

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
Updated 4/2/10

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SECTION 1**OVERVIEW**

Asbestos properties and potential health effects

Identification of Asbestos

Respiratory and other personal protection

Medical monitoring requirements and procedures

The qualifications and role of inspectors

Building Systems

Legal issues, insurance and bonding

Public relations

Asbestos Sampling

Asbestos building inspection practices and reporting

Regulations: EPA, State, OSHA and DOT

Laboratory requirements

Equipment and supplies

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PRE-COURSE QUIZ

This quiz is for your use to evaluate your knowledge before the course. This will not be graded but questions are typical of the exam to be given at the end of this course.

Circle the letter by the best answer to the question.

1. The best approach to determining the type and location of asbestos in buildings involves the following:
 - a. Review building plans and records
 - b. Interview building staff
 - c. Do a visual inspection, sampling and review analytical results.
 - d. All of the above.

2. Which is the act requiring accredited individuals for school related asbestos activities?
 - a. AHERA
 - b. OSHA
 - c. NESHAP
 - d. NIOSH

3. Which of the following is a true statement?
 - a. EPA requires removal of asbestos from all schools.
 - b. EPA requires inspection of all secondary, elementary schools and colleges.
 - c. The AHERA asbestos inspection does not cover all potential asbestos building materials.
 - d. Inspectors do not need respiratory protection for sampling.

4. Which asbestos-related condition is associated with large concentrations of asbestos inhaled over a long period of time?
 - a. Skin disorders
 - b. Mesothelioma
 - c. Lung cancer
 - d. Asbestosis

5. Which agency regulates worker safety?
 - a. OSHA
 - b. State Department of Health Services
 - d. ACGIH
 - c. US EPA

6. Asbestos is likely to be present in which of the following building items?
 - a. The thermal insulation on pipes and boilers.
 - b. In floor tiles
 - c. In surfacing materials
 - d. All of the above

7. Which of the following are usually found in boiler rooms?
 - a. Breeching
 - b. Floor tile
 - c. Ceiling tile
 - d. None of the above

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SECTION 2

PHYSICAL PROPERTIES AND USES OF ASBESTOS

BACKGROUND AND HISTORY OF ASBESTOS USE

Key terms:

AHERA = Asbestos Hazard Emergency Response Act. This Public Law 99-519 resulted in EPA promulgating The Asbestos-Containing Materials in Schools Rule (40 CFR 763 Subpart E).

A. IDENTIFICATION OF ASBESTOS:

1. Suspect Materials

- a. Surfacing
- b. Thermal System Insulation
- c. Miscellaneous Materials

2. Assumptions

- a. Any suspect material may be assumed to contain asbestos.
- b. Non-suspect materials such as fiberglass, metal, wood, and glass may be assumed to not contain asbestos.

3. Laboratory Analysis

- a. PLM (polarized light microscopy) Specified by EPA and OSHA regulations as the official method.
- b. NIST (National Institute of Standards and Technology) Accredited Lab. AHERA requires this accreditation to test bulk samples from schools.
- c. < 1 % asbestos

4. Physical Appearance

- a. Natural State:
 - 1) Naturally occurring crystalline silicate minerals.
 - 2) Fibrous forms:
 - a) Parallel bundles of minute fibers.
 - b) Smaller bundles called "fibrils."
 - c) Minute individual fibers.
 - d) Perfect lengthwise cleavage
 - e) Length-to-width ratio typically > 10:1

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B. FORMS OF ASBESTOS:

1. Serpentine: One type: **Chrysotile**

USA and Canada

Wavy fibers

Wettable

White Asbestos

Most common form of asbestos (93 %)

Considered by some to be the least dangerous type of asbestos

2. Amphiboles: Straight rigid fibers, Five types:

a. Amosite -

South Africa

Brown Asbestos

Brittle fibers

High resistance to heat.

5% of asbestos used

b. Crocidolite -

South Africa

Blue Asbestos

2% of asbestos used

High acid resistance

c. Anthophyllite, Actinolite and Tremolite-

Rarer forms of amphiboles

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C. PROPERTIES OF ASBESTOS

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

D. EPA ASBESTOS BANS:

1. 1970: Spraying of commercial Asbestos products and the use of ACM (asbestos containing material) premolded or wet-applied thermal insulating products.

2. 1989: EPA imposed a wide spread ban on manufacture of most commercial Asbestos products. The recent ban was being phased in over the next 5 years.

3. 1990-1992: Ban of 1989 is on hold due to legal ramifications.

4. 1992: Clarification of 1989 ban:

- a. Prohibition of new uses or resumption of uses stopped.
- b. Labeling requirement.

5. Despite Bans:

- a. Still possible to encounter asbestos in new building materials.
- b. Specify asbestos free materials in new installations.

E. USES AND LOCATIONS OF ASBESTOS

1. General Information:

- a. 3,600 products since the early 1900's.
- b. Still possible to encounter asbestos in new building materials; supposed to be labeled as asbestos.
- c. 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 in the North East. May be amosite and crocidolite in South East

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c. Two major forms of transite:

- 1) Flat or corrugated sheets
 - a) Siding
 - b) Tiles
 - c) Insulating board
 - d) Outdoor theater screens
 - e) Large signs

- 2) Pipe
 - a) Rainwater drains
 - b) Gutters
 - c) Pressure piping including water mains = largest single use.

3. Other Major Building Uses:

a. Flooring:

- 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:

Spray on 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 Felts
- 3) Tar still used
- 4) Shingles

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- f. Electric cable insulation and lighting fixtures
- g. Glues and putties
- h. Preformed boards

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 may be used in adhesives and cements. They are too brittle for textile products or for use as fibrous reinforcement.

e. Actinolite and tremolite also exist in non-fibrous forms.

5. Major Non - Building Uses: ACM

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

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SECTION 3

POTENTIAL HEALTH EFFECTS ASSOCIATED WITH ASBESTOS EXPOSURE

INTRODUCTION:

The adverse health effects from Asbestos exposure were first described in the early 1900's. Nevertheless, widespread concern about Asbestos developed only recently as a result of the extensive health problems that have emerged among people who were heavily exposed during and immediately after World War II.

Repeatedly breathing large amounts of Asbestos is associated with Asbestosis, increased risk of lung cancer and mesothelioma.

Individuals vary considerably in their ability to withstand disease. Asbestos fibers can produce a fatal disease in one person, and yet leave no marks on a colleague working nearby. Preventive measures must be adequate to protect all including those most likely to develop disease.

Asbestos fibers in the air are not visible to the naked eye and there is no odor, irritation or other tangible signs of exposure. Only sophisticated air sampling and analysis using microscopic methods can detect the presence of these fibers.

The mere presence of Asbestos materials in a building should not produce airborne fibers as long as the material is maintained in a secure wrapping or binder and otherwise maintained in good condition. Release of Asbestos into the air in occupied areas must be carefully avoided. Exposures to Asbestos in buildings may occur upon wear or damage and is often due to improperly handling the material and permitting fibers to become airborne. Once inhaled, Asbestos fibers may enter the lungs and last indefinitely there.

A. NATURE OF ASBESTOS RELATED DISEASES;

Dose Response Relationships, Latency Periods and the Lack of a Safe Exposure Level

Key Terms:

Dose-Response relationship -

A principle in toxicology wherein increases in the dose, or exposure, result in proportional increases in the response, or effects.

Latency Period -

Length of time between exposure to a toxic substance and the onset or appearance of resultant disease. Asbestos-related diseases have relatively long latency periods.

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1. Major Diseases:

a. Asbestosis:

- 1) Scarring of the lung tissue seen on x-ray, a form of pulmonary fibrosis. A form of pneumoconiosis, which is a generic name for lung diseases caused by inhalation of dusts.
- 2) Associated with breathing large amounts of asbestos.
- 3) A restrictive lung disease. When fibers lodge in the alveoli, the resultant scarring results in decreased surface area, thereby reducing the lung's ability to oxygenate the blood. Also, as the lung's ability to expand and the breathing capacity are reduced, patients become short of breath.
- 4) A progressive lung disease, which means that it can progress even after exposure is discontinued. If the disease process is advanced, it can cause disability and death.
- 5) Prevention and early detection include chest x-rays, pulmonary function tests and exposure history.
- 6) The latency period for Asbestosis is 5 - 10 years with very heavy exposure. Otherwise it may be 20 - 40 years.

b. Lung Cancer: - abnormal cell growth

- 1) Asbestos is a known human carcinogen.
- 2) Generally, a dose-response relationship exists: the risk of disease increases in direct proportion to the increase in Asbestos exposure.
- 3) However, for lung cancer, there is no known threshold, or "safe" dose, at which it can be said that the risk of this response, lung cancer, is zero.
- 4) Latency period > 15 years, with a peak at 30-35 yrs.

c. Mesothelioma:

- 1) A rare form of cancer of the pleural cavity or peritoneal cavity, associated only with Asbestos exposure.
- 2) An essentially incurable form of cancer.
- 3) Mesothelioma tumors are the uncontrolled growth of cells in the lining of the chest cavity (called the pleura) in between the chest walls and the lungs, or in the lining of the abdominal cavity (called the peritoneum).
- 4) Associated with low levels of Asbestos exposure.
- 5) Latency period for mesothelioma is up to 40 years.
- 6) Usually fatal within 1-2 years after diagnosis.

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2. Minor Occurrence of Diseases:

a. Other Cancers- (Less common).

1) Gastrointestinal tract or digestive tract due to the ingestion of Asbestos fibers.

- a) Esophagus
- b) Stomach
- c) Colon

2) Vaginal (very rare)

3) With early detection, these types of cancers can be curable.

b. Pleural Diseases - Less Serious Disease,

Thickening or scarring of the pleural tissues which normally have no serious health effect but indicate Asbestos exposure

B. ROUTES OF EXPOSURE TO ASBESTOS FIBERS.

1. Lung diseases caused by inhalation (breathing)

a. Lungs continuously exposed to vapors and suspended particulate matter.

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

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

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

c. Some Asbestos fibers can be carried along in the air, down the bronchial tubes, and lodge in the lung tissue where they may remain and incite a reaction in the surrounding lung tissue.

d. Some fibers break into small fragments and are eliminated from the body.

e. Other fibers migrate to the mesothelial lining. These retained fibers trigger tissue defense reactions and create lung disease.

2. Less common gastrointestinal diseases caused by ingestion.

a. Ingestion means to take into the gastrointestinal system. May include eating or indirectly by swallowing fibers that were inhaled.

b. Asbestos can contaminate food, water or other beverage

c. Residues of asbestos on the skin may result in this extra exposure by hand to mouth activity.

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C. SYNERGISTIC EFFECT BETWEEN CIGARETTE SMOKING AND ASBESTOS EXPOSURE;

1. Synergistic effect means the combined, or multiplicative, effect of two factors wherein the whole is greater than the sum of its parts.
2. Incidence of lung cancer is much higher among smokers who were also exposed to Asbestos:
3. Smokers not exposed to Asbestos ten times that of non-exposed, non-smokers.
4. Non - smokers exposed to asbestos have a risk of approximately five (5) times that of non-exposed, non-smokers.
5. Combination (synergistic) effect, among smokers who are also exposed to Asbestos, is 50 - 90 times that of non-exposed, non-smokers.
6. Cigarette smoke has numerous other adverse effects.
7. Cigarette smoke deactivates the cilia.
8. Extrapolation: Conclusions above about the synergistic effect have been extrapolated from data at high exposures to risk assessments for low exposures.
9. Greater lung cancer risk for smokers exposed to asbestos
10. Mesothelioma: No synergistic effect known.
11. Stop smoking and risk of lung cancer can decrease to close to that of a non-smoker.

D. RELATIONSHIP BETWEEN ASBESTOS EXPOSURE AND ASBESTOSIS, LUNG CANCER, MESOTHELIOMA, AND CANCER OF OTHER ORGANS.

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. Relative Hazards of Asbestos Types

- a. All agree that the amphibole types are dangerous.
- b. Many believe that chrysotile Asbestos is less dangerous than amphiboles.
- c. Other important factors known are the fiber length and diameter which combined with the long latency make it extremely difficult to draw conclusions.
- d. The most prudent approach is to treat all forms of Asbestos with due care and minimize exposure.
- e. One point is generally agreed on: Crocidolite and amosite are more dangerous than chrysotile
- f. Much controversy over Chrysotile. some say it is harmless; some say just as bad as amphibole type asbestos.

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3. Fiber size and shape:

- a. Fibers longer than 5 microns and thinner than 0.5 microns appear to be more carcinogenic than shorter and thicker fibers.
- b. Fibers longer than 8 microns are not generally respirable and much less dangerous.
- c. Therefore, thin fiber between 5-8 microns are the worst.

E. MAN-MADE MINERAL FIBERS

- 1. Fiberglass, Mineral Wool and Refractory Ceramic Fibers may be linked with lung cancer.**
- 2. Mineral wool (rock wool) according to EPA is a probable human carcinogen and fiberglass is a possible human carcinogen.**
- 3. These man-made mineral fibers do not appear to be as toxic as asbestos, which is a known human carcinogen.**
- 4. OSHA regulates airborne exposure to man-made mineral fibers. There are monitoring and respirator requirements. Can be tested by NIOSH 7400.**
- 5. There is a NIOSH guideline for glass fibers of about 2 f/cc.**
- 6. OSHA standards are expressed in mg/m³ (mg of dust/cubic meter of air). The OSHA permissible exposure limit (PEL) for total particulate matter in air for nuisance dust is 15 mg/m³ if the matter has <1% asbestos.**
- 7. Established ACGIH limits for mineral wool are in the classification of nuisance dust with a Permissible Exposure Limit of 10 mg/m³.**

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SECTION 4

ROLE AND QUALIFICATIONS OF THE INSPECTOR;

ROLE OF OTHER PROFESSIONALS

Key terms:

Asbestos Containing Material: (ACM): A material with 1% or more of asbestos as determined by PLM (polarizing light microscopy).

Asbestos Containing Building Material: (ACBM) ACM which is surfacing, thermal system insulation, or miscellaneous materials. ACBM is a specific AHERA term referring to ACM in a school which is in one of those three categories and not excluded from AHERA. For example ACM roofing is not an ACBM, ACM brake linings are not an ACBM.

A. ROLE OF THE INSPECTOR:

1. General:

- a. Information gathering pertinent to asbestos in building
- b. Provide the Management Planner the basis for Decision making.
- c. Location and classification of ACBM
- d. Sample collection or assumption
- e. Compilation of the asbestos inventory
- f. Physical Assessment

2. Specific Tasks of the Inspection Process:

- a. Preinspection Planning: (See section 7)
- b. The Survey: (See section 8)
 - 1) Inventory of ACM
 - 2) Physical assessment
- c. The Inspection Report: (See section 8)

B. SKILLS, PRIOR EXPERIENCE AND QUALIFICATIONS OF THE INSPECTOR:

1. Connecticut Requirements:

- a. Training 3 days at a CT DPH Approved training center and passing an examination
- b. Licensing implemented in summer- fall of 1994:
- c. Associates or bachelors degree in appropriate science and one years work experience or two years work experience as an inspector.
- d. Approval by the state
- e. Annual refresher training

2. Other States:

Many states such as Rhode Island, Mass and New York require licensing.

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4. Other Qualifications and Skills:

- a. Thorough knowledge of building systems.
- b. Observant and meticulous
- c. Must know the regulations for inspections in every detail.
- d. Understand sampling strategies and methodologies.
- e. Recommended one year apprenticeship or prior experience in inspection
- f. Skilled in dealing with people
- g. Able to produce well organized and legible report

C. ROLE OF THE MANAGEMENT PLANNER:

1. Makes decisions as to selection of response actions and priorities.
2. Comparison of Function of Inspector vs Management Planner:
 - a. Inspector assesses the **physical condition**;
 - b. Management Planner Assesses the **Hazard**.
 - c. Example:

Management Planner makes the recommendation to remove asbestos in a certain area because the inspector reports significantly damaged asbestos thermal system insulation.

3. Compiles the management plan.

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SECTION 5

LEGAL AND INSURANCE ISSUES

FOR THE INSPECTOR AND MANAGEMENT PLANNER

Preface:

This training material is intended as a general guide to legal issues, and is not to be considered as legal advice.

