per cubic centimeter of air (f/cc) averaged over a period of 30 minutes.

Sampling and analytical methods used to determine whether these limits are being met or exceeded are found in Appendix A of 29 CFR 1910.1001 and Appendix A of 29 CFR 1926.1101.

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



<u>Airborne concentrations that exceed the exposure limits might not be visible to the naked eye</u>. Never assume airborne concentrations are below the established limits just because you cannot see fibers in the air.

Both the General Industry and Construction Asbestos standards establish exposure assessment requirements based on initial monitoring or objective data. Medical surveillance requirements vary by standard and depend on factors such as exposure levels, duration of exposure, and the type of asbestos work performed. If you have exposure assessment questions, talk to your industrial hygienist. If you have medical surveillance questions, contact Occupational Medicine at 505-667-0660. You have the right to obtain a copy of your exposure and medical records. The records may be accessed through the WeCare Portal

Construction Activities

1926.1101(a)

Activities identified in the OSHA construction standard for asbestos include the following:

- demolition or salvage of structures with ACM;
- removal or encapsulation of ACM;
- construction, alteration, repair, maintenance, or renovation of structures or substrates that have ACM;
- installation of products that have asbestos;
- asbestos spill/emergency cleanup; and
- transportation, disposal, storage, containment of, and housekeeping activities involving ACM, on the site or location at which construction activities are performed.

Note: The OSHA construction standard for asbestos does not apply to asphalt roof coatings, cements, and mastics that have ACM.

Classes of Asbestos Work

1926.1101(b)

The OSHA construction standard for asbestos classifies four types of asbestos work as summarized in the table below. Training requirements vary depending on the class of work. Training requirements become more extensive as the potential for asbestos disturbance increases.



This course (#8661) or the online course #14727 ONLY meets the training requirements for authorized personnel to perform Class IV asbestos work. Initial Class IV training must be at least 2 hours. Annual refresher training is also required.

Other classes of asbestos work require additional training. Class II specified-material training is at least 8 hours, and Class III training is generally at least 16 hours in total. Class I training must be equivalent to the EPA asbestos-abatement worker course.

OSHA Classes 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

Competent Persons

1926.1101(o)(1-4)

A Competent Person is qualified to identify asbestos hazards, select appropriate controls, and has authority to take prompt corrective action. OSHA requires Competent Person oversight for asbestos construction work, and LANL must designate a competent person for all construction worksites covered by 1926.1101. The competent person must inspect the job site often enough to assess whether conditions have changed, and at any reasonable time following a workers request.



Awareness training alone does not qualify a worker as an asbestos Competent Person. For Class III and IV work, Competent Person training must be consistent with EPA O&M training under 40 CFR 763.92(a)(2). Class I and II Competent Persons require the more extensive MAP-equivalent supervisor training. Training for competent persons who support Class I or II asbestos work is also acceptable for Class IV work.

Training Requirements

1910.1001(j)(7)

1926.1101(k)(9)

The OSHA general industry standard for asbestos requires that all workers who perform housekeeping work in areas where ACM and/or PACM is present, must receive asbestos awareness training. The training must be provided at no cost to the worker and must, at a minimum, address:

OSHA requires that each awareness level worker be trained at least once a year.

- health effects of asbestos,
- locations of ACM and PACM in the building/facility,
- recognition of ACM and PACM damage and deterioration,
- proper response to fiber release episodes, and
- housekeeping requirements in the OSHA Asbestos standard.

The OSHA construction standard for asbestos requires that all workers performing Class IV work receive at least two hours of training that addresses the locations of TSI and surfacing ACM/PACM and asbestos-containing flooring material; flooring material where the absence of asbestos has yet to be certified; and recognition of damage, deterioration, and delamination of ACM in buildings. The standard also directly refers to the training requirements in 40 CFR 763, *Subpart E-ACM in Schools*, which are as follows:

763.92(a)(1)

- All maintenance and custodial staff who may work in a building that contains ACM must receive awareness training of at least 2 hours, whether or not they are required to work with ACM.
- School custodial/maintenance workers must be trained within 60 days after starting work.
- Maintenance and custodial staff include custodians, electricians, heating/air conditioning engineers, plumbers, etc.

40 CFR 763 also requires that if maintenance and custodial staff will conduct any activities that disturb ACM, they must receive 14 hours of additional training.



P101-23 Training Requirements

- Workers must receive asbestos training according to the class of work they perform (OSHA Class I, II, III, or IV).
- Custodial, maintenance and craft personnel assigned to facilities where ACM/PACM is present must take *Asbestos Awareness Self-Study.(#14727)* or *Asbestos Awareness (#8661).* Training is required annually.
- While not required, awareness level training (#14727 or #8661) is strongly recommended for personnel with responsibilities in P101-23.

