

**ASBESTOS CLASS III TRAINING
UPDATED 3/24/05**

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SECTION 1

BACKGROUND INFORMATION ABOUT ASBESTOS

COURSE OVERVIEW:

This is a basic course in asbestos safety, regulations and procedures. For initial training, the course is 16 hours and for the annual refresher, 4 hours. This course meets the EPA requirements for school O&M workers who can do small scale projects involving less than 3 sq ft or 3 linear ft of Asbestos containing material. This course meets the current OSHA requirements for workers doing Class III work.

This training is only valid for O&M type repair and maintenance activities disturbing less than 3 square ft and less than 3 lin ft of ACM and is not sufficient for larger scale removal work or collecting samples.

Neither the U.S. nor the State of Connecticut have an approval available for this 16 hour course. However, OSHA and EPA recommend that training providers be used who are approved for other asbestos courses be used to conduct this training. Chem Scope, Inc is approved for all asbestos course disciplines by EPA and CONES and accredited by the State of Connecticut.

Each persons must complete all specified hours of the training in order to obtain documentation from the provider that the course was completed.

A. HOW TO RECOGNIZE ASBESTOS CONTAINING MATERIALS: (ACM)

1. Materials Which Must be Treated as ACM Unless Proven Otherwise:

a. Surfacing

- 1) Plaster and other troweled on materials
- 2) Sprayed on surfacing

b. Thermal System Insulation (TSI)

- 1) Pipe insulation
- 2) Boiler and tank insulation
- 3) Duct and other insulation

c. Common Miscellaneous Materials

- 1) Floor tile, linoleum and the mastic underneath
- 2) Transite sheets and pipes
- 3) Acoustical panels such as ceiling tiles
- 4) Glues, putties, grouts and tars
- 5) Roofing felts
- 6) Cloth such as used in duct vibration control
- 7) Preformed boards
- 8) Electrical insulation

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2. Lab Analysis for Asbestos

- a. PLM
- b. Lab must be properly Accredited
- c. < 1 % asbestos

3. Physical Appearance

- a. Naturally occurring minerals.
- b. Bundles of minute fibers

B. HOW TO RECOGNIZE DAMAGE TO ACM

1. Debris in building areas where ACM is located. ACM debris means pieces of ACM that can be identified by color, texture, or composition, or dust, if the dust appears to have come from the ACM.
2. Obvious punctures, gaps, torn covers, or delamination. Delamination means when layers pull away from the material to which they are attached (substrate).
3. Flaking, blistering, or crumbling of the ACM surface
4. Water damage - significant or repeated water stains.
5. Scrapes, gouges, mars or other signs of physical injury on the ACM.

C. TYPES OF ASBESTOS:

There are six different asbestos minerals:

Chrysotile White Asbestos

- Most common form of asbestos
- Wavy fibers
- 93 percent of total domestic Asbestos products
- 40 % of U.S. land has some amount of this asbestos

The other 5 are called Amphiboles and all have straight rigid fibers:

Amosite - Brown Asbestos
5% of asbestos used

Crocidolite -Blue Asbestos
2% of asbestos used

Anthophyllite, Actinolite and Tremolite- Rarer types of asbestos

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D. WHY ASBESTOS WAS USED

Thermal insulating ability	Inexpensive
Virtually indestructible	Mechanical strength
Chemical resistance	Flexibility
Fire resistance	Friction and wear resistance
Wet strength	Acoustical properties

E. WHY SPECIAL PRECAUTIONS ARE NEEDED FOR ASBESTOS FIBERS

1. Flight Characteristics and Settling Time

- a. Many millions of fibers in a small handful
- b. All types can get airborne with little force.
- c. Fibers may stay in the air for days.
- d. Fibers can follow air currents through a building.

2. Can't Detect without Air Testing

- a. Not visible to naked eye
- b. No odor
- c. No irritation or other tangible signs of exposure
- d. Only air sampling and analysis using microscopic methods can detect the presence of these fibers.

3. Wavy Chrysotile vs the Straight (Amphibole) Asbestos Types:

- a. Chrysotile is harder to get airborne than Amphiboles.
 - 1) Absorbs water which makes it heavier when wet
 - 2) Wavy structure resists release
 - 3) Adheres tightly to binders
- b. Amphiboles such as amosite get airborne with ease.
 - 1) Do not absorb water
 - 2) Straight brittle structure increases release

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4. Other factors:

- a. Erosion
- b. Abrasion
- c. Vibration
- d. Wet residues that become dry

F. USES AND LOCATIONS OF ASBESTOS

1. General Information:

- a. 3,600 products since the early 1900's.
- b. 90,000 tons of asbestos per year still used in the USA.
 - 1) Still possible to encounter asbestos in new building materials.
 - 2) Specify "Asbestos Free" materials for new installations.

2. "Transite" Asbestos cement products: A miscellaneous material

- a. 65 percent of all asbestos used, A hard and tough flexible cement.
- b. Mostly chrysotile. Rarely amosite and crocidolite.
- c. Two major forms:
 - 1) Flat or corrugated sheets
 - a) Siding
 - b) Tiles
 - c) Insulating board
 - 2) Pipe
 - a) Rainwater drains
 - b) Gutters
 - c) Pressure piping including water mains = largest single use.

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3. Major Building Uses:

a. Flooring: A Miscellaneous Material. Usually chrysotile. Found in finished areas

- 1) Mastic (still used)
- 2) Floor tiles (rarely used after 1989)
- 3) Linoleum (top layer or felt backing up to 1989)

b. Thermal Insulation:

Pipes, ducts and vessels: Rarely used after 1980. Retards heat loss or gain

- 1) Boiler rooms
- 2) Other mechanical rooms
- 3) Steam tunnels
- 4) Pipes and HVAC ducts throughout building leading to:
 - a) Radiators
 - b) Registers
 - c) Fixtures

c. Fireproofing and Structural uses in Condensation Control:

Surfacing on steel beams and decking: Rarely used after 1980. Delay or prevent collapse of structures in fires.

Applied to steel and concrete to minimize condensation.

d. Acoustical: Used extensively prior to the 1970's.

Surfacing on ceilings and sometimes walls: Rarely used after 1980.

Ceiling tiles and panels

e. Roofing: Rarely used after 1980.

- 1) Flashing
- 2) Built up roof
- 3) Felts or tar

f. Transite panels: Rarely used after 1980. Frequently seen behind radiators and in siding

g. Electric cable insulation and lighting fixtures

h. Glues and putties

i. Preformed boards

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4. Special Building Uses:

- a. Amosite: High temperature applications
 - 1) Steam boilers and lines
 - 2) Exhaust fire boxes
 - 3) Power plants generating high pressure steam.
- b. Crocidolite: Very resistant to acids and to outdoor exposure.
- c. Chrysotile and crocidolite are used in Asbestos textiles and filtration products.
- d. Anthophyllite, actinolite, and tremolite are used primarily in adhesives and cements. They are too brittle for textile products or for use as fibrous reinforcement. Actinolite and tremolite also exist in non-fibrous forms.

5. Major Non - Building Uses:

- a. Brake linings
- b. Clutch facings
- c. Gaskets
- d. Reinforced plastics.
- e. Appliances

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G. DATES OF USE OF ASBESTOS

USES	DATES OF USE
Friable-Insulating Spray-applied insulation, or troweled on	1935 - 1978
Preformed Thermal Insulating Products Bats, blocks and pipe covering	1925 - 1949
Textiles Cloth, blankets, felts, sheet, cord, rope, yarn, tubing, tape/strip, curtains	1920 - Present
Cementitious Products, Extrusion, panels, pipe	1930 - Present
Paper Products, Corrugated millboard	1910 - Present
Roofing Felts smooth or mineral surface, shingles, pipelines	1910 - Present
Asbestos Containing Caulking putties, Joint compounds, Roofing asphalts, mastics, asphalt tile roof putty, plaster, stucco, sealants, cement.	1920 - Present
Asbestos in Portland Cement (Ebony Products)	1930 - Present
Flooring Tile and Vinyl asbestos tile Sheet Goods, asphalt asbestos tile	1950 - 1989
Wall Covering, Vinyl Wallpaper	1920 - Present
Paints and Coatings, Roof coating,	1900 - Present
Surfacing Materials including Plaster and Sheetrock	1900 - 1989

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SECTION 2

POTENTIAL HEALTH EFFECTS RELATED TO ASBESTOS EXPOSURE

A. NATURE OF ASBESTOS RELATED DISEASES

1. Major Diseases:

ASBESTOSIS: -

Associated with breathing large amounts of asbestos.