Consultants involved in inspecting, assessing and planning regarding asbestos hazards in buildings must be aware of the legal implications of their work and the potential liability involved. One need only to refer to Section 3 on health effects to realize the potential liability and litigation. It is important to thoroughly plan and execute the work.

The inspector and Management Planner must plan carefully to avoid legal problems, disputes or litigation. He should obtain advice from a competent attorney addressed to the general parameters of the work and the contract and to the particular job situation.

A. TYPES OF LIABILITY:

1. Statutory:

Violation of government regulation.

Violation of the law includes failure to perform the specified procedures including:

- a. Negligence
- b. Gross negligence
- c. Performing a prohibited act
- d. Conspiracy
- e. Fraud

2. Contract:

a. Nature of the Contract

- 1) May be a formal Document, a combination of a letter of proposal and a purchase order or letter of reply.
- 2) Always should include:
 - a) The scope of work
 - b) Prices of services

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b. Breach of Contract: means the contract is not properly performed.

- 1) See that good contract documents are prepared and observed.
- 2) Use written change orders for any changes in the work.

3. Tort Liability:

a. A legal wrong. Requires two conditions:

- 1) Someone is aggrieved (harmed personally or financially)
- 2) Someone is responsible.

b. Anyone and everyone may be sued.

c. The likelihood and degree of adverse affect on the defendant depends on:

- 1) Following regulations
- 2) Following contract specifications
- 3) Risk contribution
- 4) Proof- documentation, witnesses and medical evidence
- 5) Degree of harm

B. INSURANCE:

1. Claims Made vs Occurrence:

- a. Claims made: Covers claims which occur and are made during the term of the contract.
- b. Occurrence: Covers incidents which occur during the policy term, regardless of when the claim is made.

2. Limits

- a. Aggregate Limit: The maximum amount of liability payable for all losses during the policy period.
- b. Single Limit: The maximum amount of liability payable for a single incident.
- c. Time Limit - Length of policy- usually renewed annually

3. Errors and Omissions Insurance (The preferred insurance for consultants)

- a. Cost- Premiums start at about \$40,000/ year plus typically 10%.
- b. Availability: Difficult.

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4. Comprehensive General Liability Insurance Policies:

- a. Premises fire, theft and injury.
- b. Automobile liability, usually combined single limit.
- c. Completed Operations- claims made after leaving the site.
- d. Damage During on-Site Operations
- e. Excludes employees and errors and omissions.
- f. Rates may be lower for consultants who have errors and omission insurance.

5. Worker's Compensation Insurance, State Mandated Liability Insurance

- a. Covers employees of the insured for job related injury or illness.
- b. Required by state law for all employee's.
- c. Owners may be exempted.
- d. Report illness or injury attributed to their work immediately.

6. Exclusions:

- a. Pollution: excludes a broad list of substances, can exclude asbestos
- b. Asbestos: policy may specifically exclude asbestos related injury.
- c. Anticipatory damage.
- d. Exclusion of coverage for employees, tenants and/or subcontractors.

7. Master Policy:

Provides a specific total dollar amount of coverage to a group of insured parties. The amount of coverage may be inadequate.

8. Other Items to Investigate

- a. Best's ratings are useful. A. M. Best Company, Oldwick, NJ. 908-43902200. A+ = good company B or lower = marginal or poor company.
- b. Paperwork and reporting requirements: may be burdensome
- c. The financial stability age and stature of the insurance company
- d. Special features such as work guidelines which may be burdensome.
- e. Authorized in Connecticut.

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9. Bonding:

- a. Supplement to insurance which reserves a guaranteed amount of cash to be paid in case of default.
- b. Availability: More difficult to obtain than insurance and requires very complex applications and collateral.
- c. Types
 - 1) Performance bond: usually a cash amount equal to the contract sum.
 - 2) Bid bond: Usually 5% of the bid sum.

C. RESPONSIBILITIES:**1. Inspector's Responsibilities:**

(Section 8 has a more detailed description of the inspector's duties)

- a. Determine nature, condition and exact location of ACM.
- b. Any additional tasks agreed upon with the client.

2. Use of Results from Prior Inspections:

- a. Inspector may accept or reject all or part of prior inspection
- b. Common errors and omissions of the previous inspector.
 - 1) Grouping truly dissimilar items in a single homogeneous area.
 - 2) Lack of details on homogeneous sampling areas such as:
 - a) Color
 - b) Texture
 - c) Appearance
 - d) Precise location of samples.
 - e) Concise drawings
 - f) Space by space narrative
 - g) chain of custody documents
 - h) sample records

c. Review:

The inspector needs to review prior data before and during his inspection and in some cases may be better off to start over.

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3. Management Planner's Responsibilities:

- a. Recommendations including selection of response actions and the O&M program.
- b. Producing a satisfactory Plan:
 - 1) Complies with AHERA
 - 2) Functional document for the LEA to use.
- c. Recommend Response Actions:
 - 1) Abatement: It is not the Management Planner's job to describe how the abatement work will be conducted, but only to recommend which actions should be taken. Wording should be included to the effect that an Accredited Project Designer must be used to design Abatement activity.
 - 2) O&M: Preparation of a detailed O&M Plan.

4. Owner's Responsibilities:

- a. Specific Statutory Responsibilities of the LEA:
 - 1) LEA is responsible for all activities related to ACBM at their schools.
 - 2) The LEA must maintain records at each school and generally direct asbestos related activities.
- b. General Common Law and Statutory Responsibilities of Building Owners:
 - 1) Primary responsibility for the abatement of hazards within any structure, including asbestos.
 - 2) Should know that asbestos exists in a building, and that it is likely to be hazardous to those exposed to it, including their own and other's employees, tenants, outside service people and contractors, visitors and the public. The owner may be liable to any of these parties for failure to act properly or allowing any extended delay in identifying hazards or in instituting proper asbestos management and/or remediation program.
 - 3) Responsible for the actions of an employee while employed or an independent contractor while engaged and acting within the scope of their employment or work.
 - 4) Has a duty to warn persons who may be affected by the danger including possible degradation or disturbance of ACBM.
 - 5) Owner's responsibility does not relieve tenants and outside contractor of their responsibilities including responsibility to protect its business patrons or its employees.
 - 6) Responsibilities of owners carry through to loan and sale transactions and to disclosure to subsequent prospective purchasers and lenders who may carry a mortgage on the property.

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D. LIABILITIES:

1. Inspector Liabilities

a. Errors and Omissions:

Failure to accurately identify and assess ACBM in all areas of the building.

b. Shared liability

Errors made by the inspector are likely to cause the Management Planner to err.

For example, the Management Planner may fail to address damaged ACBM in a certain area because the inspector failed to report the presence of the damaged ACBM. The portion of the responsibility for such omissions borne by the inspector and Management Planner depends somewhat on contracts with the building owner but is likely to be shared by the inspector, Management Planner and the building owner.

c. General liability (Physical damage and direct injury caused by inspections)

- 1) Surface damage
- 2) Water and Fire
- 3) Auto
- 4) Equipment

2. Management Planner's Liabilities

The management planner shares all of the inspector's liability and has the following additional liabilities:

a. Fiber Release Episodes

1) Failure to properly specify precautions and procedures.

a) Maintenance, Repair and Remodeling.

b) Preventative measures.

2) Overlooking key areas may result in contamination.

b. Abatement: Failure to recommend needed abatement activities.

c. Control Recommendations

1) Select the most appropriate response actions. It is better to err on the cautious side.

a) Recommendations must be the least burdensome measures which protects health and the environment.

b) In selection of response actions, consider:

Condition and location
Use of the affected areas
Cost.

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- 2) Removal: Liability exists through possible contamination of the building.
- 3) Encapsulation: Liability of the material delaminating.
- 4) Enclosure: Liability of future disturbance if the location is not properly documented.
- 5) O & M plan: Constant liability of fiber release episodes if there was inadequate description of Repair and O&M procedures.
- 6) Isolation: Liability of potential exposure and contamination.

E. DEFENSES FOR THE INSPECTOR AND MANAGEMENT PLANNER:

1. Inspector Defenses:

- a. Solicit LEA Review of Report.
- b. State the Limitations of Inspections.
 - 1) All materials not covered in an AHERA Inspection.

Examples of materials which are not included are:

Stored material, concrete, cinder block, blackboards, pressed wood, carpets, curtains, table and desk tops, chemical lab gloves and other fire resistant equipment, fire blankets, appliances, and exterior roofing.

The Inspector or Management Planner should suggest that as questions about such materials may arise, it is prudent for the School to point these items out to the AMP Coordinator who may have analysis made of any suspect materials.

- 2) Inaccessible Materials:

Some building materials may escape detection because they are inaccessible.

- c. Written Communications:
- d. Careful Preinspection Planning (See section 7)
- e. Completeness of Inspections and Management Plans
 - 1) Check Lists for Inspectors and Management Planners
 - 2) All spaces inspected and documented
 - 3) Hazard assessment
 - 4) Maintaining accurate and complete records
 - 5) Quality Control
 - 6) Positive and negative reinforcement.

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2. Management Planner Defenses:

- a. Accurate and feasible plan.
- b. Send a draft version requesting input from the LEA.
- c. Precautions before building disturbance:
- d. Transmittal Meeting:
- e. Verify Inspector's Data:
 - 1) Go to the site to check.
 - 2) Cross check drawings with site narrative.
- f. Precautions for Managing ACBM in Place:
 - 1) Verify Resources available:
 - 2) Specify Who Does What:
 - 3) Temporary measures:
 - 4) Abatement Precautions:
 - 5) Specify which activities require Accredited persons.
 - 6) Planning O&M activities to minimize the risk of exposure:
 - a) Alter existing operation and maintenance procedures that could cause the release of spreading of asbestos fibers.
 - b) Schedule necessary maintenance and renovation when there are no occupants in the area.
 - c) Institute procedures to reduce the level of any exposure to both maintenance personnel and occupants of the building.
- g. Recordkeeping and Documentation
 - 1) Retain complete copies of the inspection report and Plan.
 - 2) Specify who checks Ongoing records:
 - a) Employee training.
 - b) O&M activities.
 - c) **Periodic surveillance every six months.**
 - d) **Reinspections every three years.**
 - e) Notifications each year to PTO **and the method for notifying short term employees.**

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- f) Preventative measures implemented.
- g) Records of Asbestos abatement activities
- h) Certificates for Accredited persons.
- i) Documentation of proper procedures for building renovation and remodeling.
- j) Certification of asbestos free replacement materials used

h. Insurance (see above)

The Planner has a special need for Errors and Omissions insurance because he has responsibilities far beyond that of the Inspector.

i. Recommended Meeting with LEA:

The Planner's role in such a meeting is to provide the LEA with guidance in performing the activities the LEA is required to do. The activity list and particularly assignment of responsibilities need to be addressed.

Typical questions the LEA may ask would include: Where are the signs available? What are the costs expected for implementing the Plan? For example, what is cost of in house staff doing surveillance, O&M type repairs, etc vs an outside professional?

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SECTION 6:

BUILDING SYSTEMS

A. INTERRELATIONSHIP BETWEEN BUILDING SYSTEMS

1. Overview of Common Physical Plant Layout and Organization:

a. Core Areas

- 1) Main Office
- 2) Cafeteria- kitchen
- 3) Athletic
- 4) Library- media
- 5) Mechanical Systems
- 6) Custodial Areas
- 7) Specialty training areas

b. Classrooms

c. Connectors

- 1) Corridors
- 2) Lobby
- 3) Stairs

d. Exterior

- 1) Porticos
- 2) Covered Walkways
- 3) Outside freezers
- 4) Under portion of outside porticos
- 5) Covered walkways
- 6) Roof mechanical rooms
- 7) Friable exterior materials near air intakes.

Friable material: when dry may be crumbled, pulverized or reduced to powder by hand pressure.

2. Scope of ACBM in Buildings for AHERA Inspections:

a. Buildings and attachments included:

- 1) Storage buildings and outside storage rooms
- 2) Maintenance sheds
- 3) Offices
- 4) Garages
- 5) Exterior building areas

b. Interior Materials Included

- 1) Thermal System Insulation
- 2) Surfacing
- 3) Miscellaneous Materials

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c. Materials Not Included in AHERA Inspections:

- 1) Stored material
- 2) Concrete
- 3) Cinder block
- 4) Blackboards
- 5) Pressed wood
- 6) Carpets
- 7) Curtains
- 8) Table and desk tops
- 9) Chemical lab gloves and other fire resistant equipment
- 10) Exterior roofing.

B. DRAWINGS AND PLANS:

1. Types of Drawings:

- a. Architectural Drawings: show the building structure or design.
- b. Building Drawings: contain structural details or blueprints.
- c. Floor Plans: Schematic layout of the building showing building spaces.
- d. Master Riser Plan: Three dimensional building layout.
- e. As Built Drawings: Locations of electrical or mechanical features as actually built.
- f. Mechanical Drawings:
 - 1) Plumbing
 - 2) Electrical
 - 3) HVAC
- g. Framing Plan: Shows vertical columns and supports of the building.
- h. Site Plan: Shows arrangement of buildings on the property and other details which may include roads, utilities, underground tunnels, and dimensions.

2. Reading Blueprints and Drawings:

A table is in the Handout on W.W.W.Chem-scope.com showing the commonly used symbols. Sample drawings are attached for further discussion and practice.

3. Consolidating Building Layout Information:

- a. Start with Floor Plans
 - 1) Rarely up to date or complete.
 - 1) Usually mechanical spaces are not identified.
 - 3) Correct plans after initial site walk through, interviews, and review of detailed drawings.

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b. Interview of Building Staff Familiar with Building History:

- 1) May have seen all or part of renovations.
- 2) Details on dates and boundaries of construction

c. Personal Investigation:

1) Walk the building exterior and the roof.

a) Look for building additions evident from different type, texture and colors of:

- Brick
- Block
- Poured concrete
- Other exterior building materials

b) Look for:

- Partial building floors
- Mechanical protrusions
- Exterior entry to storerooms
- Outbuildings
- Suspect materials on underside of exterior porticos.

c) Locate roof drains.

d) Gross measurement of building dimensions.

2) Walk corridors and representative rooms to obtain a sense of the building and the composition of the building materials to be inventoried in the more detailed survey.

3) Proceed to the mechanical areas of the building. How does building heat distribute to the room spaces? Is there a HVAC? Write a description of the mechanical systems. Does for example, the system have steam or hot water heat.

C. BUILDING COMPONENTS:

1. Mechanical Systems and Areas

ACBM may be concentrated in mechanical areas. The following is a list of areas and key items.

a. Boiler Rooms:

1) Boiler:

a) Usually more than one boiler; may be original or added with new wing construction.

b) Are they all the same? If not, you can expect different homogeneous areas of boiler and pipe insulation throughout the building. List the number and types of boilers and indicate the location on the plans. Identify the types and age of the boiler(s) from the name plate and other information available.

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c) External: Is the boiler insulated with an exterior cement jacket, cast iron clad, aluminum or sheet metal clad over insulation?

d) Internal: Always assume there is internal ACBM unless there is certification that the boiler is asbestos free.

e) Oil Fired units:

Most institutional boilers are oil fired with steam or hot water feed to room heat exchangers. Find out what grade of oil is used. Heavy grades of oil require heat tracing from outdoor tanks and usually asbestos insulated plumbing.

5) Gas Fired Units: Gas inlet lines are usually not insulated. Newer systems may be direct hot air or may circulate water or steam to air handlers which exchange heat into hot air ducts.

6) Boiler Exhaust System:

Fire box
 Manifold
 Breeching
 Chimney.

More than one boiler may feed to the same breeching via individual exhaust headers which will be perhaps a third the size of the breeching diameter.

2) Pipes: Most pipes originate in the boiler room.

a) Pipes may have different insulation composition:

Fuel feed
 Circulating water feed and return
 Water or steam take away and return lines
 Domestic hot and cold water lines
 Different diameters

Fittings vs runs

Pipe joints including T's, L's, flanges, I's and other transitions including sites where pipe hangers are attached are often of different composition than the pipe run insulation.

b) Types of Insulation on pipes:

Air cell - honeycomb paper, usually ACBM
 Cementitious - usually ACBM
 Wrapped paper - ACBM or other
 Black tar coated - ACBM or other
 Foam - ACBM or other
 Wool types. - ACBM or other
 Fibrous glass with asbestos - ACBM or other
 Rock wool or mineral wool. - ACBM or other
 Modern fiberglass insulation, usually pink or yellow- not ACBM. Sometimes fiberglass insulation is used for runs and asbestos or non-asbestos cement for fittings.