ACM Roles and Responsibilities

LANL Procedure P101-23, *Occupational Exposure to Asbestos*, specifies LANL roles and responsibilities related to ACM. P101-23 applies to all LANL workers for all LANL activities and operations where there is a potential for exposure to asbestos and to facilities at LANL that contain asbestos. The goals of P101-23 are to:

- prevent worker exposure to asbestos,
- prevent uncontrolled release or disposal of asbestos,
- maintain installed ACM/PACM in a safe condition, and
- meet regulatory requirements.

Worker and manager responsibilities from P101-23 are found throughout this training manual. Facility Operations Director (FOD) and employer responsibilities are shown on the next page.

The removal of all ACM or PACM from LANL facilities is neither technically feasible nor cost effective.

Asbestos abatement refers to the control of fiber release from ACM in a building through removal, repair, encapsulation, enclosure, encasement, and/or maintenance.

Notification to New Mexico Environment Department (NMED)
Under the Asbestos NESHAP (40 CFR 61, Subpart M), notification is required for covered renovation activities when the amount of regulated asbestos-containing material (RACM) to be disturbed or removed is at least:

- **260 linear feet** on pipes;
- **160 square feet** on other facility components; or
- **35 cubic feet** where length or area cannot be measured.

Covered demolitions generally require notification regardless of the amount of asbestos present.

More information about employer responsibilities is found 1910.1001 and 1926.1101.

LANL and employers are responsible for identifying known ACM/PACM, communicating its location, establishing required controls and regulated areas, providing required training/PPE, evaluating exposures, and maintaining required records.

LANL FOD and Employer ACM Responsibilities

LANL FODs and employers have responsibilities for managing asbestos hazards and protecting workers. These include:



- **Identifying and communicating hazards:** Determine and communicate the presence, location, quantity, and condition of known ACM/PACM, and notify affected workers and visitors.
- **Managing damaged ACM/PACM:** Provide resources for timely repair or removal and ensure affected areas are appropriately posted and barricaded until the hazard is corrected.
- **Communicating asbestos work:** Inform personnel working in or near asbestos activities about applicable controls, remaining ACM/PACM, and final monitoring results, when applicable.
- **Training and hazard information:** Ensure workers receive required information and training on asbestos health effects, recognizing damaged or deteriorated ACM/PACM, signs and labels, safe work practices, and required PPE.
- **Exposure assessment and notification:** Determine worker exposure and notify affected workers of monitoring results and corrective actions when exposure exceeds applicable limits.
- **Protective measures:** Establish required regulated areas and provide required PPE at no cost to workers.
- **Records:** Maintain required exposure and medical records and provide access to those records as required.

Exposure monitoring results: Employers must notify affected workers of monitoring results within the applicable regulatory timeframe—within **15 working days under the General Industry standard** and **5 working days under the Construction standard**.

Recordkeeping: Worker exposure records must generally be retained for at least 30 years; employee medical records must generally be retained for the duration of employment plus 30 years.



Module 3 Self-Assessment

1. A renovation activity may disturb ACM. Which OSHA standard applies to asbestos construction work?

   _____

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

   _____

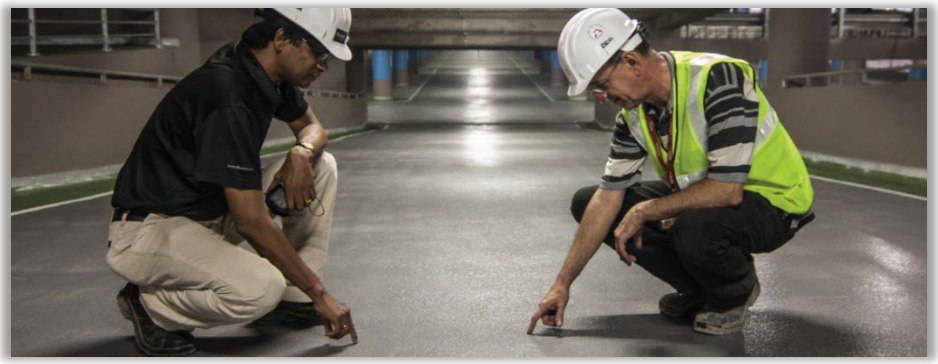
   _____

3. List three responsibilities that OSHA requires your employer to perform if you work in an area with ACM?

   _____

   _____

   _____





Module 4

Recognizing ACM and PACM

Module Objectives

After completing this module, you will be able to:

- recognize common locations and types of ACM/PACM at LANL
- recognize signs of damage, deterioration, or disturbance that may increase fiber release

The LANL Asbestos Inventory Database provides available information on known ACM locations. Before work begins, use the current LANL asbestos resources and work-planning process to determine whether ACM/PACM may be present. Database information does not replace required field evaluation or hazard analysis.