A restrictive lung disease.

Scarring of the lungs seen on x-ray.

Shortness of breath.

Advanced disease can cause disability and death.

A progressive lung disease, which means that it can progress even after exposure is discontinued.

Prevention and early detection are important. In addition to chest x-rays, pulmonary function tests and exposure history are important for accurate diagnosis.

The latency period for Asbestosis is 5 - 10 years with very heavy exposure. Otherwise it may be 20 - 40 years. Latency means the period of time between exposure and onset of disease.

LUNG CANCER: - abnormal cell growth

Asbestos is a known human carcinogen.

Risk of disease increases with increase in amount of exposure.

No "safe" dose, at which the risk of lung cancer, is zero.

Latency period > 15 years, with a peak at 30-35 yrs.

MESOTHELIOMA: - a rare form of cancer of the chest or stomach, associated only with Asbestos exposure.

Almost incurable form of cancer.

Associated with low levels of Asbestos exposure.

Latency period for mesothelioma is up to 40 years.

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2. Minor Occurrence of Diseases:

Gastrointestinal cancers

esophagus
stomach
colon

Pleural Diseases - Less Serious Disease,

Thickening or scarring of the pleural tissues which normally have no symptoms but indicate Asbestos exposure

B. ROUTES OF EXPOSURE TO ASBESTOS FIBERS.

1. Lung diseases caused by inhalation (breathing)

Defenses: Most particles, including Asbestos fibers, are trapped and eliminated by the defense mechanism.

Breathing passages lined with a sticky mucous layer that traps small particles.

Cilia line the bronchial tubes. These are hair-like projections that continuously move the mucous layer toward the mouth.

But some Asbestos fibers can be carried along in the air, down the bronchial tubes, and lodge in the lung tissue where they may remain.

Some fibers break into small fragments and are eliminated from the body. Small chrysotile fibers can dissolve in the lung and be more readily eliminated.

2. Less common gastrointestinal diseases caused by ingestion.

C. EFFECT OF CIGARETTE SMOKING ON ASBESTOS EXPOSURE

- Incidence of lung cancer much higher among smokers also exposed to Asbestos.
- Smokers not exposed to Asbestos ten times that of non-exposed, non-smokers.
- Non smoking workers are exposed to asbestos have a risk of approximately five (5) times that of non-exposed, non-smokers.
- However, the combination (synergistic) effect, among smokers who are also exposed to Asbestos, is 50 - 90 times that of non-exposed, non-smokers.
- Cigarette smoke has numerous other adverse effects.
- Stop smoking - risk of lung cancer can decrease to close to that of a non-smoker.

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D. OTHER PROPERTIES

1. Signs of exposure to Asbestos:

No way to tell except:

By personal air monitoring or

Knowing that Asbestos is being disturbed in the area.

2. Fiber size and shape:

Fibers longer than 5 microns and thinner than 0.5 microns appear to be more carcinogenic than shorter and thicker fibers. A micron is a millionth of a meter.

Fibers longer than 8 microns are not generally respirable and much less dangerous.

Therefore, thin fibers between 5-8 microns long are the worst.

The OSHA method for asbestos in air only counts fibers longer than five microns.

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SECTION 3

EMPLOYEE PERSONAL PROTECTIVE EQUIPMENT

KEY TERMS IN THIS SECTION:

NIOSH: National Institute for Occupational Health and Safety .

A. CLASSES AND CHARACTERISTICS OF RESPIRATOR TYPES:

1. Air Purifying Respirators:

- a. Negative Pressure: requires annual medical and fit test

Crimson colored HEPA filter NIOSH approved for asbestos.

Half Face-piece Mask ("Half Face")

Full Face-piece Mask ("Full Face")

- b. Powered Air Purifying Respirator (PAPR):

Face piece can be tight fitting half-mask/full-face – requires annual medical and fit test

Loose fitting PAPR mask or helmet- no fit test or medical required.

At least 4 CFM to a tight fitting facepiece

At least seven CFM to a loose fitting helmet or hood.

Batteries need constant attention

2. Supplied Air Respirators:

Deliver breathing air through a supply hose connected to the worker's facepiece.

Very high degree of protection

Can operate in oxygen deficient and toxic atmospheres.

Special training is needed to operate and maintain the individual system.

3. SCBA (Self Contained breathing apparatus)

Portable tank with fresh air

Short term or emergency escape use

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B. LIMITATIONS OF RESPIRATORS:

1. Oxygen Deficiency:

Normal air contains about 20.9% oxygen.

Breathing air must contain 19.5 to 23.5 % oxygen.

Only supplied air or SCBA is OK in oxygen deficient air.

HEPA or other air purifying respirators do NOT protect against oxygen deficiency.

2. Toxic Contaminants:

HEPA filters do NOT protect against toxic vapors.

Special cartridges are needed for each class of vapors.

Always request a material safety data sheet (MSDS) when dealing with strange contaminants. The MSDS must say what type of respirator is needed.

Respirator suppliers and Industrial Hygienists should also be consulted.

C. PROPER RESPIRATOR SELECTION

1. By class of respirators for the hazard or combinations of Hazards as discussed above.

2. By protection factor: Select the respirator which provides the required protection factor.

a. Exposure Limits Developed by Research:

ACGIH- American Conference of Governmental Industrial Hygienists

NIOSH- National Institute for Occupational Safety and Health.

b. Enforced by OSHA, Limits for Asbestos:

PEL- Permissible Exposure Limit for Asbestos:

0.1 fibers/cc
8 hour time weighted average

EL- excursion limit:

1 fiber/cc
30 minute exposure.

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c. Protection Factors:

The higher the protection factor, the higher is the protection.

A protection factor is a value obtained by dividing the concentration outside by the concentration inside the mask.

$$\text{Protection Factor (PF)} = \frac{\text{Conc. outside mask}}{\text{Conc. inside mask}}$$

Respirator Type	Protection factor
Half face neg press	10
Loose fitting PAPR or Type CE continuous flow	25
Full face, quantit. fitted or tight fitting PAPR	50

Supplied Air:

1/2 mask pressure demand	1000
full face pressure demand	2000
SCBA pressure demand	1000

D. DONNING, USE, MAINTENANCE, INSPECTION AND STORAGE PROCEDURES;

1. Donning:

- a. **Medical approval required for negative pressure respirators**
- b. Only use the respirator for which fit tests were made.
- c. Inspect and repair if needed as detailed below.
- d. Use only correct parts of the same brand
- e. Install new cartridges as needed.
- f. Adjust straps. Respirator straps go under protective hood
- g. Fit check and adjust straps as needed. Move head around while fit checking to ensure proper fit.
- i. If fit is unsatisfactory, check for loose cartridges, missing gaskets and other defects (below) and adjust as needed or obtain new fitted respirator or parts.

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2. Use and Daily Maintenance:

a. Trouble

1) Negative Pressure Respirators:

- a) Increased breathing resistance indicates filters are full. Leave work area immediately and change the filters.
- b) Decreased breathing resistance indicates leak. Correct at once.

2) PAPR

- a) Reduced air flow can be detected by feel and sound and indicates weak battery or plugged filters. Leave work area immediately and correct.
- b) If battery goes, tight fitting PAPR becomes temporary negative pressure respirator.

b. Taking off

- 1) HEPA vacuum off any gross contamination.
- 2) Proceed to the shower with respirator still on.
- 3) Clean the respirator using soap and water and rinse.
- 4) Remove the cartridges and wash the respirator with detergent (disinfectant if needed) in warm water using a brush and wiping with a clean paper towel.
- 5) Wash the cartridge gaskets separately with warm water.
- 6) Rinse thoroughly in warm tap water to remove all traces of detergent and disinfectant.
- 7) Dispose of the wet respirator cartridges in a receptacle for Asbestos waste.
- 8) Proceed to the Clean (change) Room and dress

3. Storage:

Allow to dry on a clean paper towel for the next days use.
When dry, reassemble with the cartridges and package the unit in a 1-2 gallon zip loc bag with the exhalation valve up. Store free of overlaying material and equipment to avoid distorting the rubber.