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c) Pipe Paths through Building:

Protrusions of pipe from the boiler room determine the likely path of flow through the building. Does the pipe run overhead to perhaps above drop ceilings? Does the pipe run through a pipe tunnel system?

Are there crawl spaces and tunnels directly accessible from the boiler room?

Do risers run inside walls in pipe chases or protrude into rooms.

3) Hot water tank- condensate tank

4) Cooling Units: Central air conditioning compressors may be located in the boiler room. Here you will see another selection of insulated pipes and ducts. The ducts may be insulated outside and occasionally inside. Be watchful for interior duct insulation. Ducts usually have expansion and vibration joints which may be asbestos containing.

b. HVAC: (heating, ventilation, and air conditioning system) Physical Organization:

1) Basic components:

Fans
 Ducts
 Heat exchangers
 Heat source such as a boiler
 Compressor or other form of chiller.

2) Operation:

Heat or cooling source
 Heat exchangers
 Air inlets
 Air returns
 Fresh make up air added- about 10%
 Humidity may be added.

3) Flow Path:

The inspector should describe or draw the flow sheet for such systems, since this is a major factor in the Management Planner's decision making. In particular, note where asbestos materials are near air intakes or may otherwise be distributed through the building.

4) Spreading Contamination by Air Transport:

a) Air transport is a major factor in spreading asbestos contamination HVAC insulating materials and flex joints frequently contain asbestos.

b) **Watch for air returns in drop ceilings with no ducts- drop ceiling may be return air plenum.**

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5) Where ACBM is found on HVAC Components:

Exterior of air ducts may be a soft friable cement board which is glued and wired onto the duct

Troweled on cement may be used at joints.
All of this may be covered with canvas, foil or paper.

A gray white asbestos paper is sometimes glued directly on the ducts.

Exhaust ducts around kitchens may have a loose, fluffy spray on or troweled on amosite insulation.

Asbestos insulation is rarely used inside of ducts, but the inside must be accessed to be sure. Investigation inside air handlers is often the best way to determine the presence of interior duct insulation.

Fiberglass insulation with foil wrap is commonly used in air system ducts. Always watch out for asbestos cement tipping at hangers and joints.

Duct joints may be connected by flexible duct connectors. These may contain asbestos or not. A gray white fabric is almost always ACM. Black rubber may be asbestos or not. Vibration dampers connecting fan units to ducts may be of the same composition as the duct connectors.

c. Room Heat Exchangers and Duct Inlets and Returns

1) From the mechanical rooms, trace the path of the pipes and ducts to the individual building spaces.

a) Piping path to the room heat units:

Pipe tunnel?
Pipe travel over drop ceilings, inside walls, exposed?
Pipe risers to upper floors inside walls or accessible?

b) Duct path to the rooms:

Is space over the drop ceiling a return air plenum?
General path?
Type of insulation? (if none report bare metal)

c) Nature of the room heat exchangers:

Baseboard, radiator, blower units, etc?
Asbestos in the room heat exchangers?
Asbestos paper insulation on walls?
Asbestos pipe insulation?
Transite panel inside below or behind?

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d. Inspecting Electrical System:

1) Safety:

- a) Sampling and intrusion into electrical systems is generally not done for safety reasons.
- b) Visual observation of exposed wires and parts: Suspect materials should be noted in the report. These should be more closely inspected before renovation or other disturbance and only when the electrical system is shut down.

2) Applications:

- a) Asbestos cloth insulation is used in older wiring service. This type of insulation is easily recognized by its woven or braided appearance, fibrous texture and gray color.
- b) Asbestos transite type insulation may be used in panels transformers, motors or boxes and in any portion of the electrical system. These materials are hard gray nonfriable insulators.
- c) Asbestos cement or paper may be used in older florescent fixtures and inside built in spotlight fixtures and ceiling or wall protrusions.

2. Ceiling Construction

a. Surfacing Materials

1) Hard plaster construction:

Support of steel mesh or wood slat - metal or wood lathing.

Base plaster coat is usually a mixture of lime, sand and animal hair called "brown coat". The dried coating is hard cement and coarse textured.

Finish plaster "lime coat" is generally applied over the brown coat. This is a mixture of plaster of Paris and lime.

Asbestos may be added to either the brown or finish coat plaster usually by choice of the installer.

2) Softer white troweled on cement - frequently asbestos containing and may be applied directly on lathing or over concrete or plastered ceiling. Sounding the surface is a good practice since both hard non asbestos and soft asbestos surfacing may be used in the same building.

3) The ceiling is the more likely place to encounter asbestos surfacing as compared to walls. Hallways, stairwells, under stairs and above heat sources such as boilers are more likely to have asbestos surfacing for fireproofing than rooms.

4) Plaster board is a more modern preformed plaster section which is nailed onto studs and finished with a finish coat plaster. The latest version is called sheet rock. Any of these boards or the finish plaster or taping compound may contain asbestos.

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b. Ceiling tiles and panels:

- 1) Acoustical tiles, usually 12x12 inches may be glued onto ceilings or upper walls directly or glued onto furring strips.
- 2) Fixed Ceilings; In renovation, drop ceilings may be fixed ceilings of sheetrock, Acoustical tile on lathing or separate plaster ceilings. Typically in renovation such ceilings are usually more prevalent in rooms than in halls. Hall ceilings are more likely to be lay in drop ceiling panels because of the need to access mechanical components frequently found in halls.
- 3) The lay in drop ceiling, usually 2x4 or 2x2 ft panels laid on a metal grid afford the inspector easy access to inspect above. The grid is typically suspended on wires. Since these panels are frequently moved by maintenance staff, frequent replacement is normal as is the presence of more than one vintage of panels. Inspect very closely for different ceiling tile areas.
- 4) Composition: Ceiling tiles and panels have various compositions both asbestos and non asbestos containing. Cellulose and mineral wool are commonly used with or without asbestos.

c. Paint

Asbestos containing paint is more likely to be present in ceilings than elsewhere. Ceiling tiles or finished surfaces may be painted with asbestos containing paint for strength or noise control.

3. Wall Construction:

- a. Plaster or sheetrock of the same type as used in ceilings may be used in the wall construction.
- b. Exterior and interior walls may be of different construction. Homosote and fiberboards are commonly used. Homosote is a gray fibrous, usually non asbestos board. Fiberboards are usually cellulose and rarely contain asbestos.
- c. Transite asbestos panels may be used in wall construction, especially on outside walls and behind radiators or as door or window panels. Halls and some rooms may not have finish wall construction and may be cement or cinder block or poured concrete. Frequently sheet rock is added in renovation to modify rooms. Be very careful in wall inspection since there may be many different types and vintages of materials.

4. Floor Construction:

- a. Substrate: usually concrete or board "hardwood" flooring.
- b. Vinyl tile.
 - 1) Older 9x9 inch type
 - 2) Newer 12x12 inch tile.
 - 3) Linoleum
 - 4) Mastic adhesive
 - 5) Multiple layers of floor tile or linoleum.
 - a) Plywood used to cover old vinyl flooring. If sampling, be watchful of multiple layers and sample each layer.
 - b) Always "go to the slab" or to the wood plank substrate when sampling.
 - c) The inspector should be able to distinguish a plywood layer from hardwood flooring. The easiest method is to expose at least a 6-inch area and look for the plank edges or grooving which is characteristic of hardwood floors.

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5. Deck and Roof Underside:

a. Spray on surfacing on steel decking and beams:

- 1) Easy to recognize from the gray cotton candy like appearance.
- 2) Detected quickly in areas with no drop ceilings or above lay in drop ceilings.

b. Roof drains may be asbestos insulated steel or made of hard asbestos cement. These may be located from outside as mentioned above.

c. Troweled on asbestos insulation may also be used in high rooms such as gyms and auditoriums. From a distance, these may appear to be concrete or plaster. It is essential to access these for close up observation.

6. Exterior Considerations

a. Underside of porticos and covered walk ways:

- 1) troweled on asbestos cement
- 2) asbestos transite panels.

b. On the roof

- 1) evaporative cooling units
- 2) fan rooms,
- 3) friable materials near air intakes.

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SECTION 7:

PUBLIC, BUILDING OCCUPANT AND SCHOOL EMPLOYEE RELATIONS;

PREINSPECTION PLANNING

Preface: Careful attention to this section will save the inspector extra trips to the site and promote a smooth and professional job.

A. RELATIONS:

1. Chain of Communication and Command:

a. Contacts:

- 1) Establish the prime contact. **He is person to notify when a hazardous condition is discovered.**
- 2) Identify the staff most familiar with the building
- 3) Establish the rules of communication.

b. Advise client of Required Communications under AHERA:

- 1) Notify employee organizations about the inspection
- 2) Post signs required in **routine maintenance areas**
- 3) Notices posted indicating that the building has friable asbestos.
- 4) Awareness training
- 5) Annual letter to PTA

2. Public Relations:

a. Establish the Rules:

Ask client how he wishes any contacts to be handled. It is the building owner's responsibility and not the inspector's responsibility to inform building occupants about the inspection or results or related information.

b. Tact:

The inspector must use tact in all communications with building occupants and the press and still observe the client's requirements.

The main function of the inspector is to gather information about the building and his communications should be directed in areas required to obtain information.

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3. School Organizations:

a. Public schools:

- Central education organization
- Public building commission
- Superintendent of schools
- Business manager, director
- Superintendent of building and grounds
- Plant manager or facilities manager or environmental manager
- Teachers and administrative and office staff
- Head custodian and Custodians

b. Private schools: Owner or a general manager

B. PLANNING

1. Scheduling the Inspection to Minimize Disruption:

a. Obtaining Access During Non-school hours:

- 1) Avoid disrupting building activities.
- 2) Sampling should be done while alone in the space.

b. Notifications by Building Owner:

- 1) Notify building occupants that an asbestos inspection is being conducted.
- 2) Include inspection dates in the annual letter sent to the PTO.

c. Other Arrangements:

- 1) Discuss sampling vs assuming material to be asbestos.
- 2) Keys and clearance to enter all spaces including:
 - rooms
 - closets
 - specialty areas.
- 3) Ladders or lift devices that the inspector will need.
- 4) Access to Plans and Drawings:
- 5) Education of Building Occupants about actions being taken.
 - Awareness training
 - Meetings
 - Posting of notices

2. Determine Scope of Inspection:

a. Advise client of the Scope of the AHERA Inspection.

b. Determine additional Scope of Inspection, if any.

- 1) Predemolition or pre-renovation asbestos inspection.
- 2) Exterior asbestos inspection preceding a roofing project.

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- 3) Testing non-AHERA covered building internal components.
 - 4) Other hazardous materials/ environmental audits. (Do not overstep field of expertise or certification.)
- c. List of outbuildings or off site buildings included.
- d. Partial inspections may be needed:
- 1) New additions.
 - 2) Existing Buildings renovated exposing new areas.
 - 3) If part of the facility is not involved with the school.

3. Prior Reports and Building Record Review:

- a. Prior inspections:
- 1) Obtain all prior inspection records.
 - 2) Advise client that prior inspections may be wholly or partly rejected if they do not comply with AHERA requirements.
 - 3) Prior reports may be incomplete, marginal or inaccurate
 - 4) Sites may change between inspections due to abatement and renovation.
 - 5) Identify probable homogeneous areas of ACM from blue prints or as-built drawings.
 - 6) Identify possible exclusions for previously performed inspections.
- b. Abatement Activities Since the Last Inspection:
- 1) Assemble and review records of asbestos abatement
 - 2) Adjust the list of asbestos materials by deducting materials removed.
 - 3) Plan to verify during the site visit.
 - 4) Certification of asbestos free materials.

4. Arrangements about Sampling:

- a. Advise the client that sampling may cause damage.
- b. Agree on the type of repair and who will make the repair.
- c. Identify probable homogeneous sampling areas.
- d. Determine the preference for sampling or assuming material to be asbestos. Rooms about to undergo remodeling or damaged areas should be a high priority on the sampling list.

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5. Consultation with Maintenance or Building Personnel:

- a. Review construction history.
- b. Learn about hidden and hard to access areas
- c. Learn about school physical plant operation and layout.

6. Final Inspection Preparation:

- a. Review all documentation and drawings.
- b. Have a working set of floor plans.
- c. List of questionable items from prior data to investigate on site.
- d. Arrange for escort and access.
- e. Assemble forms needed for:
 - 1) Homogeneous sample list
 - 2) Bulk sample collection
 - 3) Site narrative
 - 4) Other forms and data used by the inspector's company
- f. Be clearly decided on the scope of the inspection.
- g. Assemble equipment.
- h. If more than one inspector is to perform the inspection, assign distinct work tasks and responsibilities for each inspector.

7. Role of the Inspector in Exclusions for Previously Performed Inspections:

Inspections completed before December 14, 1987 - See 763.93

- a. Give the inspection dates for each homogeneous or sampling area receiving an exclusion?
- b. Acceptance or Rejection Issues:
 - 1) Friable ACBM was identified in homogeneous or sampling area(s).
 - 2) Nonfriable ACBM was identified in homogeneous or sampling area(s).
 - 3) Material determined not to be ACBM in homogeneous and sampling area(s) was sampled in substantial compliance with Sec. 763.85(a).

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c. Required information in prior reports

1) Blueprint, diagram, or written description that identifies clearly

(a) each location and approximate square or linear footage of homogeneous areas where material was sampled and

(b) if possible, the exact location where each bulk sample was collected and the date of collection.

2) For each bulk sample analyzed:

a) Copies of analysis Page Numbers _____

b) Dates of analysis Page Numbers _____

d. Where asbestos removal operations were conducted before December 14, 1987, descriptions of any response actions including, "if possible":

1) Names and addresses of the contractors involved.

2) Start and completion dates of the work.

3) Results of any air samples analyzed during and upon completion of the work.

7. Suggested Asbestos Inspection and Bulk Sampling Kit

a. Water spray mister, 1 pint or 1 quart

b. Zip-loc bags (Dow) heavy duty, or other suitable containers.

c. Overbag- master sample container into which individual labeled and sealed sample bags are placed. A one gallon Zip Loc bag is ideal for this purpose.

d. Waste pouch: a one gallon zip loc bag with some paper towels inside to absorb water used to clean tools is ideal.

e. Tape measure

f. Flashlights and spare batteries

g. Paper towels

h. Labels or masking tape

i. Sharpie indelible marker (water resistant) and Ball point pen

j. Needle nose pliers

k. Electrician's Hammer

l. Screw drivers and stiff putty knife

m. Chisels.

n. Single edge razor blades

o. Step ladder (If not available on site)

p. Paperwork

q. Copy of License

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- r. Asbestos free patching materials:
 - Spackle, Caulk and Putty
 - Duct and masking tape
 - Spray glue
 - Clear acrylic spray lacquer
 - Remoistenable Cloth (Diplag or equivalent) (Industrial Products)
 - Roofing cement, fiberglass cloth and portable propane torch

- s. Disposable Coveralls (Industrial Products)

- t. Dust Sampling Assembly:
 - High volume suction pump (Industrial Products)
 - disposable 25-mm sampling cassettes with cellulose ester filters, 0.3 micron porosity. (Industrial Products)
 - Vacuum tubing and tubing adapters

- u. HEPA vacuum
- v. Tweezers
- w. Dental tools including a small stemmed mirror.
- x. Disposable sample borers Wonder Makers (616) 382- 4154
- y. Encapsulant Spray, in spray mist bottle
- z. Respirator

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SECTION 8:
THE INSPECTION

Section 8-1 AHERA Requirements (Extracted from 40 CFR Part 763:

A. "FOR EACH AREA OF A SCHOOL BUILDING, THE PERSON(S) PERFORMING AN INSPECTION SHALL:

NOTE: Air monitoring is not routinely used as part of the assessment.