The LANL Asbestos Inventory Database provides information about the location of ACM at LANL by technical area (TA), building number, and room number.

For more information about the LANL Asbestos Inventory Database, contact the Occupational Safety and Health (OSH) division at 505-606-0295.

Warning! *NEVER disturb, remove, or try to repair any ACM without training and authorization. This course DOES NOT meet training requirements for disturbance, removal, or repair of ACM.*

ACM in LANL Flooring

In 2004, during a project to find the source of rodent odors in an office in TA 48, existing vinyl sheet flooring was removed without asbestos precautions because no one suspected it contained asbestos.

Two weeks after the project was started, a sample of the sheet vinyl flooring was tested and confirmed as ACM. Work was paused and the event demonstrated that **covered or hidden flooring materials can contain asbestos even when no visible warning is present.**

The presence of ACM meant that the workers who removed the material, the pest control crew, electricians, office workers in nearby rooms, and anyone else who entered the area during the intervening two weeks may have been exposed to asbestos fibers.

Failure to notify the New Mexico Environment Department (NMED) before renovation activities involving regulated asbestos-containing material (RACM) could result in penalties if applicable Asbestos NESHAP notification thresholds are met.



Asbestos vinyl sheet flooring (*below*) and other ACM, such as subflooring or mastic (*left*) may be covered over in many LANL buildings.



Note: The photos on the following pages show materials and objects with ACM that have been and may still be found at LANL. **You cannot confirm asbestos by appearance alone.** Photographs in this module show materials and conditions that should cause you to consider the possibility of ACM/PACM. Confirmation requires reliable records or appropriate laboratory analysis.

ACM and PACM

Asbestos was used in many **materials and products** because of its heat resistance, strength, durability, and insulating properties. At LANL, ACM or PACM may be found in building materials, mechanical systems, laboratory and industrial equipment, and older specialty products.





The images in this section show examples of materials and products that contain asbestos or may be treated as PACM. They may be found in interior locations such as mechanical rooms, laboratories, offices, walls, ceilings, floors, attics, equipment, or in exterior locations including underground.

You cannot determine whether a material contains asbestos by appearance alone. Use available asbestos records, labels, and work-planning information. When required, laboratory analysis is used to determine whether a material contains asbestos.



As you review the images, focus on **what the materials and products look like, where they may be found, and whether they show signs of damage or deterioration.**



TSI and Surfacing Material

Two important types of material that may be PACM in older buildings are thermal system insulation (TSI) and surfacing material.





TSI is insulation applied to pipes, boilers, tanks, ducts, and other components to prevent heat loss or gain. Surfacing material is material that has been sprayed, troweled, or otherwise applied to surfaces, such as fireproofing on structural members or materials applied to ceilings and other surfaces for acoustic or thermal insulation.





In buildings constructed before 1981, TSI and surfacing material are presumed to contain asbestos unless appropriate documentation or laboratory analysis demonstrates otherwise.

Damaged or Deteriorated ACM

The presence of ACM does not necessarily mean asbestos fibers are being released. The potential for fiber release increases when ACM is damaged, deteriorated, or disturbed. Be alert for conditions such as:

- torn, cracked, crumbling, or missing material or coverings
- exposed insulation or other fibrous material
- dust or debris beneath insulated pipes or equipment
- water-damaged material
- deterioration or delamination
- other physical damage to suspect materials



Damaged or deteriorated ACM/PACM may release asbestos the potential for exposure.

Warning! Do not touch or disturb suspect material to determine its condition.





Actions to take if you find what you think is damaged ACM or PACM are in Module 5.

Unexpected Suspect Material

What should I do?

Not all ACM/PACM at LANL is labeled, and asbestos-containing material may be hidden behind walls, above ceilings, beneath flooring, or inside equipment. Work may uncover material that was not visible or identified before the task began.

If you encounter unexpected material or discover a condition that may involve ACM/PACM:
Pause work. Do not disturb or clean up the material. Report the condition so it can be evaluated before work continues.

Module 4 Self-Assessment

1. Based on each image and the information provided, identify whether the material:
   Contains asbestos (ACM)
   Looks like it may contain asbestos (Suspect or PACM)
   Does not appear to contain asbestos (ND)



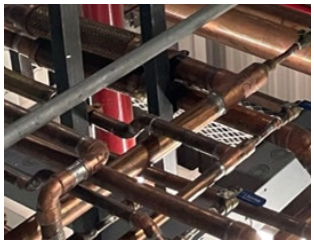
Old millboard



Lab glove & mitt

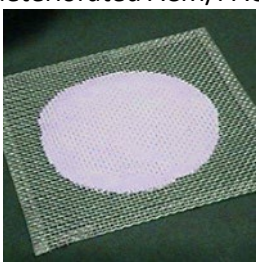


TSI



Pipes

2. For each image, decide whether the condition should be reported as possible damaged or deteriorated ACM/PACM. Label each image YES or NO.