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4. Maintenance of Air Purifying Respirators: Checking for Defects:

Half-face mask and full facepiece)

a. Rubber facepiece:

- 1) Dirt- Clean .
- 2) Cracks, tears, or holes - Issue new facepiece.
- 3) Permanent distortion- Obtain new facepiece.
- 4) Loose fitting valves or other parts- Replace or issue new facepiece).
- 5) Warped, cracked, torn or missing gaskets- Replace.

b. Headstraps:

- 1) Breaks, loss of elasticity or tears- Replace headstraps.
- 2) Broken or malfunctioning buckles or keepers- Obtain new parts or replace headstraps.

c. Valves:

- 1) Loose- Tighten or replace.
- 2) Dirt or residue- Clean or replace.
- 3) Rupture, missing cover or other defect- Replace.

d. Filter element:

- 1) Proper filter.
- 2) Missing or worn gaskets- Replace.
- 3) Worn, Cracked, dented or contaminated- Replace filter.

5. Fit-Test Methods:

FIT TESTS REQUIRED EVERY YEAR

SEAL CHECKS EACH TIME THE RESPIRATOR IS DONNED.

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a. Qualitative FIT TEST (Useable in Field or Lab - pass/fail basis)

1) Irritant Smoke Test:

- a) Stannic chloride in sealed glass tubes
- b) Irritant smoke is sprayed/squeezed.
- c) Wear goggles to protect eyes.
- d) Move about and talk.
- e) Can't fake this test. Wearer coughs if there is a leak.
- f) Adjustments or replacement of the respirator is required if the respirator leaks.

2) Banana Oil and Saccharin:

- a) The same general procedure is used as for irritant smoke.
- b) Depend on the wearer's response to smell or taste and are not reliable.

b. Quantitative Fit Tests: (Lab Method)

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c. Seal check: (Field Test)

1) Negative Pressure Test

- a) Cover air inlets with the palms and inhale gently so the facepiece collapses slightly.
- b) Hold breath for about 10 seconds.
If the facepiece remains slightly collapsed and no inward leakage is detected, the respirator probably fits tightly enough.

2) Positive Pressure Test:

- a) Close exhalation valve and exhale gently into the facepiece.
- b) This should lift the mask off the face while first exhaling.

3) Always Seal check before use.

d. Factors that alter respirator fit:

- 1) Active field conditions
- 2) Length of time since lab test
- 3) Wear on equipment
- 4) Dust build up in HEPA filters
- 5) Reproducibility of mask adjustment
- 6) Growth of facial hair
- 7) Change in weight

e. Establishing a proper respiratory protection program;

A respirator program is required for any employer who issues employees respirators (OSHA 1910.134).

- 1) Written Program is Required
- 2) Program Administrator
- 3) Enforcement Procedures
- 4) Selection and Use of Respiratory Protection Equipment
- 5) Medical Surveillance (ANNUAL)
- 6) Fit-Testing annually
- 7) Respirator Assignment and Maintenance
- 8) Employee Training Program
- 9) Respirator Program Evaluation and Recordkeeping

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E. PERSONAL PROTECTIVE CLOTHING AND PERSONAL HYGIENE:

1. Selection and Use

- a. Protective clothing must be worn in the asbestos work area.
- b. The suit is needed to keep gross asbestos contamination off the body.
- c. Disposable coveralls with attached "feet" and hooded head covering made with breathable fabrics
- d. Selection of sizes: Most popular Suit sizes: triple (xxx) and double (xx).
- e. Too loose - may get caught. Tape with duct tape.
- f. Too tight - may rip.
- g. Other equipment:
 - hard hats
 - safety goggles
 - protective gloves
 - safety shoes. For high places wear rubber soled shoes
 - knee pads

Keep these items HEPA vacuumed and stored in plastic bags between jobs.

2. Donning the suit and Work Area Entry:

- a. Don suit in clean area outside the work area
 - 1) Zip the suit down to the crotch
 - 2) Step into the suit and zip up
 - 3) Use duct tape if necessary to blouse or adjust fit
 - 4) Use duct tape to make a belt for personal pump.
 - 5) Place street clothes in locker stripping naked or at least to undergarments or swim suit.
- b. Don and Seal check respirator
- c. Pull hood over head
- d. Don any other needed safety equipment
- e. Enter via the shower Decon or the "bag out"
- f. No Eating, smoking chewing gum or tobacco.

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3. Taking off the Suit, Exit and Decontamination Procedures:

- a. HEPA vacuum contamination from self and equipment.
- b. Proceed to the Equipment Room and remove all clothing (except respirator)
- c. If wearing a sampler, place personal air sample cassette in clean zip loc pouch and HEPA vacuum or wet wipe the pump.
- d. Remove suit and dispose in asbestos waste receptacle.
- e. Leave on respirator.
- f. Proceed to the shower. Still wearing the respirator, clean the respirator and self using soap and water and rinse self in the shower. Dispose of the wet respirator cartridges in a receptacle for Asbestos waste.
- f. Following showering and drying off, proceed directly to the Clean (change) Room and dress in clean clothes. Clean clothes may be disposable clothing of a different color or otherwise distinctively different, for use outside the work Area, than suits used inside the Work Area.

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SECTION 4

CLASS III WORK PRACTICES

KEY TERMS:

Class I (1) work = TSI and surfacing removal of ACM

Class II (2) work = Removal of ACM other than TSI and surfacing, for example = removal of floor or ceiling tiles, siding, roofing, and transite panels.

Class III (3) work = Repair. Examples of Class III work = repair involving intentional disturbance of ACM in small amounts less than one standard glove bag.

Class IV (4) work = Maintenance and custodial work. Examples of Class IV work = Dusting surfaces, vacuuming carpets, sweeping or mopping ACM floors or in areas where ACM is present; cleaning up ACM, changing a light bulb or battery in a smoke detector on a surfaced ceiling, polishing floor tile.

DPH: State Department of Public Health

Note: DPH standards and licensing apply for work disturbing 3 SQ FT OR 3 LINEAR FT or more of ACM at a facility.

A. CLASS III REQUIREMENTS:

1. Class III or IV Trades Work Where Asbestos is Present:

a. General Requirements:

- 1) Training, Labeling and Notification Requirements
- 2) Isolate area with barriers and signs. Limit access to the area to trained personnel with respirator and a disposable suit.
- 3) Only HEPA vacuums and wet methods used for cleanup.
- 4) HVAC shutdown in the area. Seal vents.
- 5) Use a mini-enclosure or a glove bag with the floor under the work covered with 6 mil polyethylene.
- 6) Keep material wet.
- 7) Prompt cleanup and proper disposal in leak-tight containers.
- 8) Patch the damaged area with asbestos free materials.

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b. Additional Precautions Recommended:

- 1) A competent person should supervise the work to make sure that only the intended work is done.
- 2) Area sampling and personal monitoring should be done to verify the assessment.
- 3) An emergency plan is needed in the event of a fiber release episode. (This is outlined in Section 4 E 1.
- 4) Additional precautions for the specific case which may be delineated by an AWP or by the competent person or Project Designer.

2. Small scale Repair and Maintenance Surfacing Work:

(Which involves Drilling, Cutting, Abrasion, Sanding, Chipping, Breaking or Sawing of less than 3 square ft in a facility and for which a negative exposure assessment has not been made)

- a. Warning signs and isolation such as mini enclosures.
- b. Respirators
- c. Personal Monitoring
- d. Decontamination unit.
- e. HEPA filtered local exhaust ventilation.
- f. Wet material
- g. HEPA and wet clean surfaces
- h. Leak proof disposal containers
- i. OSHA labels on wastes
- j. Filter waste water
- k. Proper disposal.

3. Added Requirements for Class III or IV Trades Work Within Class 1 Containments such as cleaning, layout and marking, verifying work, removing fixtures, special non-ACM demolition, maintenance work to equipment and emergency repairs:

- a. Respirators and protective clothing required. Respirators usually are PAPR'S.
- b. Enter and leave through shower decontamination
- c. Follow all decontamination procedures.

NOTE: The same applies in Class II containments except a lesser respirator may be needed.

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4. Class IV Trades Work Before Class 1 Abatement such as removing: wood trim, cabinets and other casework, drop ceiling systems, lighting, fixtures, hardware; layout and marking; and demolition of proven non-ACM components such as sheetrock, and removing equipment.

- a. If Competent person's assessment indicates that no asbestos will be disturbed, follow the general applicable requirements and recommendations in 2 a and b above; or
- b. For those items which the competent person determines potentially may disturb ACM, wait until the Class I containment is set up and proceed according to Section 4 A 2. above and do this before abatement begins; or
- c. If 3 sq or 3 lin ft or more, include in the Class I work.