1. **Visually inspect** the area to identify the locations of all suspected ACBM.
2. **Touch** all suspected ACBM to determine whether they are friable.
3. **Identify** all homogeneous areas of friable suspected ACBM and all homogeneous areas of non-friable suspected ACBM.
4. **Assume ACBM or Sample:** Assume that some or all of the homogeneous areas are ACBM, and, for each homogeneous area that is not assumed to be ACBM, collect and submit for analysis bulk samples. **Note: Under AHERA, building materials installed after October 12, 1988 can be certified asbestos free by an architect or project engineer responsible for the installation, or by an accredited inspector. This certification is not valid to meet NESHAP requirements.**
5. **Assess** friable material in areas where samples are collected, friable material in areas that are assumed to be ACBM, and friable ACBM identified during a previous inspection.
6. **Record** the information and submit a copy of such record for inclusion in the Management Plan within 30 days of the inspection."

B. "ASSESSMENT MAY INCLUDE THE FOLLOWING CONSIDERATIONS:

1. Location and the amount of the material (actual or estimated), both in total quantity and as a percentage of the functional space. Information about material thickness would be needed if the inspection precedes possible removal. This would enable the contractors to more accurately bid the project.
2. Condition of material, specifying:
 - i. Type of damage or significant damage (e.g., flaking, blistering, water damage, other signs of physical damage).
 - ii. Severity of damage (e.g., major flaking, severely torn jackets, as opposed to occasional flaking, minor tears to jackets).
 - iii. Extent of spread of damage over large areas or large percentages of the homogeneous area.
3. Whether the material is accessible.
4. The material's potential for disturbance.
5. Known or suspected causes of damage or significant damage (e.g., water, vibration, air erosion, vandalism).
6. Preventive measures which might eliminate the reasonable likelihood of undamaged ACBM from becoming significantly damaged."

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C. CLASSIFY INTO ONE OF THE FOLLOWING SEVEN CATEGORIES:

1. Damaged or significantly damaged thermal system insulation ACBM.
2. Damaged friable surfacing ACBM.
3. Significantly damaged friable surfacing ACBM.
4. Damaged and significantly damaged friable miscellaneous ACBM.
5. ACBM with potential for damage.
6. ACBM with potential for significant damage.
7. Any remaining friable ACBM or friable suspected ACBM."

Section 8-2 Visual Inspection For Friable and Non Friable Asbestos:

A. FUNCTIONAL SPACES AND HOMOGENEOUS AREAS:

1. Key Terms:

a. **Functional Space:** A room, group of rooms, or homogeneous area including crawl spaces or the space between a dropped ceiling and the floor or roof deck above), such as classroom(s), a cafeteria, gymnasium, hallway(s), designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions.

b. **Homogeneous sampling area:** A suspect asbestos material of the same kind, color, texture, general appearance, which is believed to have been installed at the same time and appears identical in every respect.

2. Functional Space Examples:

Attic	Classrooms
Boiler Room	Office
Pipe Chase	Shop Area
Crawl Space	Art room
Gymnasium	Bandroom
Stairwell	Laboratory
Corridor	Cafeteria
Media Center	Library
Above Corridor	Balcony
Outside freezer	Mezzanine
Storage room	Auditorium
Maintenance shed	Sound Booth
Garage	Dormitory
Fan room	Bathroom
Pipe chase	Closet

b. Group suspect asbestos materials in homogeneous sampling areas of the same kind, color, texture, general appearance, which are believed to have been installed at the same time and appears identical in every respect.

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- c. Measure quantity of suspect ACBM in each homogeneous sampling area.
- d. Perform the physical inspection and record the assessment for each homogeneous area of ACBM.
- e. Watch for salients. A salient is a small portion of different material within a homogeneous area. If these can be identified, then they should be treated as a separate homogeneous area.

B. PRINCIPAL TYPES OF ACBM

(Refer also to Section 6, Building Systems.)

1. Surfacing:

- a. Troweled on plasters found on walls, ceilings, under stairs, on concrete and other surfaces.
- b. Spray applied material found on steel beams, under decking, under stairs.
- c. Sheet rock and plaster board may be treated as surfacing material if it is coated.
- d. Decorative and acoustical plaster

2. Thermal System Insulation (TSI):

a. Mechanical uses:

- 1) Boiler and tank insulation.
- 2) Pipe and fitting insulation
- 3) Duct insulation for HVAC and exhaust ducts
- 4) Roof Drain insulation
- 5) Boiler room doors and above boilers.
- 6) Chiller/ air conditioner/ air handling unit
- 7) Heat exchanger/ radiators
- 8) Wall and ceiling insulation
- 9) Pipe hangers
- 10) Cement on flanges and large openings on fiberglass insulation
- 11) Blown in or loose insulation, vermiculite or mineral wool types

b. Composition

- 1) Job-Molded Plaster Lagging
- 2) Preformed Plaster Lagging Insulation Pipe Insulation
 - a) Corrugated Air cell
 - b) Cardboard and Millboard
 - c) Laminated paper
 - d) Premolded or job applied cement
 - e) Wool types such as wool felt and mineral wool contaminated with ACM.

3. Miscellaneous Materials:

- a. Floor tile, linoleum and mastic.
- b. Ceiling tiles, glue dots and panels.
- c. Electrical insulation wires, panels and recessed lighting
- d. Transite and Composition Panels

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- e. Duct expansion joints
- f. Peg boards, chalk boards, fiberboards and cork boards
- g. Gaskets and packings in boilers, between breeching sections, on any mechanical equipment.
- h. Radiator backing insulation
- i. Caulking, fillers and putties around windows and doors
- j. Paint and Coatings
- k. Adhesives, glue dobs on ceiling tiles, wall hangings, behind ceramic tiles, hold insulation batts to concrete ceilings, holding melamine sheets to counters and back splashes
- l. Transite roofing, siding, roof drains, other pipes, signs, movie screens, ducts, cooling towers, walls, ceilings, hoods, behind radiators, on fascia and overhangs, sheets above windows and doors, under roofing felts, baseboards.
- m. Tars may on exterior walls or under concrete slabs, under gym floors
- n. Fire doors
- o. Elevator brake shoes
- p. Vinyl wall coverings
- q. Glue holding paneling to wall
- r. Caulks and fillers
- s. Paper products may be under roofing or flooring or between wythes of brick
- t. Undercoating under sinks
- u. Carpet adhesive
- v. Baseboard adhesive

C. FRIABILITY DETERMINATION

1. Friable material: when dry may be crumbled, pulverized or reduced to powder by hand pressure.

2. Touch Materials to Determine their Friability:

- a. Dusts off as powder, breaks or becomes loose: is friable.
- b. Can be plucked or brushed off with the fingers at any spot: is friable.

3. Observe the material and look for signs of deterioration.

- a. Dust or debris attributed to the material indicates friability.
- b. Damage usually indicates friability.

D. ASSESSMENT

Required for each homogeneous area of friable ACM for prioritization of response actions and recommending levels of building occupant awareness training.

1. Methods for Assessing Damage:

- a. Visual Inspection Preferred Method:

Visually observing characteristics of the ACM and the building environment are better indicators of current or future fiber release than air monitoring.

- b. Air Monitoring, not routinely used for Assessment:

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2. Assessment of Existing Damage:

a. Nature of damage The following are examples of types of damage:

- 1) Debris and dust
- 2) Loose or missing pieces
- 3) Cracks
- 4) Poor adhesion
- 5) Water discoloration, stained or wet
- 6) Blistered
- 7) Crumbling
- 8) Gouged, punctured, scratched or abraded;
- 9) Exposed ends
- 10) Crushed

b. Extent of Damage:

- 1) How much ACBM is damaged in terms of:
- 2) Absolute quantity
- 3) % of local ACBM area
- 4) % of entire homogeneous ACBM area

3. Assessing Potential for Disturbance and Damage: Assessment Factors

a. Accessibility

- 1) The degree to which the material can be easily reached.
- 2) One of the most important damage potential factors.
- 3) Generally, material above drop ceilings, high above at the ceiling level, behind radiators, cabinets, walls or other enclosure is not considered accessible in this frame of reference.
- 4) Barriers to casual contact reduce or eliminate accessibility. Materials which are not behind barriers are said to be exposed.

b. Activity:

- 1) The potential for disturbance increases greatly with activity. gymnasium > hallway > student bathroom > teachers bathroom > classroom > private office.
- 2) Consider possible vandalism in areas of student activity which may not be directly supervised such as lavatories and stairwells.
- 3) These are some activities which are likely to disturb ACBM:
 - Traffic
 - Sports
 - Mechanical shop activities
 - Renovation and construction projects
 - Repair and maintenance activities;
 - Routine cleaning;
 - Moving furniture and equipment
 - Storage

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c. Degree of Friability:

- 1) Strictly speaking, assessment is required for friable materials and potentially friable materials.
- 2) Whether Slightly Friable, Friable or Very Friable should be mentioned in assessments.

d. Proximity to repair or maintenance items:

This is a special form of accessibility which can be largely controlled through proper training of custodial workers and good work practices.

e. Environmental Factors:

1) Wind erosion:

Asbestos material must be exposed to the air.

Shearing force of air movement creates frictional wear.

Proximity to HVAC inlets and outlets is the most obvious case.

Other air movement by gravity convection is seen in hallways, stairwells, near heat exchangers, in large open building spaces and elsewhere. Elevators produce powerful wind pressures in and near the elevator shafts.

Air movement also spreads fibers and is one of the exposure factors discussed below.

2) Water Damage:

Leaking of roofing, upstairs bathrooms and pipe fittings are common causes of water damage.

Brown stain or wet feel.

Water can greatly increase the weight of the material rendering more prone to sag, delaminate and fall.

3) Vibration:

Machinery such as fans and motors

Expansion of steam

Traffic

Music or other loud sounds

Hammering or drilling

Slamming of doors.

Vibration is an example of harmonic motion, basically waves of motion of various frequencies which are transmitted by air, water and structural materials. Vibration is extremely important to observe since it can cause surface and internal damage to friable ACBM.

An instrument known as a vibrometer can be used to measure vibration quantitatively. A simpler technique is by touching, sound and visual observation.

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4) Animals especially rodents and cats:

Rodents may live in crawl spaces, tunnels, mechanical areas and other infrequently occupied areas. Rodents will use insulation for nesting. Cats, although not likely to be in school buildings are known to destroy asbestos pipe insulation.

5) High heat or humidity:

Either of these conditions will accelerate the aging of protective canvas covers and may affect the binder matrix.

6) Age

As a rule, ACBM will weaken with age and be more subject to damage. This is not because the asbestos changes, but rather the ingredients mixed with the asbestos as binders or wrapping.

f. Less Visible Materials:

When ACBM is not obviously visible, the building occupants may overlook or forget its presence and accidentally damage it. These materials may be accessible, inaccessible or both. For example: - an insulated pipe behind stored material in a locker or shelf.

4. Exposure Factors:

a. Amount of ACBM

1) Absolute Quantity

Specify the method of estimation or measurement: Eyeball, measured actual or from drawings.

2) Percentage of Area Occupied by ACBM

b. Potentially exposed individuals:

1) Maintenance workers and outside contractors (Highest expected exposure).

2) Teachers, students, administrative and office staff and the general public who enter the building.

c. Damage:

Damaged ACBM is expected to release fibers when dry and exposed.

d. Open Return Air Plenums and Their Importance in HVAC systems

1) Locate all air returns and note their proximity to ACBM or if ACBM is actually in the return air stream. Note the route the air takes through the return, i.e., a closed duct or drop ceiling space.

2) There are two reasons why these observations are important:

a) Return air can distribute asbestos fibers over a large building area and remain suspended indefinitely.

b) The force of air movement can erode ACBM causing asbestos fibers to be dislodged into the air.

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e. General Occupancy Patterns:

Determine how many students and staff use each area in an average day of occupancy, and how many hours / day.

5. EPA Method for Classification of ACBM:

a. Surfacing and Miscellaneous Materials:

1) Significant Damage

10% or more of the area if the damage is evenly distributed, or
25% or more if the damage is localized

- a) Surface crumbling or blistered
- b) Material hanging from the surface, delaminated, or showing adhesive failure.
- c) Water stained, heavily gouged, marred or abraded.
- d) Large accumulation of powder, dust, or debris on surfaces beneath the ceiling or wall.

2) Damaged

- a) crumbling
- b) gouged
- c) blistered
- d) water stained
- e) marred
- f) abraded;
- g) some accumulation of powder, dust or debris on surfaces

3) Good Condition:

ACBM with no visible damage or deterioration, or showing only very limited damage or deterioration.

b. Thermal System Insulation:

1) Significant Damage: ACBM with one or more of the following characteristics:

- a) mostly missing jackets;
- b) water damaged, crushed or heavily gouged or punctured insulation on at least 10% of pipe runs/risers if the damage is evenly distributed or at least 25% if the damage is localized.
- c) powder, dust, and debris on surfaces beneath pipe / boilers / tanks / etc.

2) Damaged: ACBM with one or more of the following characteristics:

- a) a few water stains or sections of missing jackets;
- b) crushed insulation or water stains, gouges, punctures, or mars on up to 10% of the insulation if the damage is evenly distributed, or up to 25% if the damage is localized;
- c) some accumulation of powder, dust, debris on surfaces beneath pipes / boilers / tanks / etc.

3) Good Condition: ACBM with no visible damage or deterioration, or showing only very limited damage or deterioration.

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6. Exhibits:

The field trip, photographs and slides to be shown will illustrate cases of no damage, damage and significant damage. In Addition refer to the EPA Guidance Documents appended.

7. Check Lists:

Various forms of check lists may be used for saving time in reporting.

Samples are included in the Handout on W.W.W.Chem-scope.com.

8. Immediate Action:

If the inspector discovers that significantly damaged ACBM or other hazardous condition is present, the LEA should be notified immediately. The LEA is required to:

- a. Immediately isolate the functional space and restrict access, unless isolation is not necessary to protect human health and the environment.
- b. Have the material Removed or repaired or use another appropriate response action which is sufficient to protect health and the environment.

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Section 8-3 Bulk Sampling and Documentation of ACBM in Schools

A. EPA METHOD FOR DETERMINING SAMPLE LOCATIONS AND NUMBER OF SAMPLES:

Preface:

This subsection discusses the EPA Simplified Sampling Scheme for Friable Surfacing Materials (EPA 560/5-85-030a, Oct 1985) and Techniques to Ensure Sampling in a Randomly Distributed Manner for Other Than Friable Surfacing Materials.

Important Note: EPA under AHERA **prohibits compositing of samples collected of building materials.** i.e. Individual samples may not be combined in a single container for analysis.

1. Friable Surfacing Material

a. Identify friable surfacing materials and arrange them into homogeneous sampling areas, i.e. areas that are uniform in texture and appearance, appear to have been installed at one time, and where there is no indication that there is more than one composition.

b. Randomly sample, favoring areas which are damaged, obtaining a representative cross section each time. Random sampling is accomplished for each homogeneous surfacing sampling area as follows:

- 1) Prepare a diagram of the surface approximately to scale.
- 2) Give the area an identification number and name on the diagram.
- 3) Show the area dimensions.
- 4) Name of inspector preparing the diagram and the date.

c. EPA recommends 9 samples for any sized area, but **following are required.**

- 1) Take a minimum of 3 samples (1000 sq. ft. or less),
- 2) For areas between 1000 and 5000 sq. ft., take a minimum of 5 samples.
- 3) For areas greater than 5000 sq ft., take at least 7 samples.

The above sample frequency applies unless one sample shows a positive result > 1% asbestos in the homogeneous area.

d. At the inspector's discretion, one preliminary sample may be taken from each area, If the results are positive, no further sampling is required; if negative, take the specified number of samples.

2. Thermal System Insulation

a. Collect at random at least 3 samples from each homogeneous area and taking a representative cross section each time. (note: the same techniques should be used as for friable surfacing to obtain randomly distributed samples.)

b. Only 1 sample is needed for a patch less than 6 lin or sq ft.

c. Treat fittings as separate homogeneous areas.

d. Be wary of mixed systems which may contain fiberglass or other obvious non-ACM which conceals ACM fittings or sublayers. Otherwise, sampling is not required of obvious non-ACM such as fiberglass, foam, plastic or rubber.

e. As above, only one sample is needed if the results are positive for asbestos.

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3. Miscellaneous Material

Sampling locations and frequency are at the discretion of the inspector. The accredited inspector will collect samples in a manner **sufficient to determine whether the material is or is not ACM.** (note: the same techniques should be used as for friable surfacing to obtain randomly distributed samples.)