Wire gauze



Resilient floor tiles



Fume hood

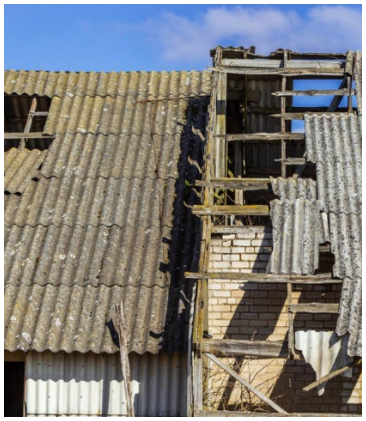


Transite pipes

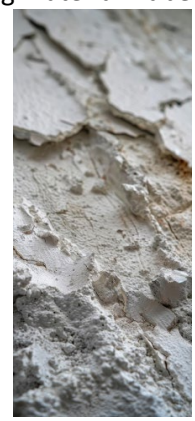
3. For each image, decide whether it shows TSI or surfacing material. Label each image YES or NO.



Pipe and insulation/ lagging



Corrugated cement roofing



Fireproofing



Insulated pipe

4. While removing a baseboard in an older building, you notice loose, lightweight filling pouring from inside the wall. What is the appropriate response?

_____



Perlite (left) and Vermiculite (right). The pen is shown for scale.



Module 5

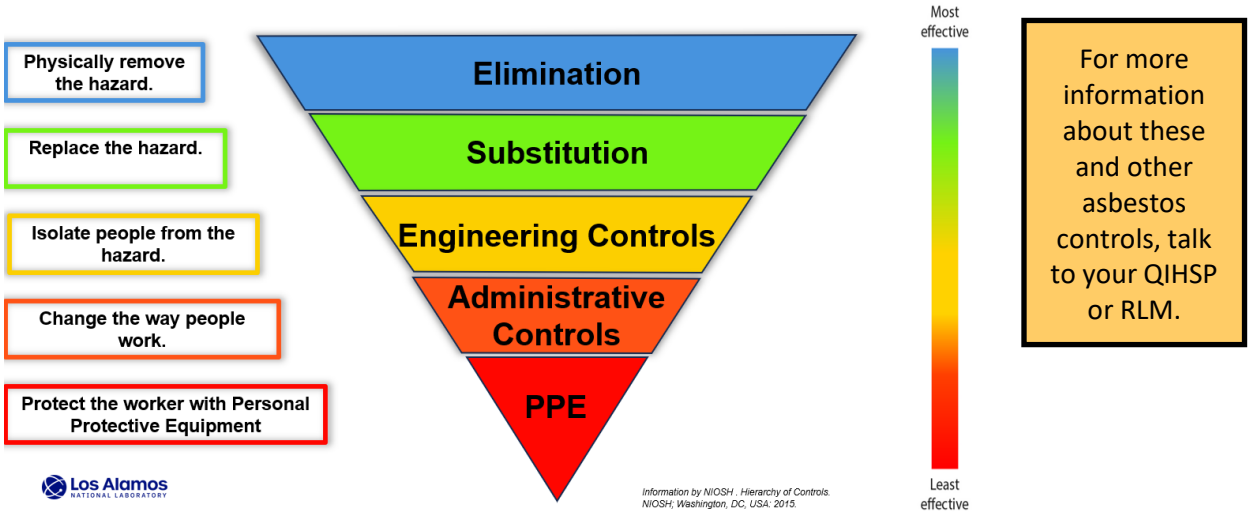
Asbestos Controls and Safe Work Practices

Module Objectives

After completing this module, you will be able to:

- Recognize asbestos controls and actions used in the workplace to prevent or minimize exposure
- Recognize what to do if you find ACM in poor condition

Hierarchy of Controls



For more information about these and other asbestos controls, talk to your QIHSP or RLM.

Note: Many controls described in this module are implemented by trained and authorized asbestos personnel. **Awareness-level workers** are expected to recognize these controls, follow posted restrictions, avoid disturbing ACM/PACM, and report concerns.

Asbestos Controls

Some of the controls used to minimize potential exposures to asbestos include:

- wet methods that use liquids to prevent asbestos fibers from becoming airborne during removal, repair or cleanup activities. Often, a *surfactant* is used to break the surface tension of the water and allow it to be more easily absorbed.

A **surfactant** is a chemical wetting agent added to water to improve penetration.

- ventilation to capture airborne asbestos fibers at the source or prevent the spread of airborne asbestos fibers to 'clean areas' during removal, repair, or cleanup activities.
- *encapsulation* used to maintain asbestos in place.

Encapsulation uses thick, paint-like materials to seal ACM fibers in place and prevent them from becoming airborne.