5. Trades Work After Class 1 Abatement:

- a. If Competent person's assessment indicates that no asbestos will be disturbed for a particular operation, no special precautions are needed for that operation.
- b. For those items which potentially may disturb small quantities of ACM \leq 3 sq ft or 3 linear ft:
 - 1) Perform these tasks within the Class 1 containment at an appropriate time in the work sequence as determined by the competent person.
 - 2) For example where top layer of plaster is non-ACM and deep plaster has ACM in small quantities, these tasks may include:
 - a) Installing wood trim, cabinets and other casework.
 - b) Installing drop ceiling systems and lighting.
 - c) Installation of new walls.
 - d) Installing hardware and fixtures.
 - e) Installation of doors and windows
 - f) Installation of pipe hangers.
 - g) Installing other equipment.
 - h) Preparation for painting or plaster repair
 - 3) At any time, if the competent person determines that any proposed work is not suitable for Class III work, then the work will be added to the scope of the Class I workers.
 - 4) Final air clearance is done after all operations in the Class I containment.

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6. Glove Bag Work (TSI):

- a. Used for straight runs of pipe or elbows and used without modification.
- b. Before beginning, loose and friable ACM next to the glovebag must be secured (2 layers of 6-mil poly).
- c. Respirators and protective clothing required.
- d. Must completely cover the circumference of the pipe or other structure.
- e. Smoke tested
- f. Below 150 deg F
- g. Any attached waste bag connected to collection bag by hose must take water and vacuum pressure and must have a shut off device to ensure no exposure when bag is disconnected.
- h. Collapse bag with HEPA vacuum before disposal

B. GENERAL WORK PRACTICES

1. Critical Barriers:

- a. Used to separate work area from non work areas.
- b. Polyethylene sheeting 6-mil thick.
- c. Seal with duct tape.
- d. Free standing barriers should have 2 layers of 6-mil poly.
- e. Support on a pipe or wood frame.
- f. Seal any of these if within the isolated area:

- windows
- corridors
- doorways
- skylights
- duct vents and diffusers
- fixed objects

Do not seal off sprinkler heads, smoke/heat detectors or other safety equipment.

2. Floor Drop Cloths:

6-mil Poly sealed with tape.

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3. Decontamination System:

- a. Configuration: At least 3 "rooms" separated by airlocks

Equipment room facing the Work Area

Shower Room

Clean Room

- b. Equipment Room: Storage of contaminated clothing and equipment.

- c. Shower Room:

- 1) Pass through shower that does not restrict passage:
- 2) Hot and cold or warm running water and soap.
- 3) One shower/10 employees for each sex (See OSHA 1910.141)
- 4) Poly must be non-transparent.
- 5) Waste filtered with best available technology (less than 5 microns).

- d. Clean Room:

- 1) Storage of street clothes
- 2) Change area

4. Emergencies:

- a. Each worker must be instructed as to the emergency evacuation procedure.
- b. When fire or other emergency threatens safety, cut or break barriers to get out.

5. Warning Signs:

- a. At all entries to Work Areas.
- b. Must be on waste container at least during loading and unloading of wastes:
- c. All workers must understand the signs; Pictographs warning signs are OK.

"DANGER

ASBESTOS DUST HAZARD

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLY"

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6. Electrical and ventilation system lock-out;

- a. The lockout-tagout procedures are the same as for general construction.
- b. In addition HVAC (heating ventilation and air conditioning) systems which interact with the work area must be turned off.

7. Proper Working Techniques for Minimizing Fiber Releases;

Wet

Wait

Cut

No visible emissions

Disassemble

Package

Wet package contents further as needed

Wet clean substrate surfaces

HEPA vacuum when dry

Lockdown

8. Use of Wet Cleaning Methods:

- a. Spray asbestos materials before and during work
- b. Use cloths, mops, rags and towels and sponges or other cleaning tools which have been dampened with amended water.
- c. Dispose of these cleaning items as Asbestos contaminated waste.
- d. Do not let Asbestos materials dry.
- e. Keep changing to fresh wipers, mops, brushes etc. Used wipers will only smear. Use clean water each time.

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9. Bagging:

- a. Bag the wet Asbestos waste freshly in the Work Area
- b. Seal filled containers with the wet Asbestos waste.
- c. Wet clean the outside of the sealed bag.
- d. Move to the bagout for double bagging by workers who have entered from uncontaminated areas dressed in clean suits.
- e. Only the bags and cleaned equipment should exit via the bagout. Persons should leave only via the Decon- shower.
- f. Package in impermeable dust tight containers (heavy duty six (6) mil polyethylene bags or sealed fiber pack drums):
- g. All containers including the Asbestos waste storage unit must be labeled in large legible letter:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

10. Cleaning Surfaces:

- a. Remove visible accumulations of ACM.
- b. HEPA vacuum all surfaces within the Work Area.
- c. Wet clean.
- d. HEPA vacuum again.

11. Lockdown

- a. Spray apply a thin coat of Encapsulant to cleaned surfaces
- b. Avoid contact with the liquid and mist. Lockdown spray is usually a skin irritant and tends to plug respirator cartridges and air samples.

12. Use of Negative Pressure Exhaust Ventilation Equipment;

- a. Placement of negative air:
 - 1) Negative air: HEPA filtered blower sucks air from the work area and discharges filtered air outside.
 - 2) Flushing Technique: Place Negative air machine to draw air away from workers.

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- 3) Exhaust outside if possible
- 4) Never discharge near air intakes or walkways.
- 5) Flanges are used to extend the inlet side when needed.

b. Backup Provisions:

- 1) Provide for back-up negative air units to accommodate filter changes and other down time.
- 2) Provide generator for power failure.

c. Maintenance:

- 1) Change filters according to manufacturer's instructions (Generally use the same techniques as for HEPA vacuums below.)
- 2) When taking out of the work area:
 - a) Remove and seal the outer filter in a poly bag
 - b) Seal inlets and outlets with poly and duct tape.

13. Use of HEPA vacuums;

a. Operating Instructions:

Follow instructions provided by the manufacturer of the machines used.

Workers must be trained for the particular vacuums.

b. Special Attachments Needed:

Brushes of various sizes
Crevice tools
Angular tools.

c. HEPA Vacuuming Procedures:

- 1) Use only on dry material.
- 2) Move slowly across the surface
- 3) Leave no visible residue

d. Filter Change:

- 1) Follow manufacturer's instructions.
- 2) Change filters in the work area.

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- 3) Use care when opening the HEPA vacuum.
 - 4) Wear protective clothing and respirators.
 - 5) Place filters and bags in the asbestos wastes, making sure to wet the material before disposal.
- e. Wrap or bag the vacuum before taking from the work area.

14. Final Cleanup and Disposal of Asbestos;

- a. Use HEPA vacuum and amended water until there is no visible residue.
- b. Decontaminate or wrap equipment with two air tight layers of 6 mil poly before removal from area
- c. Empty HEPA vacuum in the Work Area according to instructions above.)
- d. Prepare Negative air unit as described above:
- e. Asbestos wastes must be wet
- f. Must be sealed in water and air tight containers.
- g. Double 6-mil polyethylene bags.
- h. Outer containers must be clean, sealed and labeled.
- i. EPA approved landfill for asbestos wastes.
- j. Disposal in Connecticut - DEP permit is needed.

C. USE OF GLOVE BAGS AND A DEMONSTRATION OF GLOVE BAG USE.

1. Overview of the Glovebag Procedure:

The glovebag consists of a 6-12 mil bag fitted with long-sleeved gloves, a tool pouch and a 2-inch opening used for water application. The bag is fitted around the pipe or other small piece and the work is manipulated using the gloves.