B. REVIEW OF ANALYTICAL RESULTS

1. Consistency of analytical results within designated homogeneous areas to be sure they are in fact homogeneous.

2. Designate Additional homogeneous areas as needed.

C. GENERAL TECHNIQUES FOR BULK SAMPLING

1. Safety Considerations:

- a. Ladder Safety:
- b. Training on use of respirators: (See Section 9)
- c. Spill prevention and clean up.
Clean spills, self and equipment:
HEPA vacuum.
Wet cleaning
Dispose of wastes properly and retain disposal documentation.
- d. Electrical hazards:
 - 1) Grounded equipment with GFCI (ground fault interrupter circuits).
 - 2) Regular program of safety inspection of equipment.
- e. Hot pipes and tanks:
- f. Chemical and biological hazards:
- g. Confined spaces:
- h. Leaking Sample containers:
Double bag
Protect sample containers from puncture
Never use metal paper clips or staples on plastic sample bags.
Avoid introducing excess air into the sample bag.
Sample should be wet.
- i. Proper use of tools:

2. General Procedure for Sample collection:

- a. Area unoccupied.
- b. At least a half mask respirator.
- c. Label the sample container before each sample
- d. Wet the surface with water spray mist.
- e. Use borer to penetrate to the substratum for most surfaces.
(Other tools listed in the Kit above may be more suitable)
 - 1) Use a fresh borer for each sample.
 - 2) Leave the borer with sample intact in the sample bag
 - 3) All layers of the material.

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f. **Only .1 - 1 gram is needed for the analysis. Normal sample size is 0.1-10 grams.**

g. Record the sample location, and description:

- 1) Sample record
- 2) Drawing

h. Place the sample bag in the overbag.

i. Clean any debris using wet towels and discard them in the waste bag.

j. Patch the spot where the sample was taken.

3. Collection of Dust Samples

a. Use a 25 mm air sampling cassette connected to a suction pump.

b. Collect at least 0.1 gram of sample

4. Sampling of Friable Materials:

a. Special care needed in preventing fiber release.

b. Target representative location where spillage could be controlled.

c. Use a 1/4 inch diameter to 3/8 inch borer positioned in the sample bag.

d. Twist and bore gently and firmly until feeling the resistance of the substrate.

e. Twist while withdrawing the borer and finally close the sample bag over the borer.

5. Patching and Repair:

a. Procedure

- 1) Wet
- 2) Fill the Hole
- 3) Cover

b. More Permanent Materials for TSI:

- 1) Encapsulant spray
- 2) Lag seal or similar cement
- 3) Dip lag or similar remoistenable cloth.

c. Other surfaces:

- 1) Spackle for most types of plaster and troweled on surfacing.
- 2) Encapsulant for hard cementitious materials such as transite.
- 3) Modeling clay or putty for plugging holes in some materials.

6. Sampling of Nonfriable and Misc. Materials:

a. Floor Tile:

1) Locations to Minimize Damage:

- Corners
- Near walls
- Closets
- Under fixtures.
- Loose tiles

2) Procedure:

- a) Sound the floor to find loose tiles to sample
- b) Mist the tile just before sampling.
- c) Pry up with stiff putty knife.

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- 3) Examination of sublayers or mastic
 - a) Remove an entire tile to the substrate.
 - b) Scrape the mastic with a razor and package as a separate sample.
 - c) If the substrate is wood, verify that it is planking and not plywood since plywood may cover old flooring.
 - d) "Go to the slab" for sampling of flooring materials.
- 4) Under carpet:
 - a) Probe at corners, entries, under radiators and door jambs.
 - b) Determine if there is tile or linoleum under the carpet.
 - c) Mastic under the carpet should be sampled.
 - d) Note description of layers and the substrate. For example: "Gray 9x9 floor tile with black mastic on concrete".
- 5) Be watchful of new replacement tiles with similar colors to the original tiles.

b. Ceiling Tile:

- 1) Lay in ceiling panel.
 - a) Lift the panel off the metal grid.
 - b) Look above the false ceiling for suspect materials.
 - c) Cut a cross section:
 - Select an edge concealed by the metal grid.
 - Spray mist and use a borer or razor blade knife to cut a cross section of the ceiling panel.
 - d) Repair with encapsulant spray.
- 2) Glued on 12x12 inch or other size ceiling tile.
 - a) Look for a loose tile, if possible and gently dislodge the tile with the putty knife.
 - b) Sample the glue dots holding the tile to the substrate.
 - c) Moisten the dot and use a blade to scrape some off.
 - d) Cut a cross section of the tile with the knife or borer.
 - e) If a ceiling tile cannot be dislodged, take direct samples by cutting near a corner. Try about 2 inches from a corner of the tile to include glue dot in sample.
 - f) Sample the substrate.

c. Roofing:

- 1) Although not in the scope of the AHERA requirement, the inspector should know the basic techniques for collecting roofing samples. This type of sampling work requires training and experience with roof construction.
- 2) Before going on the roof, identify the composition of the roof deck if possible so you know when you have penetrated through all the layers of roofing, e.g. concrete, wood, metal.
- 3) Sample each type of flashing and decking. Flashing is applied at joints, protrusions and other roof transitions. Tar should be sampled separately at several locations.
- 4) Note the presence of any gravel and include samples of gravel and dust or tar.
- 5) If there is a tectum roof deck, take great care not to puncture it when sampling the roof.

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- 6) For the first cut, use a chisel or knife to make a cut about 2" by 2" so you can visualize what is there (and thereafter for the same roof, borings may be made with about 5/8 inch diameter very sharp cork borer or disposable borer).
- 7) Continue the cut down to the actual deck. If there is a tin layer, it is likely to have asbestos paper under it. Make sure there is no transite sheet there and then you can recognize the true deck material.
- 8) Cut through all felt layers and any insulation carefully noting the depth of the hole and the nature and thickness of each layer. Place a label on the top layer so it can be identified in subsequent analysis.
- 9) For decking samples do not sample near any transitions since a flashing may be in the way.
- 10) Use the patching cement with fiberglass reinforcing to fill the hole. Use a heat gun for gently heating the surface to melt the cement in cold weather.

d. Hard to Get Materials:

It is not feasible to describe all the techniques and configurations one may encounter for accessing and sampling building materials. A few situations are mentioned below:

- 1) Possible insulation inside metal jackets, fire doors, boilers and the like may be accessed using dental type tools, fine forceps or an awl with the tip bent back slightly. Access may sometimes be made by removing screws and probing the screw hole.
- 2) Very loose friable and hard to access material may be sampled by suction filters such as described above under dust sampling.
- 3) Insulation inside walls can sometimes be detected by removing receptacle and switch covers. Make sure the breaker is off to avoid electric shock.
- 4) Very hard materials such as lab counter tops can be safely sampled with minimal damage using a suction pump and file.

e. Sheetrock:

You must sample the taping compound and untaped areas separately. OSHA regulates sheetrock taping compound separately when other agencies do not. If the taping compound is >1%, this is an OSHA ACM. If there are no surfacing layers with ACM and the combined analysis of the sheetrock and taping compound is <1 % asbestos then EPA and DPH don't regulate it.

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7. Labeling and Keying Sample Identification to Sampling Locations

a. General Requirement under AHERA:

Exactly identify sample locations through a drawing and/or other description.

b. A suggested system:

1) Sample label simple and unique.

2) Write the same number on the sample work sheet with detailed information about the sample and the locations.

a) Date collected

b) Name of site

c) Name of collector

d) What the materials is.

e) Specific location including space identification.

g) Color

h) Texture and appearance

i) Anything else that will help describe the sample material such as: thickness, substrate or how the sample was collected.

3) Enter the sample location on the drawing.

D. THE LABORATORY:

1. Analysis by Polarized Light Microscopy (PLM)

a. Extremely specific

b. Nominal detection limit is 1% asbestos

c. Less than 1% is considered to represent a non-asbestos material.

d. Lab will report the results as follows:

1) No asbestos which can be seen by the method: "no asbestos detected"

2) Less than 1% asbestos: "< 1% and name the type of asbestos."

3) More than 1% asbestos: approximate % and the type of asbestos.

4) More than one type of asbestos: % and name of each type.

5) Information on other fibrous materials such as cellulose, fiberglass and the non-fibrous material identified.

2. Choosing an Accredited Laboratory

a. Must be Accredited by NIST/NVLAP for schools covered by AHERA. EPA also recommends that Accredited labs are also used for public and commercial buildings.

1) NIST = National Institute of Standards and Technology

2) NVLAP = National Voluntary Laboratory Accreditation Program

3) Accreditation for a period of one year.

b. State approved public health laboratory:

1) State of Connecticut laboratory division.

2) Approval for a two year period.

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E. QUALITY CONTROL AND QUALITY ASSURANCE PROCEDURES

1. Purpose: Ensure the reliability of:

- a. Results from laboratory analysis
- b. The inspector's sample collection and labeling
- c. Overall documentation of the asbestos in the building.

2. Samples:

a. Acceptable Criteria:

- 1) Clearly labeled.
- 2) Clean, air tight.
- 3) Minimum quantity to be a representative sample, usually 0.1 -1 gram.

b. Sample custody:

- 1) Package groups of samples together with paperwork enclosed.
- 2) Use Chain of custody documents for transfer of samples.

c. Quality of Samples:

1) Error:

- a) Usually related to sample collection rather than analysis.
- b) Lab will report the analysis "of the sample" and not the material in the building.

2) Complete Sample Description

3) Repetitive samples.

4) Contamination:

The greatest care in technique and cleaning equipment is needed.

For example, if the same equipment is used to sample material with 50% asbestos is next used to sample a truly non asbestos material; then the 2nd sample has a significant potential to become contaminated.

5) Mix-up:

It is strongly recommended to first place the sample number and description in the sample record, then label the container with the sample number before collecting the material. After collecting the material, double check the label vs the sample log.

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Section 8-4 Recordkeeping and Writing the Inspection Report

EPA Recommends that States develop and require the use of standardized forms for recording the results of inspections in schools or public and commercial buildings and that the use of these forms be incorporated into the curriculum of training conducted for Accreditation.

A. DETAILING OF ACBM INVENTORY:

1. Executive Summary and Site narrative (EXAMPLES FOLLOW)

This is a room by room record of the inspection.

2. List of homogeneous sampling areas (EXAMPLE FOLLOWS)

This is a list of all suspect ACBM which basically summarizes the suspect materials from the site narrative.

3. List of ACBM (EXAMPLE FOLLOWS)

This list includes all the confirmed or assumed ACBM from the List of Homogeneous Sampling Areas. In order to eliminate ACBM from the list of homogeneous sampling areas, it must be sampled and found to not be ACBM. Sufficient samples must be taken, all with negative results to prove the material is not ACBM.

4. Sample records

See section above on bulk sampling. A handout on W.W.W.Chem-scope.com entitled "Bulk Sample Record" will be discussed in class.

5. Floor plans

Sample locations must be shown on the floor plans. The floor plans should also have all the space identification names or numbers to tie the ACBM location to the site narrative, and the list of ACBM.

A sample set of floor plans is included in the handout on W.W.W.Chem-scope.coms and is to be discussed in class.

6. Photographs

Use photos or videos to record key sampling areas and show examples of ACM condition.

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EXAMPLE 1: EXECUTIVE SUMMARY

CHEMSCOPE
ASBESTOS REINSPECTION AND PLAN UPDATE
MAC SCHOOL SEPTEMBER 26, 2002

Section 1, page 2.1

EXECUTIVE BUILDING SUMMARY

The MAC SCHOOL is a 1 level building plus a partial basement and tunnels with a total area of about 28,000 sq ft constructed of steel and masonry, located at 80 Park Rd.

It was built in 1954 and there was an addition in 1988.

Prior inspections made by JOE BLOW in 1986 and 9/18/90. The State approved the initial inspection as of 7/26/91. JOE BLOW performed the last re-inspections From August 93 to January 1994 and he was the asbestos coordinator from about 1986 to May of 1996 until Ron Arena of Chem Scope took over this function.

According to prior data, there were some 1984 asbestos removals by ABCD CONTRACTORS indicating that the ACM insulation was removed from the two boilers, and hot water tanks in the original boiler room (CS-6). JOE BLOW reported that all asbestos was removed from the boiler room and replaced with non-ACM materials. We checked the insulation on boiler #1 on 7/26/01 with 3 samples and confirmed this was non-asbestos (CS #145-964.)

There is also a 1988 boiler room and 1988 addition which was certified asbestos free by the prior inspector in 1990 and 1994.

We elected to inspect the entire school rather than to rely on prior records since prior reports of presently existing asbestos locations were vague and appeared to be incomplete.

The tunnel contains about 2000 lf of ACM pipe insulation which is damaged and this is to be kept isolated until repair or removal.

~~We found two asbestos pipe insulation risers in the KC2 closet in good condition, that appears to have been missed in the earlier inspections.~~ Removed by XYZ 7/00. The rest of the pipe insulation that can be seen is fiberglass with fiberglass fittings.

Over the years there were several positive tests of pipe insulation and all the pipe insulation is confirmed ACM except fiberglass. Cement on ends of fiberglass in the kitchen was found to be ACM. There are chases over ceilings which we suspect conceal more ACM pipe insulation and probably there is more behind the walls, especially in bathrooms.

Some additional asbestos insulation was found in the kitchen which is in good condition.

Heat from the boilers is distributed through the basement tunnels and up to the radiators. There may be risers inside walls and concealed pipe above ceilings.

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CHEMSCOPE
ASBESTOS REINSPECTION AND PLAN UPDATE
MAC SCHOOL SEPTEMBER 26, 2002

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EXECUTIVE BUILDING SUMMARY (cont)

There are air ducts seen throughout and there is a fan room. The ducts are bare or fiberglass and have visible vinyl non-asbestos black flex connectors. There are two roof penthouse mechanical rooms with some cloth flex joints which are assumed to be ACM. This area is isolated and not in service.

There is no sprayed on surfacing visible.

There is about 500 sf of troweled on plaster surfacing- ceiling plaster and some sheetrock which was missed in the earlier inspections. The plaster became damaged in 1999, was sampled and found to be non-asbestos; the sheetrock was tested and found to be non-asbestos in areas of the 2002 renovations.

In the original building, there is about 15,000 sq ft of assumed ACM 9x9 floor tile (VAT) and 1700 sf of assumed ACM 12x12 floor tile. Mastic under both tiles is also assumed to be ACM. Some of this is under carpet.

Floor tile in the 1988 wing was certified asbestos free. Even so, now that some of this flooring is to be removed, we did some quality control and confirmed that the mastic and tile in the renovation areas are non-asbestos. (The reason is that some mastics which were installed after 1990 in buildings are sometimes ACM.)

A number of other new miscellaneous materials were found which were added to the inventory of suspect ACM which are summarized in section 6.3 and 8.1 and which must be addressed according to regulations. These included window caulk/~~glazing~~ (negative 4/02), baseboard glue (negative 4/02), black paper on ceilings and glue dobbs.

Prior reports and bulk samples indicate that suspended ceiling tiles are non asbestos which we recently confirmed to be true.

Prior reports indicate that there was hard ACM board behind radiators. We did not see this but we do see black tar paper which is assumed ACM and this may conceal transite behind radiators.

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
Updated 4/2/10

EXAMPLE 2 EXTRACT FROM A SITE INSPECTION NARRATIVE:

CHEM SCOPE page 6.2.2
 MAC SCHOOL, Site Re-inspection Narrative (cont) SEPTEMBER 26, 2002

<u>SPACE ID</u>	<u>FLOOR</u>	<u>WALLS</u>	<u>CEILING</u>
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Note: 9X9 VAT is on black mastic on concrete unless otherwise noted.

Confirmed ACM is **bold underlined**
 Assumed ACM is **bold**

BASEMENT:

Deck over drop ceilings where accessible is bare metal and ducts are bare metal. Pipe over drop ceilings is all fg ins.