- *enclosures* used to maintain asbestos in place.
- regulated areas (see page 38).
- signs and labels warning of asbestos work or ACM (see page 39).

An **enclosure** is a barrier built around ACM with all seams completely sealed to ensure the structure is airtight.

- safe work practices for working with or around ACM hazards (see page 40).
- required controls for Class IV work (see page 40).
- housekeeping requirements for working with or around ACM (see page 41).
- training that addresses the hazards of ACM, the controls used to prevent or reduce exposure, and the actions to take when exposure may occur (see pages 26-27).
- personal protective equipment (PPE) (see page 42).

Worker rotation as a means of reducing worker exposure to asbestos is NOT ALLOWED.

Specific controls required for Class IV work are found on page 40



Regulated Areas

A regulated area for asbestos is an area where airborne concentrations of asbestos exceed or there is a reasonable possibility that they may exceed the PEL. In addition, the asbestos construction standard identifies regulated areas as:

1910.1001(b)
1926.1101(b)

- any area where Class I, II, and III asbestos work is conducted, OR
- any adjoining area where debris or waste from such asbestos work builds up.

Requirements for asbestos regulated areas include the following:

- All Class I, II and III asbestos work must be conducted within regulated areas *(construction*).
- Access to regulated areas is limited to authorized persons.
- Regulated areas must be identified in a way that
  - minimizes the number of persons within the area, and
  - protects persons outside the area from exposure to airborne asbestos.
- Regulated areas must be properly posted with warning signs (see page 39).
- All asbestos work performed within a regulated area must be supervised by a competent person (*construction).*
- NEVER eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

1910.1001(e)
1926.1101(e)

Only authorized persons may enter an asbestos-regulated area. Required PPE and respiratory protection depend on the work and exposure conditions. Follow the posted requirements and do not enter unless you are authorized.

Requirements for respirator use at LANL are summarized on page 42.



Regulated areas for work with ACM often use plastic sheeting and negative ventilation to prevent elevated concentrations of airborne asbestos from entering nearby areas.

Signs and Labels

Warning signs must be posted at all approaches to each asbestos regulated area. Only authorized personnel are allowed to enter regulated areas for asbestos.

1910.1001(j)(4)

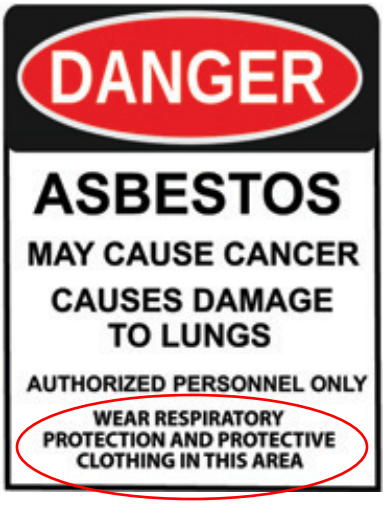


Asbestos **signs** must be posted outside regulated areas.

In the sign on the right, personal protective equipment (PPE) is also required for entry.

Below: Asbestos **label** for products and containers with ACM.





P101-23 requires the posting of signs at entrances to mechanical rooms and areas in which workers reasonably can be expected to enter and which contain ACM or PACM.

OSHA requires asbestos warning labels on applicable asbestos-containing products, containers, and waste containers, subject to specific regulatory exceptions. Installed ACM/PACM must be identified through required signs, labels, and hazard notifications, as applicable. Warning labels must have the information shown on the label above.

Labels may not be required when asbestos fibers cannot be released during normal use or when another OSHA labeling exception applies.

Note: **At LANL, not all installed ACM/PACM is labeled.** The absence of a warning label does not mean asbestos is absent. If you suspect ACM/PACM may be present in your work area, contact your supervisor or industrial hygienist before disturbing the material.

New Mexico regulates asbestos as "New Mexico special waste" and requires that waste containers with ACM be clearly labeled or marked with special waste labels *(shown at right*). LANL addresses waste labeling requirements in P409 *LANL Waste Management.*

To meet State of New Mexico requirements (NMAC 20.9.8), P101-23 requires containers of ACM waste to be labeled in both English and Spanish.



Safe Work Practices

If you disturb ACM, asbestos fibers may be released into the air, increasing your risk of getting an asbestos-related disease. Although working with or near non-friable ACM is less hazardous than working with or near friable ACM, fibers can still be released from non-friable ACM, depending on the operations performed.

Activities that cut, drill, sand, abrade, break, or otherwise damage ACM/PACM can release fibers. Do not perform these activities unless you have the required asbestos training, authorization, and controls.



NEVER disturb building material posted with asbestos signs or labels. In areas where ACM has been disturbed, contact your site health and safety professional so they can assess the situation and take appropriate action.