2. Materials:

- Glovebag unmodified and as provided by manufacturer
- Pump-up garden sprayer (2-3 gallon size)
- Amended water
- Duct tape (three-inch width)
- Polyethylene disposal bags (six mil)

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- Smoke tubes with aspirator bulb
- HEPA-filtered vacuum cleaner
- Bone saw
- Utility knife with retractable blade
- Wire cutters
- Tin snips (if aluminum jacket is present)
- Polyethylene plastic (roll of 4 or 6 mil)
- Respirator
- Disposable full-body suits with hood and feet covering
- Small scrub brush
- Stapler
- Several rags
- Wettable cloth Wettable cloth is a plaster impregnated fiberglass webbing available at many hardware and/or plumbing supply stores, one trade name is Diplag.
- Asbestos caution signs and labels
- Reinsulation materials

4. Operation:

- Two trained persons are required
- Not for hot pipes over 150 degrees F
- Isolate area as above
- Mix the surfactant with water in the garden sprayer.
- Place one layer of duct tape around the pipe.
- Slit the top of the glovebag open (if necessary), and cut down the sides to accommodate the size of the pipe (about two inches longer than the pipe in diameter).
- Pre-cut wettable cloth into donut shaped strips to repair insulation ends. Cut the inner diameter 1/2 in. smaller than the diameter of the pipe beneath the insulation and the outer diameter of the donut 3 in. longer than the diameter of the pipe insulation. Finally, cut a slit in each of the two donuts so they can be slipped around the pipe.

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- Place materials into the pouch located inside the glovebag.
- Place one strip of duct tape along the edge of the open top slit of the glovebag for reinforcement.
- Place the glovebag around the section of pipe to be worked on, and staple the top together through the reinforcing duct tape. Staple at intervals of approximately 1 inch.
- Fold the stapled top flap back, and tape it down with a strip of duct tape.
- Tape the ends of the glovebag to the taped portion of pipe.
- Using the smoke tube and aspirator bulb, place the tube into the water sleeve (two-inch opening to glovebag). Squeeze the bulb to fill the bag with visible smoke. Remove the smoke tube and twist the water sleeve closed. While holding the water sleeve tightly, gently squeeze the glovebag and look for smoke leaking out. Tape any leaks found using duct tape, and re-test the bag with smoke.
- Insert the water sprayer through the water sleeve. Tape the water sleeve tightly using duct tape around the wand.
- One person places his hands into the long-sleeved gloves while the second person directs the water spray at the work.
- Remove any aluminum jacket first. Use wire cutters to cut any bands and the tin snips to remove the aluminum. Fold the sharp edges in to prevent cutting the bag. Use caution to prevent cuts - these edges are sharp.
- With the insulation exposed, use the bone saw to cut the insulation at each end of the section to be removed inside the glovebag. NOTE: A bone saw is a serrated, heavy-gauge wire with ring-type handles at each end.
- Throughout this process, water is sprayed on the cutting area to keep dust to a minimum.
- Once the ends are cut, slit the insulation section from end to end using the knife.
- Spray tools in the bag with water and replace in tool pouch.
- Lift the insulation off the pipe and gently place in the bottom of the bag.
- Scrub and wet wipe the exposed pipe inside the glovebag.
- Wet the donut-shaped pieces of wettable cloth over the exposed ends of the insulation remaining on the pipe.
- Remove the water wand from the water sleeve, and attach the small nozzle from the HEPA-filtered vacuum. Turn on the vacuum only briefly to collapse the bag.
- Remove the vacuum nozzle, and twist the water sleeve closed, and seal with duct tape.
- From outside the bag, pull the tool pouch away from the bag and twist it to separate it from the bag.

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- Place duct tape over the twisted portion and then cut the tool bag from the glovebag, cutting through the twisted-taped section. In this manner, the contaminated tools may be placed directly into the next glovebag without cleaning. Alternatively, the tool pouch with the tools can be placed in a bucket of water, opened underwater, and the tools can be cleaned and dried without releasing asbestos into the air.
- Discard rags and scrub brush with the asbestos waste.
- With the removed insulation in the bottom of the bag, twist the bag several times and tape it to keep the material in the bottom during removal of the glovebag from the pipe.
- Slip a six mil disposal bag over the glovebag (still attached to the pipe). Remove the tape and open the top of the glove bag and fold it down into the disposal bag.
- Remove the disposable suits and place these into the bag with the waste.
- Twist the top of the bag closed, fold this over, and seal with duct tape. Label the bag with a warning label.
- Using a clean damp rag, wipe the exterior of the respirator and leave the work area. Remove the respirator.
- Asbestos-containing material must be disposed of at an approved landfill in accordance with DEP /EPA regulations.

D. EMERGENCY PROCEDURES, SUDDEN RELEASES AND POTENTIAL EXPOSURE SITUATIONS:

1. Emergency Response to Asbestos Fiber Releases

- Isolate area with barriers and signs
- HVAC shutdown in the area if possible
- Seal vents
- Use a mini-enclosure or a glove bag if possible
- HEPA vacuum any visible residue and cover the floor under the work with 6 mil polyethylene .
- Limit access to the area to trained personnel with respirator and a disposable suit.
- Use the same practices as above

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2. Fire Prevention and Response at Abatement Sites:

- Polyethylene burns similarly to candle wax. Fire resistant poly should be used but not much better in some cases than ordinary poly.
- Special precautions for containing hot surfaces
- Written emergency action plan and fire prevention plan
- OSHA Fire Protection and Prevention includes requirements for:
 - Temporary or permanent water supply for fire protection.
 - A trained fire fighting brigade as the project warrants.
 - Portable fire extinguishers of a 2A rating for every 3000 sq ft of the work area. Point of travel to the nearest fire extinguisher must not exceed 100 ft. Where more 5 gal of flammable or combustible liquid exists, a 10B fire extinguisher must be located within 50 ft of the material. (This is likely to include gasoline used for generators.)
- Ensure that the area allows a quick and easy escape route and all workers are briefed on escape.
- No smoking, no welding, no other ignition sources near flammable materials.
- Make sure outside contractors or other building occupants who may work near the area are aware of the safety requirements.
- Notify local fire marshal
- Emergency equipment on hand including fire extinguishers and first aid kits.
- Do not block exits

3. Training:

Workers must be instructed on fire, electrical, and other hazards peculiar to each job site. Instructions must include spill response, power failure and emergency evacuation procedures.

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4. Sudden Releases Which May Result in Occupant and Worker Exposure:

a. Prevention

- Proper work practices
- Housekeeping
- Training

b. Detection

- Visual monitoring of containment, adjacent areas and storage areas
- Air monitoring

c. Correction

Asbestos spills- see above.

Chemicals - see MSDS for spill response.

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SECTION 5

PERSONAL AIR MONITORING

Key Terms: PEL = OSHA permissible exposure limit = 8 hour 0.1 fibers/cc (TWA)
EL = OSHA excursion limit = 30 minute 1.0 fibers/cc
TWA = Time weighted average

- 1. Collection of daily personal samples**
- 2. NIOSH Method 7400 (PCM) or OSHA Method ID-160**
- 3. Daily 30 min excursion limit samples**
- 4. 8 hour time-weighted average concentration samples.**
- 5. Each work operation, usually 25% of all workers..**

6. Air Sample Records:

Date of collection, employee name and social security number

Flow rate

Start and end time or total minutes

Job activity during sampling

Location of the work area

Respirator type

Air sample pump calibration:

- 7. Flow rate of 0.5 - 5 liters per minute**
- 8. Pumps should be recharged at the end of each days work.**
- 9. At least two field blanks or 10% of the set of samples.**
- 10. Employee must be able to observe monitoring**
- 11. Results posted promptly at work site.**

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SECTION 6

OVERVIEW OF KEY REGULATIONS

Section 6-1

Principal U.S. EPA Asbestos Regulations

A. AHERA (ASBESTOS HAZARD EMERGENCY RESPONSE ACT)

1. Covers Schools public or private grades k-12
2. EPA Accreditation required for individuals: Abatement Workers; Supervisors and Monitors; Inspectors; Management Planners, and Project Designers.
3. 2 hr awareness training for custodial and maintenance workers within 60 days of hire.
4. Signs in routine maintenance areas.
5. Can assume materials are ACM or collect bulk samples of materials and submit to NIST Accredited Lab for PLM analysis. Damaged assumed ACM must be tested
6. Periodic Surveillance every six months and Annual notification to PTO.

B. NESHAP

1. National Emission Standards for Hazardous Air Pollutants. 40 CFR Part 61 Subpart M
2. Covers practically all facilities, activities and buildings except some residentials if more than 160 sq ft or 260 lin ft of RACM is involved.
3. Licensed Inspector must inspect for asbestos prior to any demolition or renovation
4. DPH or EPA Must be notified.
5. Emission controls.
6. Waste disposal manifests
7. Asbestos must be removed:
 - a. Before demolition or renovation if friability is possible. Removal required before disturbance or dislodging will result or
 - b. If the work precludes future removal.