BOILER ROOM (CS-6)	CONCRETE	CONCRETE	PLASTER
BY STAIRWELL 1 UNDER RM 12			

2 Boilers, boiler insulation total 70 sf, which appears to be Cal-sil. (ACM boiler ins removed in 1984 and Joe Blow tested negative in 8/90). In prereno inspection 5/28/02 we tested confirmed the exterior was negative CS-149-339 but **underneath there are several asbestos containing materials: tan hard cement over the roping between boiler sections and the gray packing are also positive ; For removal 2003.** For purpose of removal, the entire insulation must be treated as asbestos. Some cement associated with the refractory brick inside is non-asbestos. See CS-149-339 for details.

Pipe is fg ins. Fittings are fg. **Breeching 20 sf has a mixture of fg and probable calsil but asbestos residues were found underneath** 5/28/02 CS-149-339; For removal 2003. Fire door is hollow metal. Bare metal ducts with black vinyl flex duct connectors (2) 25 sf. Window glazing / caulk 8x4 window. Plaster ceiling has 10 sf damage on 10/99 and tested non-asbestos, 2 samples here and 1 in CS-8). We checked the gray insulation on boiler # 1 hanging out on 10/20/00 CS# 142-999 and this was negative for 3 samples. We later checked the white exterior insulation on boiler #1 in damaged areas on 2/21/01(CS #144-178.) and 7/26/01 (CS #145-964.) with a total of 6 samples and confirmed this was non-asbestos. There is one mudded fitting in front of #2 boiler about 10' above the floor which should be checked before disturbance.
12 sq ft White sealant on ends of fg lines: For removal 2003.

(CS-5) SWITCHBOARD RM	CONCRETE	CONCRETE	PLASTER
6 X 6 ft			

(CS-4) HALLWAY	CONCRETE	CONCRETE	CONCRETE/BLACK PAPER
8 x 45 ft.			

fg ins pipes and fg ins fittings. Black paper on ceiling. **Off white sealant on ends of fg pipe ins. For removal 2003.**

(CS-7) STORAGE	CONCRETE	CONCRETE	CONCRETE/BLACK PAPER
22 x32 ft			

fg ins pipes and fg ins fittings. Black paper on ceiling with embedded metal wire grid with tan glue on back on hard gray cement on more black paper, tested 7/26/02 CS#149-993 6 spls negative. **Off white sealant on ends of fg pipe ins. For removal 2003.**

(CS-8) GYM OFFICE	CONCRETE	CONCRETE	PLASTER
6 x14 ft			

fg ins pipes and fg ins fittings. Plaster ceiling has 2 sf damage on 10/99 and tested non-asbestos, 1 sample here and 2 in CS-6).

(CS-2) CLOSET	CONCRETE	BRICK	CONCRETE
fire door 3x6. keyhole missing and sampled 10/99- non-asbestos.			

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
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CHEM SCOPE page 6.2.3
 MAC SCHOOL, Site Re-inspection Narrative (cont) SEPTEMBER 26, 2002

<u>SPACE ID</u>	<u>FLOOR</u>	<u>WALLS</u>	<u>CEILING</u>
(CS-3) MENS ROOM 5x7'	CONCRETE	CB	PLASTERE

Overhead, fg pipe ins with PVC fittings. Off white sealant on ends of fg pipe ins. For removal 2003.

(CS-9) TUNNEL AREA 10 x205 ft	CONCRETE	CONCRETE	CONCRETE/BLACK PAPER
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2000 lf ACM air cell ins and ACM mudded fittings. Badly damaged 20' in from tunnel entry. A new sign was posted on the door 2/02. 18 sf metal fire door.

MAIN FLOOR:

Note: 4 entries to classrooms, 20 sq ft each

(CS-10) HALL #1 11x90 + 8x90 - 10X6 ft	9x9 VAT	BRICK	2X2 DROP
---	--------------------	-------	----------

~~1750 sf light brown VAT with white and tan streaks plus a darker border tile. VAT and mastic Removed summer 2002.~~ No original BB.
 70 sf of black paper in radiator. Window glazing / caulk 6x5 window. Gray dust and black debris on ceiling tile non-asbestos 6/20/02 CS#149-339.

(CS-12) ENTRANCE 6 x10 ft	9x9 VAT	GLAZED BRICK	2X2 DROP
------------------------------	--------------------	--------------	----------

~~160 sf light brown and green VAT. VAT & mastic Removed summer 2002.~~ 40 sf of black paper in radiator. No original BB. Dark brown reinforced paper above ceiling under concrete roof deck tested non asbestos 6/20/02 CS#149-339.

(CS-13) CAFETERIA 30 x60 ft	12X12 FLOOR TILE on 9x9 VAT	BRICK	2X2 DROP
--------------------------------	--	-------	----------

~~1800 sf beige and blue 12X12 floor tile on lt brown 9x9 VAT on black mastic on concrete. VAT & mastic Removed summer 2002.~~ 180 lf original BB removed. VAT & Black mastic under VAT confirmed ACM here 4/23-26/02 CS# 148-830; also 4/02 tan glue on BB also negative, 3 spls. 7/19/02 CS#149-962, pink leveling compound at seam in floor tested negative (3).

(CS-14) WORK ROOM 14X12 ft	GRAY CARPET ON VAT	BRICK/CB	2X2 DROP
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160 sf carpet on green VAT. **VAT & mastic Removed summer 2002.**No original BB.

(CS-15) CLOSET IN CAFET 6 x 6 ft	9x9 VAT	BRICK	2X4 DROP/PLYWOOD ABOVE
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~~35 sf green VAT. VAT & mastic Removed summer 2002.~~No original BB.

(CS-16) JANITORS CLOSET 4 x 6 ft	CERAMIC	GLAZED BRICK	SR
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(CS-17) CONF ROOM 19 x 12 ft	BROWN CARPET ON VAT	CB	2X4 DROP
---------------------------------	--------------------------------	----	----------

~~220 sf carpet on brown VAT. VAT & mastic Removed summer 2002.~~No original BB. Window glazing / caulk 6x5 window. Black mastic under 8x24 VAT border tile and the tile confirmed ACM here 4/23-26/02 CS# 148-830. Gray dust on ceiling tile non-asbestos 6/20/02 CS#149-339. Black caulk on black foam along top of radiator covers non asbestos 6/20/02 CS#149-339.

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
Updated 4/2/10

EXAMPLE 3
EXTRACT FROM LIST OF HOMOGENEOUS SAMPLE AREAS

CHEMSCOPE

Section 6, page 3.1

ASBESTOS REINSPECTION AND PLAN UPDATE
 MAC SCHOOL SEPTEMBER 26, 2002

List of Homogeneous Sampling Areas

Previously identified ACBM (confirmed and assumed as noted below):
There was no newly identified ACBM.

<u>Material Description/Space Id</u>	<u>footage</u> (<u>Very approx</u>)	<u># of samples</u> (<u>Incl Prior Data</u>)	<u>Findings</u>
--------------------------------------	--	---	-----------------

SURFACING MATERIALS:

PLASTER CEILINGS (CS-5) SWITCHBOARD RM (CS-8) GYM OFFICE (1 spl 10/99 negative) (CS-6) BOILER ROOM (2 spls 10/99 negative) (CS-3) MENS ROOM 35	535 SF	3	Non-asbestos
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THERMAL SYSTEM INSULATION:

Pipe Insulation and fittings.

(CS-9) TUNNEL AREA	2000 lf	5	Confirmed ACM
(CS-66) CLOSET IN KG2	20 lf	Removed by XYZ 7/00	
(CS-18B) OUTSIDE CLOSET	6 lf confirmed ACM 2/26/02	For removal 2003..	
CS-18 kitchen under sink <3 sf & lf	Spec for removal 2002-changed	Not removed	

Boiler room TSI was removed in 1984

We checked the white outer insulation on boiler #1	6		non-asbestos
In 2001-2002 confirmed this was non-asbestos			
We checked a gray inner layer of insulation 10/00	3		non-asbestos
And this was negative			

In 2002, pre-Reno inspection: the underlying materials were examined and many found positive:

Hard gray cement on top of roping and packing	100 sq ft	3	confirmed ACM
For removal 2003.			
Gray packing	100 sq ft	3	confirmed ACM
For removal 2003.			
Gray material under breeching insulation		1	confirmed ACM

MISCELLANEOUS MATERIALS:

SHEETROCK CEILINGS:	2000? SF	7	Non-asbestos
White taping compound & tape	5		
White gypsum with brown paper	7		

(CS-16) JANITORS CLOSET
 (CS-30) PHONE RM
 (CS-32) SUPPLY RM

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
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CHEMSCOPE

Section 6, page 3.1

ASBESTOS REINSPECTION AND PLAN UPDATE MAC SCHOOL SEPTEMBER 26, 2002
 LIST OF HOMOGENEOUS SAMPLING AREAS (CONT)

Radiator Black Paper:	1100 sf	0	Assumed ACM
Throughout see sec 6.2			
Black Paper/ ceilings	2400 sf	6	Non-asbestos
with embedded metal wire grid with tan glue on back on hard gray cement on more black paper, tested 7/26/02 in CS-7: (CS-4) HALLWAY 7 x 20 ft. (CS-7) STORAGE 15 x15 ft (CS-9) TUNNEL AREA 10 x205 ft			
Baseboard Mastic: (4/02)	180 lf	3	non-asbestos
(CS-13) CAFETERIA			
Gray transite window sills	12 sf	0	Assumed ACM
(CS-49) STAFF ROOM			
12x12 floor tile/ Mastic: Old Wing: 900 sf		4/4	Assumed ACM
		except as noted below	
(CS-20) JANITOR OFFICE	120 sf		
(CS-35) EAP ROOM	260 sf		
(CS-49) STAFF ROOM	352 sf		
(CS-50) CLOSET IN STAFF ROOM	12 sf		
xx KINDERGARTEN 2 (KG2) 273 sfxx			tested non-asbestos tile and mastic 3/3.
(CS-70) STORAGE	119 sf		
ROOM 2 CLOSET	36 sf		VAT and mastic Removed summer 2002.
(CS-35A) STORAGE	64 sf		(oozing mastic non-asb 10/99)
CS-56 CLOSET BY RM 4	45 sf		tile and mastic negative 4/02
12x12 floor tile and Mastic: 1988 Wing: Certified asbestos free IN 1990			
		3 samples tile negative 4/02	Non-asbestos
		3 samples orange mastic negative 4/02	
KINDERGARTEN 1 (KG1) 70 sf under carpet 1988			
Light brown glue Dobbs			
under 1x1 ceiling tiles:	20 sf	3	non-asbestos
(CS-37) CLOSET IN HALL 1 tested 2/02			
(CS-42) closet			
Cloth flex duct connectors	65 sf	0	Assumed ACM
Roof Penthouse #1 and #2			
9x9 VAT and Mastic:	21,300 sf	5 (10/99,4/02)	Confirmed ACM tile
		5 (4/02)	confirmed ACM mastic
See 6.2 for additional information on floor tile and mastic sample results.			
(CS-10) HALL #1	1750 sf	VAT & mastic Removed summer 2002.	
(CS-12) ENTRANCE	160 sf	VAT & mastic Removed summer 2002.	
(CS-13) CAFETERIA (under VCT)	1800 sf	tile & mastic + 4/02 VAT & mastic Removed summer 2002	
(CS-14) WORK ROOM (under carpet)	160 sf	VAT & mastic Removed summer 2002.	
(CS-15) CLOSET	35 sf	VAT & mastic Removed summer 2002.	
(CS-17) CONF ROOM (under carpet)	220 sf	VAT & mastic + 4/02 VAT & mastic Removed summer 2002.	

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
Updated 4/2/10

EXAMPLE 4
EXTRACT FROM LIST OF ACBM

CHEMSCOPE Section 8, page 1.1
 ASBESTOS REINSPECTION AND PLAN UPDATE MAC SCHOOL SEPTEMBER 26, 2002

List of ACBM

<u>Material</u>	<u>Description/Space Id</u>	<u>footage</u>	<u>Damage</u>	<u>Recommendations</u>
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SURFACING MATERIALS:

NO ACM SURFACING MATERIALS DETECTED

THERMAL SYSTEM INSULATION:

Pipe Insulation:

(CS-9) TUNNEL AREA	2000 lf	yes	O&M, ISOLATE TIL REMOVAL IS FEASIBLE
(CS-66) CLOSET IN KG2	20 sf Removed by XYZ 7/00		
CS-18B outside closet	6 lf	yes	O&M <u>For removal 2003.</u>
CS-18 Kitchen	<3 sf & lf	NO	O&M <u>For removal 2003.</u>

Off white sealant on ends of fg pipe ins.	NO	O&M
Boiler room, CS-4 hall, CS-7 storage, CS-3 mens	<u>For removal 2003.</u>	17 sf
CS-18 Kitchen <3 sf	<u>For removal 2003.</u>	

Gray cement and packing under exterior boiler
 Insulation:

no O&M

Gray material under breeching insulation

no O&M

MISCELLANEOUS MATERIALS:

Radiator Black Paper:	1100 sf	No	O&M
Throughout see sec 6.2			
Gray transite window sills (CS-49) STAFF ROOM	12 sf	No	O&M
Cloth flex duct connectors Roof Penthouse #1 and #2	65 sf	No	O&M

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
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B. GENERAL REQUIREMENTS:

1. Minimum information heading all documents

- a. Name of the School Building
- b. Date of the Inspection
- c. Name(s) of the Inspectors of that date.

2. Ambiguity

- a. Use only **one name or number** for one area or space
- b. Use only **one name or number** to describe a homogeneous sampling area

3. Clarity

- a. Proper grammar
- b. Recognized abbreviations; Include a key for other abbreviations
- c. Print in dark ink.

C. OTHER DOCUMENTS NEEDED

1. Assessments

2. Copies of Certificate

3. Statement of Accreditation

D. USE OF A RECORDING DEVICE FOR THE SITE NARRATIVE:

1. Technique:

- a. Clear
- b. Concise
- c. Consistent. For example: if describing room surfaces, **use the same order** in describing walls, ceilings and floors.
- d. Try to record as you want the finished document typed.

2. Identification of Tape:

- a. Periodically repeat the site name and the area or floor # on the recording, especially when changing sides or tapes.
- b. Write on the finished tape using a label: "Start side #1" School name, date, inspector name; side #2 with the same information.

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Section 8-5 Reinspections

A. AHERA REQUIREMENTS

1. Needed every 3 years

- a. **Counts as a surveillance.**
- b. **Not needed for asbestos free buildings if properly documented**

2. Accredited Inspector

3. Procedure:

- a. Must reinspect all known or assumed ACBM and determine by **touching** whether non-friable material has become friable since the last inspection.
- b. May sample any newly friable materials or continue to assume the material to be ACBM,
NOTE: except DPH requires sampling.
- c. Must record:
 - 1) Changes in the material's conditions
 - 2) **Each** sample location
 - 3) Inspection date
- d. Must assess known or assumed ACBM:
 - 1) Newly friable
 - 2) Re-assess the condition of friable known or assumed ACBM
- e. Submit assessment and reassessment information to the building owner within 30 days of the reinspection for inclusion in the Management Plan.
- f. Submit notice to CT DPH that the reinspection has been done.

4. Records:

- a. Assessments
- b. Prior report if referred to or updated report
- c. Certificate and statement of accreditation

B. EPA RECOMMENDATIONS:

1. Check Completeness and accuracy of Prior Report

2. Modify Report as needed

CHEM SCOPE ASBESTOS INSPECTOR TRAINING
Updated 4/2/10

SECTION 9

RESPIRATORY PROTECTION

Employee Personal Protective Equipment

INTRODUCTION

As already discussed in the section above on health hazards, breathing in asbestos fibers is a recognized hazard. The inspector's potential exposure is primarily associated with collecting building material samples and accessing areas such as crawl spaces and pipe tunnels. This exposure may occur in a large number of buildings perhaps adding up to a significant exposure or large amounts of asbestos exposure can occur in a single work site.

Regulations requiring respirators for inspectors are not as clear cut as for workers at asbestos abatement projects. EPA recommends using a respirator when sampling. OSHA regulations under the general industry asbestos standard 1910.1001 require respiratory protection when the exposure may exceed the EL or PEL during **30 days or more per year**. The applicability of such regulations to the inspector creates a gray area where some employers may wish to avoid the expense and administrative time to establish an effective program.