Required Controls for Class IV Work

Class IV asbestos work must use the following controls:

1926.1101(g)(10)

- HEPA filtered vacuums
- wet methods, unless the use of wet methods could create electrical hazards or equipment malfunction
- prompt cleanup of debris containing ACM or PACM

Note: *Exemptions or other requirements exist for roofing operations.*

1926.1101(j)(3)

Class IV cleanup is asbestos work and may be performed only by personnel who have the required training and authorization. Workers performing Class IV work in a regulated area must use the same hygiene practices required of workers performing Class I, II and III work within that regulated area. This may include respiratory protection and/or decontamination facilities (such as change rooms and showers).

Housekeeping Requirements

1910.1001(k)

Housekeeping requirements when working with or around ACM are very specific in OSHA standards. Housekeeping requirements include the following:

- Maintain all surfaces as free as practicable of ACM waste, dust, and debris.
- Clean up all spills and releases of ACM as soon as possible.
- NEVER sand flooring that has ACM.
- To strip finishes, use wet methods and low-abrasion pads at speeds lower than 300 revolutions per minute (rpm).
- Dry-buff flooring that has ACM ONLY if there is enough finish to prevent the pad from contacting the ACM.

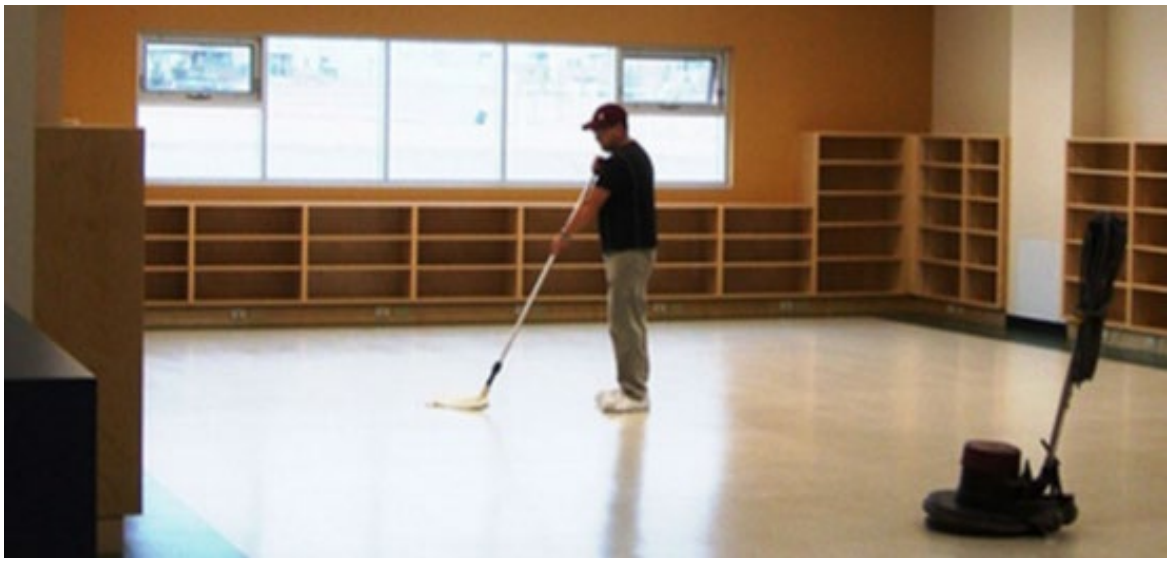
At the time of this writing, P101-23 allows the use of compressed air to remove ACM if ventilation that will capture the dust cloud created by the compressed air is used. **Do not use compressed air for suspected asbestos cleanup unless specifically authorized under applicable controls.**

- Vacuuming of surfaces contaminated with asbestos MUST be performed with a vacuum equipped with a high-efficiency particulate air (HEPA) filter. *Note: A HEPA vacuum is an asbestos control—not permission for an awareness-level worker to clean suspect debris.*
- NEVER dust or dry-sweep in areas with accessible ACM or PACM or with visibly deteriorated ACM.

P101-23 prohibits shoveling and other dry cleanup of dust and debris containing ACM/PACM.

Asbestos housekeeping may be performed ONLY by trained and authorized personnel. Unauthorized personnel may NOT work with ACM or PACM. Prohibited work includes materials cleanup, maintenance, and housekeeping efforts.





Personal Protective Equipment

PPE is secondary protection that is used when other control measures are not feasible or not sufficiently effective at reducing exposures to ACM.

1910.1001(h)

PPE requirements depend on the task, asbestos material, and expected exposure. Do not select or use asbestos PPE on your own. Follow the IWD/work controls and requirements established by qualified personnel.

If you are not sure what PPE you will need for your work, read your IWD or talk to your site health and safety professional.