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Section 6-2

OSHA Regulations

A. SCOPE OF OSHA ASBESTOS STANDARDS:

1. OSHA Construction Standard: (29 CFR 1926.1101; formerly 1926.58):

All construction-related work which may disturb asbestos:

2. OSHA General Industry Asbestos Standard, (29 CFR 1910.1001):

Covers brake and clutch repair and manufacturing of asbestos products and any operations where the PEL may be exceeded.

Note: Maintenance or other construction activities are covered by 1926.1101.

B. OSHA CONSTRUCTION STANDARD: (29 CFR 1926.1101)

1. Work Classes:

Class I work : Removal of Surfacing or TSI

Class II work Removal of anything else

Class III work Repair

Class IV work: Maintenance

2. Regulated Areas (Asbestos Work Areas)

a. All Class I, II and III Asbestos Work

Any area where Asbestos is disturbed (Does not depend on exceeding PEL)

b. Demarcation including Signs

1) Signs posted at all entries to Work Areas.

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE CLOTHING REQUIRED IN THIS AREA

2) Supplementary bilingual, pictograph, and/or graphics signs must be available.

3) Demarcation usually includes critical barriers or negative pressure enclosures in addition to signs.

c. Limited Access (to authorized persons)

d. Respirators and protective clothing

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e. Prohibited activities

No one can eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated area.

f. Competent Person

g. Personal monitoring

h. Trained personnel

3. Exposure Limits:

a. Permissible Exposure Limit (PEL): 0.1 f/cc, 8 hour TWA

b. Excursion Limit (EL) 1.0 f/cc, 30 minute monitoring during each day's peak work disturbing asbestos in each Work Area

c. Method: We can use the method that only counts asbestos fibers, OSHA Method ID-160 (Same as the method in Appendix B of 1926.1101) for personal samples.

4. Personal Air Sampling:

a. Required for Class I, II and for Class III jobs.

b. Required daily for each Work Area.

c. Employees must be able to observe this monitoring and the results must be posted daily at the work site.

5. Respirator Use:

a. Operation specific requirements. Respirators are required for:

1) Class I work

2) Class II work where ACM is not removed intact

3) All Class II and III work where the employer cannot produce a negative initial exposure assessment

4) Class IV work in regulated areas (e.g. cleanup in a Class I job is Class IV work).

b. Class I jobs require PAPR s if the exposures are above 1.0 f/cc for the 8 hr PEL.

c. Assessment: If competent person determines exposures will be below the PEL, must use at least 1/2 face negative pressure, non disposable respirator with HEPA filters in the regulated area.

d. In addition to the operation specific requirements for regulated areas, respirators are required at any time when exposure is above the PEL.

e. A PAPR must be used when the employee wants it.

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6. Protective Clothing

- a. Disposable Coveralls
- b. Laundering (for non-disposable clothing)
- c. Contaminated clothing.

Either as wastes or for laundering, handled as Asbestos Wastes.

- a) Must be transported in sealed impermeable bags, or other closed, impermeable containers, and
- b) Have required labels.
- d. Inspection of protective clothing.
 - 1) The competent person shall examine worksuits worn by employees at least once per workshift for rips or tears.
 - 2) When rips or tears are detected, immediately mend or replace.

7. Hygiene Facilities and Practices: "Decons"

- a. Decons or Decontamination areas: adjacent and connected to (contiguous) the regulated area with an equipment room, shower area, and clean room connected to each other in series.
 - 1) Equipment room. Supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.
 - 2) Shower Area unless the employer can demonstrate that it is not feasible. Provided per 29 CFR 1910.141(d)(3) (One shower per 10 employees or fraction thereof of each sex and soap with warm water.)
 - 3) Remote Shower: Where the employer can demonstrate that it is not feasible to locate the shower between the equipment room and the clean room, or where the work is performed outdoors, the employers shall ensure that employees:
 - a) Remove asbestos contamination from their worksuits in the equipment room using a HEPA vacuum before proceeding to a shower that is not adjacent to the Work Area; or
 - b) Remove their contaminated worksuits in the equipment room, then don clean worksuits, and proceed to a shower that is not adjacent to the Work Area.

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4) Clean Change Room. The clean room shall be equipped with a locker or appropriate storage container for each employee's use. When the employer can demonstrate that it is not feasible to provide a clean change area adjacent to the Work Area or where the work is performed outdoors, the employer may permit employees engaged in Class I asbestos jobs to clean their protective clothing with a portable HEPA-equipped vacuum before such employees leave the regulated area. Following showering, such employees however must then change into street clothing in clean change areas provided by the employer.

b. Decontamination Area Entry Procedures. The employer shall ensure that employees:

- 1) Enter the decontamination area through the clean room;
- 2) Remove and deposit street clothing within a locker provided for their use; and
- 3) Put on protective clothing and respiratory protection before leaving the clean room.
- 4) Before entering the regulated area, the employer shall ensure that employees pass through the equipment room.

c. Decontamination area exit procedures. The employer shall ensure that:

- 1) Before leaving the regulated area, employees shall remove all gross contamination and debris from their protective clothing.
- 2) Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers.
- 3) Employees shall not remove their respirators in the equipment room.
- 4) Employees shall shower prior to entering the clean room.
- 5) After showering, employees shall enter the clean room before changing into street clothes.

d. Lunch Areas. Whenever food or beverages are consumed at the worksite where employees are performing Class I asbestos work, the employer shall provide lunch areas in which the airborne concentrations of asbestos are below the permissible exposure limit and/or excursion limit.

e. Requirements for Class IV work.

Employees performing Class IV work within a Class I, II or III area must comply with the respective hygiene practice required within that area.

f. In Review: Considering OSHA and DPH Regulations, There are Four exceptions to Contiguous Shower Requirement:

- 1) Outdoors
- 2) Where is shown not to be feasible.
- 3) Class III jobs.
- 4) Any job involving less than 3 sq ft or 3 lin ft of ACM.

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8. Medical Surveillance:

a. Required for those employees who:

- 1) Are issued a negative pressure respirator.
- 2) For a combined total of 30 days or more per year either engage in Class I, II or III work and/or who are exposed above the PEL or EL.

b. More than one hour of work counts as a day.

Note: This is one area where the General Industry Standard is stricter: All exposed above the PEL or EL, irrespective of the 30 days, must have medical surveillance.

c. At least once per year and at time of hire unless done within the year hired.

d. Requires

- 1) Examination under supervision of a licensed physician.
- 2) No cost to the employee.
- 3) At a reasonable time and place.
- 4) Questionnaire with medical and work history with special emphasis directed to the pulmonary, cardiovascular, and gastrointestinal systems.
- 5) Medical Exam including pulmonary function testing of forced vital capacity (FVC) and forced expiratory volume at one second (FEV 1).
- 6) Optional chest X-ray if ordered by the physician.
- 7) Information provided to the physician.
 - a) A copy of 1926.1101 with Appendices D, E, G and I;
 - b) Description of the affected employee's duties as they relate to the employee's exposure;
 - c) The employee's representative exposure level or anticipated exposure level;
 - d) A description of any personal protective and respiratory equipment used or to be used; and
 - e) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

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8) Physician's written opinion

- a) Whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;
- b) Any recommended limitations on the employee or on the use of personal protective equipment such as respirators; and
- c) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
- d) A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.
- e) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos.
- f) The employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

9. OSHA Asbestos Record Retention: Most records (30 years)

10. Presumption of asbestos: Assume material is asbestos or test to prove otherwise.

11. Assessments

- a. There are 2 kinds of assessments done by a competent person: one is called "Initial Exposure assessment" which is required for Class I, II, and III jobs; and the other is called "Negative initial exposure assessment", which is an optional process.
- b. A new Initial Exposure Assessment must be produced immediately before or at the initiation of a new job. Employers may evaluate repetitive operations with highly similar characteristics, as one job, such as cable pulling in the same building so long as historic data used reflect operations of the same duration and frequency."

12. Methods of Compliance (work practices):

- a. Must smoke test all negative pressure enclosures.
- b. Must have manometer readings of negative pressure of 0.02 inches of water or greater recorded daily.
- c. Required in all jobs (Class 1, II, III and IV) regardless of the results of the Assessment:
 - 1) HEPA vacuums
 - 2) Wet methods "OSHA will allow employers to claim infeasibility if they cannot use wet methods due to conditions such as electrical hazards, hot surfaces, and the presence of technical equipment which cannot tolerate moisture. (NOTE for NESHAP jobs): ALL ACM MUST BE KEPT WET until sealed in a leak tight container .