The prudent employer will use state of the art practices to protect his workers regardless of the relative low exposure potential of inspectors. However, the respiratory protection program is not just a matter of buying a respirator and giving it to an employee. Once the employer gives the worker a respirator, the OSHA regulations are no longer a gray area; they now apply in full effect to any employee who is issued a respirator.

A. REGULATIONS COVERING RESPIRATORY PROTECTIVE EQUIPMENT COVERED IN THIS SECTION:

1. Construction Industry Asbestos Standard: CFR 29 1926.1101. See also Section 10-2.
2. Respirator Standard: CFR 1910.134 See also Section 9.

B. CLASSES AND CHARACTERISTICS OF RESPIRATOR TYPES:

1. Air Purifying Respirators:

a. Negative Pressure:

HEPA filter/ NIOSH approved respirators used for asbestos. Half or Full Face. NIOSH = National Institute for Occupational Health and Safety.

b. Powered Air Purifying Respirator (PAPR):

- 1) Face piece can be a half-mask, full-face mask or helmet.
- 2) At least 4 CFM to a tight fitting facepiece
- 3) At least seven CFM to a loose fitting helmet or hood.
- 4) Batteries need constant attention

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2. Supplied Air Respirators: Breathing Air Systems

a. General

- 1) Deliver breathing air through a supply hose connected to the worker's facepiece.
- 2) Very high degree of protection and can operate in oxygen deficient and toxic atmospheres.
- 3) Additional training is needed from the manufacturer to operate and maintain the individual system.

b. "Type C Air-Supplied" respirators- supplied by remote tanks or compressor.

- 1) Tanks: Continuous supply of grade D breathing air required
- 2) Compressor- typical 100 SCFM; 50 PSIG for a low pressure system.
 - a) Heats air- must be cooled before delivery
 - b) Carbon monoxide sources
 - c) Needs purification, temperature control and monitoring
- 3) Distribution
 - a) Continuous and sufficient supply
 - b) Measure air pressure in the supply system
 - c) Hose lines maintained at 60-75 PSIG
 - d) Up to 300 ft of hose
 - e) Check pressure with all respirators in use
- 4) Adequate reserve air and escape time of 5 minutes
- 5) Temperature control of breathing air
- 6) Continuous carbon monoxide monitor and alarm
- 7) Cautions in the use of breathing air systems
 - a) Locate compressor to take in clean air from outside the work zone, at least 8 ft above ground away from vehicles and the compressor exhaust. Best location is 15-20 ft up a tree.
 - b) Monitor carbon monoxide every 4 hours of use.
 - c) Compressor oil must be compatible with system
 - d) Purifying system required with compressors; must not be overloaded.
 - e) Never use pure oxygen for asbestos abatement
 - f) Inspect all components for damage
 - g) Explosion possible. Inspect safety relief valves carefully.

c. High Pressure Versus Low Pressure Systems:

- 1) High pressure = greater than 200 PSIG (lbs/sq inch gauge pressure).
 - a) Air may go directly into a storage tank.
 - b) A pressure regulator reduces the pressure to 125 PSIG for distribution to a manifold from which 2-6 masks may be supplied through low pressure airlines.
- 2) Low pressure = less than 200 PSIG (lbs/sq inch gauge pressure).
 - a) Air comes directly from a compressor with a purifying train.
 - b) Air is distributed to a manifold as above.
 - c) Emergency tank air supply is required per 1910.134.

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d. Testing for Grade D Air:

- 1) Carbon Monoxide (CO) 20 PPM max. Use an MSA Passport Monitor or similar device to test at least every 4 hours in addition to any automated tests on the equipment. Critical to test CO.
- 2) Oxygen 19.5-23.5%. (Tested simultaneously with the CO)
- 3) Carbon Dioxide (1000 PPM max). Can be tested with Draeger or Sensidyne tubes or with an infrared detection meter.
- 4) Condensed Hydrocarbons 5 milligrams/cubic meter. Collect samples in a gas bag and take to the lab for GC gas chromatographic analysis.
- 5) Objectionable odors- none.
- 6) Water vapor 66 PPM (parts per million) max. This is to prevent interference with the CO scrubbing devices. Water indicating tubes are used in the purifying train.

e. Determining Proper Backup Air Volumes:

1) Allow a clean reservoir with 30 minutes of air for each mask connection. Figure 15 CFM at each connection. Therefore 450 cubic ft of air (at atmospheric pressure) is needed for each worker. A typical 80 cubic ft size cylinder when fresh has about 2000 PSIG of air. PSIG DIVIDED BY 14 = THE NUMBER OF ATMOSPHERES. So this cylinder has about 140 atmospheres of pressure and therefore 140 times 80 = 11,200 cubic ft of air at atmospheric pressure. 11,200 divided by 450 = 24.88, leaving enough air for about 24 workers to escape.

2) If the hose is cut, the above calculations are meaningless, so make sure each worker has his SCBA.

3. SCBA Self Contained breathing apparatus-

- a. Portable tank with fresh air
- b. Short term or emergency escape use

NOTE: THE ABOVE IS ONLY A PRIMER. PROJECT MONITORS WHO ARE GOING TO MONITOR SUPPLIED AIR MUST GET DETAILED INFORMATION FROM THE SUPPLIER AND THE MANUFACTURER OF THE PARTICULAR EQUIPMENT.

C. LIMITATIONS OF RESPIRATORS:

1. Oxygen Deficiency:

- a. Normal air contains about 20.9% oxygen.
- b. Work area air must contain 19.5 to 23.5 % oxygen.
- c. Only supplied air or SCBA apparatus is acceptable in oxygen deficient atmospheres.
- d. HEPA or other air purifying respirators do NOT protect against oxygen deficiency.

2. Toxic Contaminants:

- a. HEPA filters do NOT protect against toxic vapors.
- b. Special cartridges are needed for each class of vapors.
- c. Always request a material safety data sheet (MSDS) when dealing with strange contaminants. The MSDS must say what type of respirator is needed.
- d. Consult respirator or chemical suppliers on specific problems.

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D. PROPER RESPIRATOR SELECTION

1. By OSHA requirements Discussed Above.
2. According to limitations Discussed Above.
3. By Technical Agencies: Select the respirator for any substance which provides the required protection factor based on personal air monitoring vs the exposure limits:

ACGIH- American Conference of Governmental Industrial Hygienists

NIOSH- National Institute for Occupational Safety and Health.

4. Protection or Fit Factors:

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

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

b. Protection factors are **not** used to determine the TWA and PEL exposures; these are determined **outside the mask**.

c. Protection factors presented in Table 1 of 1926.1101 (Appendix 4; some values follow with the protection factors underlined>:

1) Negative pressure HEPA filtered:

a) Half-mask air purifying "not in excess of 1 f/cc (PF = 10)

b) Full face mask air purifying "not in excess of 5 f/cc (PF=50 if the mask is quantitatively fit tested; but if qualitatively fit tested, the PF is only 10.)

2) PAPR: "not in excess of 10 f/cc (PF= 100*)

*PROTECTION FACTORS FOR TIGHT FITTING PAPRS:

AGENCY	PROTECTION FACTOR	MASK	FIT TESTING METHOD
OSHA	100	FULL FACE	QUALITATIVE
OSHA	50	½ FACE	QUALITATIVE
OSHA	1000	FULL FACE	QUANTITATIVE
NIOSH	50	½ OR FULL FACE	ANY

3) Supplied air types: (PF=1000 or more)

E. RESPIRATOR DONNING, USE, MAINTENANCE, INSPECTION AND STORAGE PROCEDURES;

1. Donning:

- a. **Medical approval needed with negative pressure respirators. If you have a loose fitting PAPR and work with asbestos less than 30 days per year, a medical is not needed.**
- b. Only use the respirator for which fit tests were made.
- c. Inspect for defects as detailed below. (Repair or replace any defective parts using only correct parts of the same brand.)
- d. Install new cartridges as needed.
- e. Adjust straps. Over-tightening the straps will sometimes reduce facepiece leakage, but the wearer may be unable to tolerate the respirator during the work period.
- f. Respirator straps go under protective hood
- g. Seal Check. 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 before re-entry.
- 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. Never use solvents other than water since they are likely to attack the rubber facepiece.
- 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.

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

a. Rubber facepiece:

- 1) Dirt- Clean .
- 2) Permanent distortion, cracks, tears, or holes - Issue new facepiece.
- 3) Loose fitting valves or other parts- Replace or issue new facepiece.
- 4) 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- Replace.

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.

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F. QUALITATIVE FIT TESTING PROTOCOL USING IRRITANT SMOKE (STANNIC CHLORIDE):

- 1. Prior to initial use of a respirator, whenever a change in conditions such as a different respirator facepiece type is used, and at least annually thereafter.**
- 2. Test subject clean shaven at facepiece sealing surface.**
- 3. Fit-testing of tight-fitting PAPR's in the negative pressure mode. This is accomplished by shutting off the power.**
- 4. Selection of respirators available and mirror available to evaluate the fit.**
- 5. Test subject informed about the selection process and trained in putting on respirators.**
- 6. Assessment of comfort shall include the following points:**
 - a. Position of the mask on the nose
 - b. Room for eye protection
 - c. Room to talk
 - d. Position of mask on face and cheeks
- 7. The following criteria shall be used to help determine the adequacy of the respirator fit:**
 - a. Chin properly placed;
 - b. Adequate strap tension, not overly tightened;
 - c. Fit across nose bridge;
 - d. Respirator of proper size to span distance from nose to chin;
 - e. Tendency of respirator to slip and self-observation in mirror to evaluate fit and respirator position.
- 8. Test subject conducts a seal check.**
- 9. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred back to the doctor who approved this individual for respirator use.**
- 10. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.**
- 11. To be discussed with test subject prior to the commencement of the fit test:**
 - a. Description of the fit test and test exercises that the subject will be performing.
 - b. Test subject's responsibilities during the test procedure.
- 12. The respirator shall be worn for at least 5 minutes before the start of the fit test.**
- 13. The fit test shall be performed while the test subject is wearing any safety equipment that may be worn during actual respirator use which could interfere with respirator fit.**
- 14. Test Substance delivery: The test substance is an irritant smoke (stannic chloride). Sealed glass and plastic tubes with substances to generate this smoke are available from safety supply companies. When the tube ends are broken and air passed through them with an aspirator (squeeze bulb), a dense irritating smoke is emitted. The squeeze bulbs used are Sensodyne kits calibrated to deliver 20 cc of air per squeeze using the thumb and index finger to compress the bulb until the opposite walls are touching. By squeezing gradually over 6 seconds, 20 cc is delivered and using 10 squeezes/per minute, a rate of 200 cc/min of smoke is delivered.**

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15. No form of test enclosure or hood over the test subject shall be used.

16. The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

17. The fit test shall be performed in an area with adequate ventilation.

18. Sensitivity Screening Check:

- a. Break both ends of a smoke tube
- b. Attach one end of the smoke tube to a 1/2 ounce squeeze bulb which delivers 20-cc per squeeze.
- c. Cover the sharp edge on the other end of the smoke tube.
- d. Advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.
- e. Carefully direct one squeeze of the irritant smoke in the test subject's direction to check response.

19. Irritant Smoke Fit Test Procedure

- a. Test subject dons the respirator without assistance, and performs seal checks.
- b. The test subject instructed to keep eyes closed.
- c. Respirator not adjusted once the fit test exercises begin. Adjustment voids the test.
- d. The test operator directs the stream of irritant smoke from the smoke tube toward the face seal area of the subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
- e. If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

20. Test Exercises

During the following exercises, challenge the respirator seal continually with the smoke, directed around the perimeter of the respirator at a distance of six inches at a rate of 10 gradual squeezes per minute (200 cc/min). Withdraw the tube and stop pumping at once if the test subject should exhibit a characteristic cough reaction to the smoke. In this case the test has failed and the procedure needs to be repeated with another facepiece.

- a. 1 Minute Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
- b. 1 Minute Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
- c. 1 Minute Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.
- d. 1 Minute Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
- e. 1 Minute Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from the Rainbow Passage or count backward from 100.

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Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

- f. 1 Minute Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes.
- g. Normal breathing. Same as exercise (1).

21. Follow-up

- a. Question the test subject regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.
- b. If the subject reports detecting the irritant smoke at any time, the test is failed; repeat the entire sensitivity check and fit test procedure.
- c. Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
- d. If a response is produced during this second sensitivity check, then the fit test is passed.

G. OTHER FIT TESTING METHODS

1. Banana Oil and Saccharin Qualitative Tests:

- a. The same general procedure is used.
- b. Depend on the wearer's response, and thus are not entirely reliable. (Irritant Smoke eliminates this variable.)
- c. Details can be found in 1910.134 as amended F.R. 1/8/98.

2. Quantitative Fit Tests:

- a. Quantitative fit testing uses a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit. A device called a Portacount TM quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has special sampling fittings installed on the respirator that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style and model.
- b. Quantitative fit testing also uses controlled negative pressure (CNP) and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit. The CNP instrument manufacturer Dynatech Nevada also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator.

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H. SEAL CHECK

Each time the respirator is donned.

Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

1. Negative Pressure Test

- a. Cover air inlets with the palms to restrict air flow 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.
- c. This Seal Check has potential drawbacks, such as the hand pressure modifying the facepiece seal and causing false results.

2. Positive Pressure Test:

- a. Close the exhalation valve and exhale gently into the facepiece. (For some respirators, this test requires that the wearer remove the exhalation valve cover before the respirator is put on and then replace the valve before use.) The test is easy for respirators whose valve cover has a single small port that can be closed by the palm or a finger.
- b. Should have slight positive pressure inside the facepiece without any evidence of outward leakage around the facepiece.
- c. When exerting enough exhalation pressure, the facepiece should lift off the face rather than have air blow by the face only.

I. FACTORS THAT ALTER RESPIRATOR FIT and cause variability between field and laboratory protection factors:

- 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**

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J. WRITTEN RESPIRATORY PROTECTION PROGRAM

- 1. Procedures for selecting respirators for use in the workplace;**
- 2. Medical evaluations of employees required to use respirators;**
- 3. Fit testing procedures for tight-fitting respirators;**
- 4. Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;**
- 5. Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;**
- 6. Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;**
- 7. Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;**
- 8. Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and**
- 9. Procedures for regularly evaluating the effectiveness of the program.**

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SECTION 10

REGULATIONS

Key points are presented from selected regulations. The professional should read the entire regulation referenced and be familiar with other existing regulations. Regulations vary in scope but overlap considerably. Some regulations are more detailed or are stricter than other regulations on certain requirements. Where regulations differ, the strictest provision must apply.

In this section, we examine some of the pure aspects of each regulation; in other sections the combined requirements are woven together. This creates some duplication in the text, but it is important for the student to know the source of each requirement. In addition, some new terms are presented which are explained more fully in sections to follow.

Section 6-1
U.S. EPA Asbestos Regulations

A. TSCA, TITLE II AHERA ASBESTOS HAZARD EMERGENCY RESPONSE ACT

40 CFR 763 subpart E, Oct 1986, Asbestos in Schools Rule.

1. Synopsis:

- a. Covers Schools public or private grades **k-12**
- b. Inspections required for friable and non-friable ACBM **every 3 years.**
- c. **Management plans required for all schools**
- d. Response actions must be implemented which will "protect human health and the environment".
- e. EPA Accreditation required for individuals: **AHERA Accredited Abatement Workers; Supervisors and Monitors; Inspectors; Management Planners, and Project Designers.**
- f. **LEA must have a "designated person"**
- g. **2 hr awareness training for custodial and maintenance workers within 60 days of hire.**
- h. **Signs in routine maintenance areas.**
- i. **Can assume materials are ACBM or collect bulk samples of materials and submit to NIST Accredited Lab for PLM analysis. Damaged assumed ACBM must be tested**
- j. **Periodic Surveillance every six months and Annual notification to PTO.**
- k. Rigorous recordkeeping requirements.
- l. DPH regulation 19a-333-1-13 include all of the AHERA requirements plus a few more; a copy of this DPH regulation is in the handout on W.W.W.Chem-scope.com.