Proper use of PPE can reduce your exposure to ACM. When working with or near ACM, PPE should be selected based on the:

- type of work
- duration of the work
- type of ACM (friable or non-friable)

If a worker is exposed to asbestos above the PEL or EL, or where the possibility of eye irritation exists, the employer must provide PPE at no cost to the worker and ensure that the worker uses all necessary PPE. Types of PPE that may be used when working in areas with ACM or PACM may include:

- coveralls
- head covers
- foot covers
- eye protection
- gloves
- respiratory protection

For LANL RPP contact information, see page 45.

Whether you are wearing PPE for ACM or any other hazard, you must know the following:

- when PPE is necessary
- what PPE is necessary
- how to properly inspect, don, doff, adjust, and wear the PPE
- the limitations of the PPE
- the proper care, maintenance, useful life, and disposal of the PPE

*Persons performing Class IV asbestos work in regulated areas where workers are performing other classes of asbestos work must use **respiratory protection**. The LANL Respiratory Protection Program (RPP) provides or coordinates the requirements for medical evaluation, training, respirator fit-testing, and approval of respirator selection.*



Protective clothing used for Class IV asbestos work must NOT allow asbestos fibers to pass through and contaminate a worker's regular clothing. This helps prevent worker exposure to asbestos and exposure of a worker's friends or family to asbestos, should contaminated clothing be taken home.

Personal Protective Equipment Introduction Self-Study (#28886) addresses many of the OSHA training requirements that must be met before workers can use PPE.

If you find ACM in poor condition…

While most ACM at LANL 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, 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
- deterioration, delamination, or physical damage of suspect ACM



Warning! *NEVER 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!*

Actions to Take

If you discover damaged or deteriorated ACM/PACM, or unexpected material that may contain asbestos:

- Pause work.
- Do not disturb or clean up the material.
- Move away from the immediate hazard if necessary to avoid exposure.
- Report the condition to the appropriate supervisor/RLM/building manager and industrial hygiene or safety professional.
- Do not resume work until the condition has been evaluated and you are told it is safe to proceed.

In 1996, four electrical workers disturbed ACM during installation of communication conduits in an attic of the Chemistry and Metallurgy Research (CMR) Building. The workers wore their personal work clothes, including t-shirts and overalls for the job. To get on the roof, they had to use a ladder 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” × 12” area of transite wallboard. Although air samples collected after the event indicated that no personnel were exposed above the PEL, analysis of the event showed that

- the hazard analysis for the work was not submitted for approval until after work began;
- the work area was not properly inspected prior to the job; and
- only one of the four workers recognized the potential ACM hazards, even though the TSI on the piping above the ladder and the transite wallboard near the work area were properly labeled with ACM warning signs.

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

Module 5 Self-Assessment

1. List three examples of controls used to minimize airborne asbestos fibers.

   _____

   _____

   _____

2. List two operations that should be avoided to prevent non-friable ACM from becoming airborne.

   _____

   _____

3. List two housekeeping requirements found in 29 CFR 1910.1001.

   _____

   _____

4. List two conditions to watch for in areas where unlabeled ACM may be present.

   _____

   _____

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

   _____

   _____



Appendix A

Lessons learned/ Case studies

1. In 2024, LANL conducted an abatement of asbestos-containing roofing material that required the entire roof to be designated as a regulated area. During this work, employees performing routine environmental release monitoring entered the regulated area, violating the established barriers. Despite notifying the Field Operations Director (FOD) and building management, miscommunication between responsible parties resulted in these employees being instructed to cross the asbestos-regulated boundary without appropriate personal protective equipment (PPE) or respiratory protection.
   Although there is no completely safe level of asbestos exposure, an OSH evaluation determined that the employees' exposure did not exceed OSHA permissible exposure limits (PEL) or excursion limits due to the short duration and nature of their activities.

   Lesson Learned: Only authorized persons may enter regulated areas. Follow all posted PPE and respiratory-protection requirements. If you are unsure about the presence of asbestos or the status of an abatement activity, contact your Responsible Line Manager (RLM) or local OSH-DS Industrial Hygienist.

2. During a 2024 asbestos building inventory inspection at LANL, an OSH technician found a supply of uninstalled legacy asbestos-containing vinyl floor tile in an office and a nearby storage area. When asked about the material, personnel stated it was being kept as "good tile" for future repairs to damaged flooring. The tile was collected and turned over to the local Waste Management Coordinator (WMC) for proper disposal.
   The installation of new asbestos-containing building materials is strictly prohibited in LANL facilities unless specific approval is granted. If uninstalled asbestos-containing material is discovered, contact your Responsible Line Manager (RLM) and local WMC to ensure proper disposal.

   Lesson Learned: Although not all LANL buildings contain asbestos, legacy vinyl tile and asphalt flooring installed before 1980 should be presumed to contain asbestos unless confirmed otherwise.