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3) Prompt cleanup and disposal in leak-tight containers.

d. Prohibitions:

- 1) High speed abrasive disc saws
- 2) Dry sweeping and dry cleanup including shoveling
- 3) Employee rotation
- 4) Compressed air unless in a negative pressure enclosure

e. Added Requirements for Class I Jobs:

- 1) Require PAPR s unless the exposure is proven below 1.0 f/cc for the 8 hr PEL.
- 2) To use lesser respirators, must have a Negative Initial Exposure assessment.
- 3) Supervised by competent person
- 4) Negative pressure enclosures
 - a) At least four air changes/ hour
 - b) Negative pressure of at least 0.02 inches of water monitored daily.
 - c) Continued use through the job
 - d) Air flushing technique - ventilation placed to draw dust away from the worker.
 - e) Smoke tests before work begins and at start of each shift and any leaks sealed.
 - f) Deactivate electricity or use GFCI.

13. Training Requirements:

Training must be at no cost to the employee.

a. Class I and II work = AHERA Training

- 1) 40 hours for supervisors
- 2) 32 hours for workers

b. Class III work = 16 hours equivalent to the EPA O&M worker training plus more training if the competent person so determines.

c. Class IV work = 2 hours

d. Annual refresher training is 8 hours for supervisors and workers, up to 4 hours for class III, and up to 2 hours for class IV training.

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14. Floor Maintenance- Housekeeping requirements:

Practices for ACM/PACM floor: sanding prohibited, stripping done with low abrasive pads below 300 RPM plus wet methods, burnishing and dry buffing done only over enough wax to prevent contact with the floor.

C. RESPIRATORY PROTECTION STANDARD OSHA 29 CFR 1910.134

1. Written Program

2. Respirator Assignment and Maintenance

- a. Respirators should be assigned to individual workers for their exclusive use.
- b. Fit testing must be checked after repair or replacement of component parts.
- c. Inspection for defects
- d. Maintenance and storage procedures.

3. Employee Training Program

4. Respirator Program Evaluation and Recordkeeping

D. OTHER IMPORTANT OSHA REGULATIONS AFFECTING ASBESTOS ABATEMENT

1. Fire safety OSHA 29 1910.38 and 1926.24 and 1926.150-155)
2. Ladder and Scaffold safety, OSHA 29 CFR 1926.450 et seq
3. Electrical safety OSHA CFR 29 1926.402 and .416-.417
4. Protective Clothing and Equipment See Section 3
5. Recording and Reporting of Injuries OSHA 29 CFR 1926.22
6. First Aid and Medical Attention OSHA 29 CFR 1926.23
7. Shower and Sanitation requirements OSHA 1910.141

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E. MEDICAL SURVEILLANCE PROGRAM:

1. Medical evaluations of employees required to use respirators;

2. Activities:

- a. Monitoring the worker's ability to wear a respirator.
- b. Biological Monitoring and examinations specific for lead exposure including blood lead testing.
- c. In general this written program includes:
 - 1) Pre-employment, during employment and after employment medical examinations.
 - 2) Mechanism for emergency and other medical treatment
 - 3) Work practices
 - 4) Personal hygiene
 - 5) Symptoms of asbestos, lead or other toxicants
 - 6) Signs of adverse health effects
 - 7) Record keeping system
 - 8) For lead workers: Lead level vs effects at hire or placement
 - 9) Changes with time
 - 10) Occupational vs non occupational sources of asbestos/lead
 - 11) Information to physicians
 - 12) Employees right to see all test results
 - 13) Medical removal

**ASBESTOS CLASS III TRAINING
UPDATED 3/24/05**

Section 6-3

DPH Regulations

A. DPH ASBESTOS STANDARD: 19A 332-1 THROUGH -16

1. Applicability:

- a. All Interior Work
- b. Includes all structures even single family homes and ships in dry dock.
- c. Applies to schools except reoccupancy criteria and other requirements in DPH School regulations are stricter.

2. Asbestos Project:

≥ 3 sq ft or 3 linear ft of asbestos material

3. Spot Repair:

< 3 sq ft or 3 linear ft of asbestos material

4. Notification:

10 day notification to DPH required when:

- a. >10 lin ft or 25 sq ft of interior ACM or exterior friable ACM and
- b. For any demolition (effective June 2004)

5. Abatement Project Requirements:

6. Post abatement reoccupancy testing (finals):

No occupancy until test is satisfactorily completed

B. 1994 STATE LICENSURE REQUIREMENTS:

DPH Licensing and Training requirements for anyone doing interior abatement of ACM or exterior friable ACM.

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Section 6-4

DEP Disposal Regulations

Connecticut General Statutes Sec 22a-209-8 (i) (DEP Applies to Waste Disposal in Connecticut)

Connecticut DEP: Any disposal of Asbestos in the State of Connecticut must be authorized by the office of Solid Waste Management. To request a disposal permit, contact the Solid Waste Management Unit at 566-5847.

Twenty five day notification must be sent to:

State of Connecticut
Dept. of Environmental Protection
Solid Waste Management Unit
79 Elm St.
Hartford CT 06106

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SECTION 7

OPERATIONS AND MAINTENANCE (O&M)

Source: EPA "Managing Asbestos in Place" 20T-2003 July 1990.

A. ASBESTOS PROGRAM MANAGER

1. Usually an individual from the safety department
2. Oversees all asbestos related tasks
3. Has authority to oversee and direct custodial and maintenance staff.

B. BUILDING INSPECTION AND ASSESSMENT

1. Locate and assess ACM
2. Licensed asbestos inspector

C. ASBESTOS O&M PROGRAM DEVELOPMENT

1. Incorporate into building maintenance program.
2. Implement a work permit system
3. Monitoring of work
4. Periodically update the program.
5. Cost analysis O&M vs Abatement

D. SELECTING ALTERNATIVE ABATEMENT ACTIONS

1. Encapsulation
2. Removal
3. Enclosure
4. Repair

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E. O&M PROGRAM ELEMENTS

- 1. Notification- Communication**
- 2. Surveillance**
- 3. Controls**
- 4. Work Practices**
- 5. Recordkeeping**
- 6. Worker Protection**
- 7. Training**

F. REGULATIONS INVOLVED

See Section 6

G. AGENCY CONTACTS

1. EPA REGION 1
JFK FEDERAL BLDG
BOSTON MA 02203 (617) 565 3265
2. DPH ASBESTOS PROGRAM
410 CAPITOL AVE MS # 51 AIR , PO BOX 340308 HTFD CT 06134
PHONE (860) 509 7367.
3. OSHA

BRIDGEPORT 579 5581 1 LAFAYETTE CIRCLE SUITE 202 BPORT 06604.

OSHA HARTFORD FEDERAL, 240 3152

OSHA 566 4550 WETHERSFIELD

OSHA PUBLICATIONS 202 523 9667

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SECTION 8

TERMINOLOGY

Abatement: Procedures to control fiber release from Asbestos-containing materials; includes Removal, Encapsulation, and Enclosure.

Airlock: A system for permitting ingress and egress while assuring air movement to a contaminated area from an uncontaminated area.

Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time.

Amended Water: Water to which a surfactant has been added.

Asbestos: Asbestos is a name given to a number of naturally occurring fibrous silicates. There are two varieties of Asbestos; the serpentine form (Chrysotile) characterized by long, soft, flexible, and wavy fibers, and the amphiboles which occur as straight, needle-like fibers, and consist of crocidolite, amosite anthophyllite, tremolite, and actinolite.

Asbestos Containing Material: (ACM) Surfacing ACM, thermal system insulation ACM, or miscellaneous ACM.

Asbestos Project: Asbestos Abatement disturbing 3 linear or 3 square ft of Asbestos Material or more at a facility.

Clean Room: An uncontaminated area or room which is a part of the Worker Decontamination Enclosure with provisions for storage of worker's street clothes and protective equipment.

Critical Barrier: The last layer of plastic sheeting separating Work Areas from non Work Areas

Curtained Doorway: A device to allow passage from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway, and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Two curtained doorways spaced a minimum of six (6) feet apart form an Airlock.

Decontamination Enclosure System (Decon.): A series of connected rooms, with Curtained Doorways between any two (2) adjacent rooms, for the decontamination of workers and of materials and equipment. A Decontamination Enclosure System always contains at least one Airlock.