3. A woman who worked in a hair salon for more than 20 years was exposed to asbestos from customers who worked at a nearby asbestos production plant. She often brushed the asbestos dust out of the hair of the weavers who worked at the plant. Her fingers and toes became clubbed (clubbing of the extremities is shown on page 19). She was diagnosed with asbestosis in the 1980s and died in 1997 from an asbestos-related cancer.

   Lesson Learned: Asbestos exposure can occur even when a person does not work directly with asbestos. Fibers carried on clothing, hair, or equipment can expose coworkers, family members, and others. Proper containment, decontamination, and work practices help prevent asbestos fibers from spreading beyond the work area.

Resources, Contacts, and References

LANL requirements, training, and points of contact that may affect asbestos operations at LANL are shown below. This list is NOT all-inclusive.

LANL Requirements Documents*	LANL Institutional Training*
P102-1 *Medical Surveillance and Certification Programs*	N/A
P101-6 *Personal Protective Equipment*	*Personal Protective Equipment Introduction Self-Study* (#28886) Respiratory Protection courses – see the RPP homepage
P101-14 *Chemical Management*	*Chemical Hazard Communication Live* (#25418) OR *Chemical Hazard Communication Self-Study* (#25997)
P101-16, *Local Exhaust Ventilation and HEPA Filtration Systems.*	*Ventilation: Fume Hoods Self-Study* (#48002)
P101-18 *Pause/Stop Work*	*General Employee Training* (#15503)
P101-23 *Asbestos*	*Asbestos Awareness Live* (#8661) OR *Asbestos Awareness Self-Study* (#14727)
LANL Websites and Points of Contact	
LANL Requirements Documents at http://int.lanl.gov/policy/collections/numerical/index.shtml	
LANL Occupational Safety and Health (OSH) at 606-0295 or http://int.lanl.gov/org/padops/adesh/occupational-safety-and-health/index.shtml	
LANL Occupational Medicine (OccMed) at 667-0660 or http://int.lanl.gov/employees/health-wellness/occupational-medicine/index.shtml	
LANL Respiratory Protection Program (RPP) at 667-3560 or http://int.lanl.gov/safety/industrial_hygiene_and_safety/ihs_programs/respiratory-protection.shtml	
LANL Institutional Training Services (ITS) at 667-0059 or http://int.lanl.gov/services/training/index.shtml	
OSHA and EPA Regulations*	
29 CFR 1910.1020 *Access to employee exposure and medical records*	
29 CFR 1910.1001 *Asbestos* (see page for list of Appendices)	
29 CFR 1926.1101 *Asbestos* (see page for list of Appendices)	
29 CFR 1910.1200 *Hazard Communication*	
29 CFR 1910.1450 *Occupational Exposure to Hazardous Chemicals in Laboratories*	
29 CFR 1910 Subpart I, *Personal Protective Equipment*	
40 CFR 763 *Asbestos*	
40 CFR 61, Subpart M *National Emission Standard for Asbestos*	
*Additional LANL Requirements documents may apply. *Additional Institutional Training may be required. *Additional OSHA and EPA Regulations documents may apply	

OSHA Asbestos Standard Appendices

OSHA has identified mandatory and nonmandatory appendices in both the General Industry and Construction standards that address asbestos. Appendix topics are listed below.

Appendices in the OSHA Asbestos Standards			
Standard	**Section**	**Information**	**Compliance**
29 CFR 1910, General Industry	1910.1001	asbestos	mandatory
	1910.1001 App A	OSHA reference method	mandatory
	1910.1001 App B	sampling and analysis	nonmandatory
	1910.1001 App C	[Reserved]	
	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	nonmandatory
	1910.100l App H	medical surveillance guidelines for asbestos	nonmandatory
	1910.1001 App I	smoking cessation program information for asbestos	nonmandatory
	1910.1001 App J	polarized light microscopy of asbestos	nonmandatory
Standard	**Section**	**Information**	**Compliance**
29 CFR 1926, Construction	1926.1101	asbestos	mandatory
	1926.1101 App A	OSHA reference method	mandatory
	1926.1101 App B	sampling and analysis	nonmandatory
	1926.1101 App C	[Reserved]	
	1926.1101 App D	medical questionnaires	mandatory
	1926.1101 App E	interpretation and classification of chest roentgenograms	mandatory
	1926.1101 App F	work practices and engineering controls for Class I asbestos operations	nonmandatory
	1926.1101 App G	(reserved)	
	1926.1101 App H	substance technical information for asbestos	nonmandatory
	1926.1101 App I	medical surveillance guidelines for asbestos	nonmandatory
	1926.1101 App J	smoking cessation program information for asbestos	nonmandatory
	1926.1101 App K	polarized light microscopy of asbestos	nonmandatory

Note: Respirator fit-testing requirements are addressed in 29 CFR 1910.134, *Respiratory Protection*.

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