Demolition (DPH) means the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.

Encapsulant (sealant): a liquid material which can be applied to Asbestos-Containing Material and which controls the possible release of Asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant or be penetrating into the material and binding its components together (penetrating encapsulant). Any such encapsulants must be in conformance with Building and/or Fire Safety Code requirements.

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Encapsulation: All procedures necessary to apply an encapsulant to Asbestos-containing building materials to control the possible release of Asbestos fibers into the ambient air.

Enclosure: An asbestos abatement option where an airtight, impermeable, permanent barrier is constructed around ACBM to prevent the release of asbestos fibers into the air.

Equipment Decontamination Enclosure: That portion of a Decontamination Enclosure System (Decon) designed for controlled transfer of materials and equipment, typically consisting of a Washroom and a Holding area.

Equipment Room: A contaminated area or room which is part of the Worker Decontamination Enclosure with provisions for storage of contaminated clothing and equipment.

Excursion Limit: (EL) OSHA 30 minute exposure standard of 1.0 fibers/cc.

Friable Asbestos Material: An Asbestos Material that can be crumbled, pulverized or reduced to powder when dry by hand pressure and which releases Asbestos fibers into the environment.

Glove Bag: A manufactured polyethylene bag type of enclosure with built-in gloves, such as is placed with an air-tight seal around asbestos- containing material and which permits the asbestos-containing material contained by the bag to be removed without releasing asbestos fibers to the atmosphere;

HEPA Filter: A high efficiency particulate air (HEPA) filter in compliance with ANSI Z9.2-1979.

HEPA Vacuum Equipment: Vacuum equipment with a HEPA filter system for filtering the air effluent from the unit.

Holding Area: A chamber in the Equipment Decontamination Enclosure located between the Washroom and an uncontaminated area. The Holding area comprises an Airlock.

Latency: The period of time between exposure and onset of disease.

Miscellaneous Material: Interior building material on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or thermal system insulation.

Negative Air Units or Negative Air Pressure Equipment: A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a contaminated area (negative with respect to adjacent uncontaminated areas) and capable of maintaining a constant discharge of filtered air outside and creating suction so that air flow direction moves from uncontaminated areas into the Work Areas.

NESHAP: National Emission Standards for Hazardous Air Pollutants, including Asbestos, administered by the EPA.

NIST: National Institute of Standards and Technology

NIOSH: National Institute for Occupational Safety and Health.

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Permissible Exposure Limit (PEL): OSHA Standard. The employer must ensure that no employee is exposed to an airborne concentration of Asbestos, tremolite, anthophyllite, actinolite, or a combination of these materials in excess of the PEL of 0.1 fibers per cubic centimeter of air as an eight (8) hour time weighted average (TWA), or in excess of 1 fiber/cubic centimeter as a 30- min excursion limit as determined by the method prescribed in appendix A to OSHA Regulations 29 CFR 1926.1101, or by an equivalent method.

Removal: All procedures necessary to remove Asbestos containing materials from the designated areas and transport and to dispose of these materials at an acceptable site.

Repair: Returning damaged ACM to an undamaged condition or to an intact state so as to prevent fiber release.

Shower Room: A room between the Clean Room and the Equipment Room in the Worker Decontamination Enclosure with hot and cold or warm running water and suitably arranged for complete showering during decontamination. The Shower Room comprises an Airlock between contaminated and clean areas.

Spot Repair or Small term short duration Project: Work disturbing less than three square or linear ft of Asbestos Material. This includes repair and clean up of debris resulting in damage of less than three square or linear ft of Asbestos Material.

Stripping: Taking of Asbestos materials from any surface.

Surfacing Material: Material in a building that is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

Surfactant: A chemical wetting agent added to water to improve penetration.

TEM: Transmission Electron Microscopy

Thermal System Insulation (TSI): Material in a building applied to pipes, fittings, boilers, breeching, tanks, ducts or other interior structural components to prevent heat loss or gain, or water condensation, or for other purposes, including roof drains and interior boiler gaskets and roping.

Washroom: A room between the Work Area and the Holding Area in the Equipment Decontamination Enclosure with provisions for storage of contaminated clothing and equipment.

Wet Cleaning: The process of eliminating Asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning items as Asbestos contaminated waste.

Work Area: An area where Asbestos Abatement operations are performed which is isolated by physical boundaries to prevent the spread of Asbestos dust, fibers, or debris; Designated rooms, spaces, or areas of the project in which Asbestos Abatement actions are to be undertaken or which may become contaminated as a result of such Abatement actions. A contained Work Area is an area which has been sealed, plasticized, and equipped with a Decontamination Enclosure System.

Worker Decontamination Enclosure System: That portion of a Decontamination Enclosure System designated for controlled passage of workers, and other personnel and authorized persons; typically consisting of a Clean Room, a Shower Room, and an Equipment Room.

**ASBESTOS CLASS III TRAINING
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COURSE PROGRAM

DAY 1

- 8 - 8:30 AM REGISTRATION
 COURSE OVERVIEW
- 8:30 - 9:15 BACKGROUND INFORMATION ABOUT ASBESTOS
 POTENTIAL HEALTH EFFECTS OF ASBESTOS EXPOSURE
- 9:15 -11:00 RESPIRATORY PROTECTION, PROTECTIVE CLOTHING
 LECTURE, DEMONSTRATION AND HANDS ON.
- 11:00 - 4:00 CLASS III WORK PRACTICES: HANDS-ON
- ROTATING GROUPS:
- ALL GROUPS WILL WEAR RESPIRATORS AND SUITS
 AND RECEIVE FURTHER HANDS-ON TRAINING.
- CLASS WILL DIVIDE IN THREE GROUPS AND WILL
 CIRCULATE THROUGH 3 STATIONS, 2 HOURS EACH:
- STATION 1. GLOVE BAG REMOVAL GROUP 1 THEN GROUP 3
- STATION 2. MINI-CONTAINMENT CONSTRUCTION
 GROUP 3 THEN GROUP 2
- STATION 3. USE OF HEPA VACUUMS, NEGATIVE AIR, WET
 CLEANING AND SPRAYING EQUIPMENT. OTHER
 TECHNIQUES
 GROUP 2 THEN GROUP 1.
- ATTENDANCE WILL BE RECORDED BY INSTRUCTORS AT EACH STATION.

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COURSE PROGRAM

DAY 2

- 8 - 9:00 AM PERSONAL AIR MONITORING
OVERVIEW OF REGULATIONS
- 9:00 -11:00 CONTINUATION OF HANDS-ON FROM DAY 1
- ROTATING GROUPS:
- ALL GROUPS WILL WEAR RESPIRATORS AND SUITS
AND RECEIVE FURTHER HANDS-ON TRAINING.
- CLASS WILL DIVIDE IN THREE GROUPS AND WILL
CIRCULATE THROUGH 1 STATION MISSED ON DAY 1
2 HOURS EACH:
- STATION 1. GLOVE BAG REMOVAL GROUP 2
- STATION 2. MINI-CONTAINMENT CONSTRUCTION
 GROUP 1
- STATION 3. USE OF HEPA VACUUMS, NEGATIVE AIR, WET
 CLEANING AND SPRAYING EQUIPMENT.
 GROUP 3
- 11:00 - 3:00 ALL GROUPS WILL WEAR RESPIRATORS AND SUITS
AND RECEIVE FURTHER HANDS-ON TRAINING.
- CLASS WILL DIVIDE IN THREE GROUPS AND WILL
CIRCULATE THROUGH 3 STATIONS,
1 HOUR EACH:
- STATION 1. SMALL SCALE PLASTER REPAIR AND
MAINTENANCE WORK, PRE-ABATEMENT TRADES
WORK.
 GROUP 3, THEN GROUP 2, THEN GROUP 1
- STATION 2. MINI-CONTAINMENT AND DECON OPERATION
TRADES WORK IN A CLASS 1 CONTAINMENT
(USING CONTAINMENT CONSTRUCTED)
 GROUP 2, THEN GROUP 1, THEN GROUP 3
- STATION 3. POST ABATEMENT TRADES WORK
RECOGNIZING ACM MATERIALS
 GROUP 1, THEN GROUP 3, THEN GROUP 2
- ATTENDANCE WILL BE RECORDED BY INSTRUCTORS AT EACH STATION.
- 3:00 - 4:00 ALL GROUPS TOGETHER AGAIN FOR REVIEW AND
DISCUSSION