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2. Requirements for School Inspections:

- a. Visual inspection
- b. Materials **Not Included** in AHERA Inspections:
 - 1) Stored material
 - 2) Concrete
 - 3) Cinder block
 - 4) Blackboards
 - 5) Pressed wood
 - 6) Carpets
 - 7) Curtains
 - 8) Table and desk tops
 - 9) Chemical lab gloves and other fire resistant equipment
 - 10) Exterior roofing and most other exterior materials
- c. Identify all homogeneous areas of friable and non-friable suspected ACBM.
- d. Assume ACBM or sample.
- e. Assess friable ACBM.
- f. Prepare Inspection Report and Management Plan.

3. Asbestos Abatement Projects Records:

See Section 9-2

Records of abatement projects at schools have a high chance of being inspected by DPH within 2 years of the project. The abatement and records must comply with AHERA, DPH, OSHA and building and fire codes.

B. NESHAP

National Emission Standards for Hazardous Air Pollutants.

40 CFR Part 61 Subparts A (general) and M (Asbestos). Clean Air Act, Covers practically all facilities, activities and buildings except some residential.

1. Main Subparts:

- a. Subpart A includes parts 61.01 -.19 which are of general nature and apply to asbestos and 32 other Hazardous Air Pollutants.
- b. Subpart M deals with Asbestos and consists of parts 140-157. The original part M was effective March 31, 1971. There were major amendments effective on November 20, 1990.
 - 61.140 Applicability
 - 61.141 Definitions
 - 61.142 Asbestos mills
 - 61.143 roadways
 - 61.144 manufacturing
 - 61.145 Demolition and Renovation
 - 61.146 spraying
 - 61.147 fabricating
 - 61.148 insulating materials
 - 61.149 waste disposal from asbestos mills
 - 61.150 waste disposal from manufacturing, fabricating, demolition, renovation and spraying
 - 61.151 inactive disposal sites for asbestos mills, manufacturing, and fabricating.
 - 61.152 air cleaning
 - 61.153 reporting
 - 61.154 active waste disposal sites
 - 61.155 waste conversion
 - 61.157 delegation of authority

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2. Requirements of Subpart M:

- a. Homes with 4 or less units exempted from regulation, unless a number of homes are done as part of the project or a home had former non-residential usage.
- b. MUST inspect for asbestos prior to any demolition or renovation project
- c. PLM is official test method.
- d. Definitions including:
 - 1) Demolition means work involving taking out load supporting building members or intentional burning.
 - 2) Renovation means altering a facility component in any way including stripping of asbestos.
 - 3) **Category 1 non-friable asbestos** means resilient flooring, asphalt roofing, gaskets, and packing ACM.
 - 4) Category 2 non-friable asbestos means any other non-friable ACM.
 - 5) Regulated asbestos containing material (RACM) means any of the following:
 - a) Friable asbestos
 - b) Category 1 asbestos which has become friable
 - c) Category 1 asbestos which is subject to sanding, grinding, saw-cutting or abrading.
 - d) Category 2 asbestos which has a high probability of becoming pulverized, crumbled or reduced to powder during the demolition or renovation work.
 - 6) In other words RACM means asbestos which is friable or likely to become friable.

3. Notification Requirements Effective 10/1/97: in Maine, NH, Mass and CT.

Normal state DPH asbestos notifications (in CT of 10 calendar days or emergency notifications) satisfy NESHAP requirements and EPA does not also need to be notified. However, failure to notify DPH will also subject the party to EPA violation.

(In other states, one still must notify EPA directly.)

Note: Effective about June 2004, DPH requires notification of all demolitions. See page 102.

4. Normal EPA Notification Requirements (exclusive of item 3 above)

Note: These would apply in Other states than above or in the demolition cases cited above in item 3 b.

Note: For States listed in item 3, it is only necessary to follow the State notification requirements to comply with NESHAP, regardless of the EPA requirements below.

- a. For projects involving demolition or renovation which disturbs > 260 linear ft or 160 Sq ft of RACM:
 - 1) Prepare and submit 10- (weekday) notification forms required by the USEPA.
 - 2) Submit forms to:
 - USEPA, Region 1
 - Air and Management Division
 - J F Kennedy Federal Building
 - Boston MA 02203
 - (617) 565-3273

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- b. Remember, for demolition, notification is required even if no asbestos is involved.
- c. If amount of RACM changes by 20% or more, a revised notice is needed.
- d. If start date of project changes, a revised notice is needed.
- e. Blanket notification for the year:

If a series of jobs is expected to be done at a site in the course of the year and the total RACM work is >260 lin ft or 160 sq ft, a blanket notification may be sent for a calendar year by about 12/15 of the year preceding. Must notify by the next day of each individual job.

- 1) Non-scheduled renovation: A series of jobs is expected because of routine equipment failure.
 - 2) Planned renovation: A renovation operation or a series of renovations at a site where RACM will be occasionally stripped within a year.
- f. Emergency renovation: Must result from a sudden unexpected event that, if not taken care of, poses a hazard or may cause damage or an unreasonable financial burden. Must notify by the next day.

5. Emission controls.

- a. No visible emissions
- b. Wet removal
- c. Material drop restrictions

6. Waste disposal manifests

NESHAP is the primary regulation controlling asbestos waste disposal.

- a. Label each waste bag with site and generator name in addition to the usual OSHA labeling.
- b. EPA Approved Landfill
- c. Waste vehicle labeled during loading and unloading
- d. EPA must be notified if the dump receipt is not received within 45 days of the manifest date.

7. NESHAP (Supervisor) Training certification posted on site

8. 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.**

Note: In some cases, non-regulated asbestos may be left in the affected area before demolition or renovation but the follow up work for waste disposal may be enormous since contaminated parts of the structure must be disposed of or the asbestos sorted out after demolition. These sites should be evaluated on a case by case basis. For interior asbestos, because of CT and OSHA regulations, it is usually necessary to properly remove the asbestos before disturbance.

9. Unexpected Asbestos:

There must be a plan to handle unexpected RACM which is exposed during a project. If the unexpected RACM becomes part of the rubble, then all contaminated rubble must be properly disposed of.

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10. Interaction with State and OSHA regulations:

- a. The NESHAP regulation potentially relaxes standards for Category 1 asbestos which would be significant if state regulations are relaxed.
- b. Other fine points of the regulations are in line with existing state or OSHA regulations and not mentioned here.

C. ASHAA

1. The Asbestos School Hazard Abatement Act of 1984.

2. Congress adopted it as a mechanism to fund schools and for initial funding of EPA Asbestos Information Centers

D. EPA WORKER PROTECTION RULE

- 1. 40 CFR part 763 subpart G, 1987 for public sector employees not otherwise covered by OSHA, including school employees.**
- 2. Now it is the same as the OSHA asbestos standard, 29 CFR 1926.1101.**

E. THE 1982 ASBESTOS IN SCHOOLS RULE:

- 1. Required inspections for friable ACBM only**
- 2. Required notification of employees and PTAs and posting of notices.**
- 3. No requirement for management plans or response actions**

F. EPA ASBESTOS BANS

See Section 1

G. ASHARA: Asbestos School Hazard Abatement Reauthorization Act

1. Synopsis:

- a. This regulation requires extension of EPA asbestos inspection, project design and abatement Accreditation requirements to public and commercial buildings. Individuals doing more than one task must be EPA Accredited in each discipline. A Model Accreditation Plan (MAP) is included with this regulation which, as adopted by DPH, defines the syllabus of approved asbestos courses.
- b. Increased training requirements discussed above.
- c. The proposed EPA regulations were published in May of 1992. The effective date was to be 11/28/92, but the final rule was published on 2/3/94 and really effective 4/3/94.
- d. Licensing and training requirements in many states such as CT reinforce this regulation and generally follow the MAP. Some states are stricter.

2. Applicability:

Public and commercial buildings = All buildings other than schools and residenceals with < 10 units.

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3. Principal Changes in Training Requirements Compared to AHERA:

- a. Separate worker and contractor courses for initial and refresher. (Can no longer upgrade workers by taking an additional day.) (5 day contractor/supervisor and 4 day worker.)
- b. Increased Hands-on initial training to:
 - Worker 14 hrs (from 6)
 - Supervisor 14 hrs (from 6)
 - Inspector no change still 4 hrs
- c. Changes in Curricula:
 - 1) Worker training:

Minor additions and deletions. Add a discussion of the relationship of exposure to asbestosis, lung cancer, mesothelioma and diseases of other organs. Some wording changes in the employee personal protective equipment and work practices training.
 - 2) Contractor/Supervisor training:

Air monitoring: add EPA's recommendation that TEM be used for final air samples and a NIST Accredited lab be used. Minor wording changes.
 - 3) Inspector:
 - a) Under Bulk Sampling add EPA's Recommendation that a NIST Accredited PLM lab be used.
 - b) Under Recordkeeping Add EPA's Recommendation that standardized forms be used for recording inspection results for schools and for public and commercial buildings.
 - 4) **Management Planner: Not regulated**
 - a) **Not a required but a recommended** EPA Accreditation for public and commercial buildings.
 - b) Add a recommendation that standardized forms be used for recording inspection results for schools and for public and commercial buildings. And add the forms to the curriculum.
 - 5) Project Monitor:

Not required by EPA. States are allowed to adopt the MAP for this discipline.

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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):

- a. Coverage under a standard determined by work operation and not the primary activity of the employer.
- b. All construction-related work which may disturb asbestos including general industry applications of any of the following:
 - 1) Demolition
 - 2) Removal
 - 3) Encapsulation
 - 4) Construction
 - 5) Alteration
 - 6) Repair
 - 7) Maintenance and custodial work
 - 8) Renovation
 - 9) Installation
 - 10) Emergency clean-up
 - 11) Transportation, disposal or storage
 - 12) Excludes asphalt roof coatings, roofing cements and roofing mastics. (includes roof felts).

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.

3. 1915.1001 Shipyard Industry Asbestos Standard

Not discussed in this course. Similar to the construction standard below, but one must exactly review this regulation if one works in shipyards or shipboard.

Note: DPH asbestos standard discussed below also applies to ships in dry-dock.

B. OSHA CONSTRUCTION STANDARD: (29 CFR 1926.1101) Final Rule Effective 10/11/94; As Amended 7/30/98 and As Amended by 1910.134 Eff 4/98.

1. Definitions Include:

- a. Disturbance means activity that crumbles or pulverizes ACM or generates visible debris.
- b. Employee exposure is defined as the exposure outside any respirator use. Designation of controls according to classification:

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- c. **Class I work** = TSI and surfacing removal of ACM or PACM (presumed asbestos containing material) (TSI and Surfacing have the same meaning as in EPA AHERA except drywall is not classed as surfacing but plaster is.
- d. **Class II work** = Removal of ACM or PACM other than TSI and surfacing
- e. **Class III work** = repair and maintenance where ACM may be disturbed.
- f. **Class IV work** = maintenance and custodial including work in general industry or construction industry associated with Class I, II and III work, i.e., custodial and maintenance work is Class IV work only if associated with a construction asbestos project.
- g. Regulated area = an area established by the employer to demarcate areas where Class 1, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a Work Area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

2. Regulated Areas (Asbestos Work Areas) 1926.1101 (e)

- 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
- 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.

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4. Personal Air Sampling:

- a. Required for Class I, II and for Class III jobs.
- b. Required daily for each Work Area.
- c. Very tough to rely on first day or past work history to avoid doing this sampling.
 - 1) OSHA says that first day monitoring can no longer be relied on to predict the exposures of a job since the first day may have lighter exposure.
 - 2) Assessments are needed to rely on historical data.
- d. 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 or Supplied Air Respirators if the expected or actual exposure is from 0.1 - 1.0 f/cc for the 8 hr PEL. Supplied air must be used above 1.0 f/cc.
- 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.

6. Protective Clothing

- a. Disposable Coveralls
- b. Laundering (for non-disposable clothing)
- c. Contaminated clothing as wastes or for laundering, handled as Asbestos Wastes.
 - 1) Must be transported in sealed impermeable bags, or other closed, impermeable containers, and
 - 2) Have required labels.
- d. Inspection of protective clothing.
 - 1) The competent person shall examine work suits worn by employees at least once per work shift for rips or tears.
 - 2) When rips or tears are detected, immediately mend or replace.

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7. Hygiene Facilities and Practices: "Decons"

a. Class I asbestos jobs > 25 linear or 10 square feet:

1) Decons or Decontamination areas: adjacent and connected to (contiguous) the regulated area when feasible with an equipment room, shower area, and clean room connected to each other in series. See schematic drawings in the handout on W.W.W.Chem-scope.coms.

a) Equipment room. Supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.

b) 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.)

c) 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:

(1) Remove asbestos contamination from their work suits in the equipment room using a HEPA vacuum before proceeding to a shower that is not adjacent to the Work Area; or

(2) Remove their contaminated work suits in the equipment room, then don clean work suits, and proceed to a shower that is not adjacent to the Work Area.

d) 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 which otherwise meet the requirements of this section.

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

a) Enter the decontamination area through the clean room;

b) Remove and deposit street clothing within a locker provided for their use; and

c) Put on protective clothing and respiratory protection before leaving the clean room.

d) Before entering the regulated area, the employer shall ensure that employees pass through the equipment room.

3) Decontamination area exit procedures. The employer shall ensure that:

a) Before leaving the regulated area, employees shall remove all gross contamination and debris from their protective clothing.

b) Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers.

c) Employees shall not remove their respirators in the equipment room.

d) Employees shall shower prior to entering the clean room.

e) After showering, employees shall enter the clean room before changing into street clothes.

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4) 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.

b. Small Class I work (< 25 linear or 10 square feet) and for Class II and Class III Jobs Where no Negative Initial Exposure assessment was produced). DPH is stricter as mentioned above.

- 1) Contiguous equipment room with impermeable drop cloth on the floor.
- 2) The area must be of sufficient size as to accommodate cleaning of equipment and removing personal protective equipment without spreading, contamination beyond the area (as determined by visible accumulations).
- 3) Work clothing must be cleaned with a HEPA vacuum before it is removed.
- 4) All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area.
- 5) The employer shall ensure that employees enter and exit the regulated area through the equipment room or area.

c. 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.

d. 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.

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.

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d. Requires

- 1) Examination under supervision of a licensed physician.
- 2) No cost to the employee.
- 3) At a reasonable time and place.
- 4) **Always requires 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.

- 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

- a. Exposure monitoring results (30 years)
- b. Medical surveillance records (duration of work +30 years)
- c. Training records (one year)

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

- a. All TSI and surfacing materials installed before 1980 are PACM.
- b. All floor tile and roofing installed before 1980 is assumed to contain asbestos.
- c. Assumed asbestos materials as adopted by EPA are also asbestos unless shown to be otherwise.

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- d. If the owner wishes to not assume materials are asbestos, OSHA requires the following:
- 1) Inspection and sampling using an EPA Accredited Inspector.
 - 2) Sampling requirements for bulk samples are now the same as the EPA requirements. For each homogeneous area:
 - a) Surfacing:
 - 3 samples up to 1000 sq ft,
 - 5 samples for 1-5000 sf
 - 7 samples above 5000 sf
 - b) Miscellaneous Materials: in a manner sufficient to be correct. (Industry practice is to generally take 3 samples unless it is a patch or very small area.)
 - c) TSI 3 samples
 - 3) PLM analysis: Lab used must be NIST or AIHA proficient in bulk sample analysis. AIHA Proficiency is rated twice a year by AIHA based on ability to run unknown samples for asbestos content.
 - 4) To prove material in a homogeneous area is not asbestos, all samples in the area must test negative (<1% asbestos).
- e. Building owner or employer is responsible for treating the above materials as asbestos.
- f. If there is good cause to know that a material is asbestos containing the employer and/or building owner is deemed to know that fact. This includes material besides those mentioned above.
- g. Debris in an enclosed area where TSI or surfacing is present, and not intact, is presumed to be asbestos containing.

11. Hazard Communication Requirements for Employers Besides Owners:

- a. Employers who discover the presence of ACM or PACM on the worksite must notify the project or building owner.
- b. On worksites having multi employers:
 - 1) The person who discovers the material is also to notify the other employers.
 - 2) An employer planning Class I or Class II asbestos work is to inform all the other employers on the site of the location and quantity of these materials and the measures to be taken to protect them from exposure.

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c. Employers who are not owners planning Class I, II or III work must notify the owner of the location and quantity of ACM and PACM known or later discovered.

- 1) Within 10 days of completion of Class I or II asbestos work, the employer of the employees who performed the work shall inform the owner and employers who will be working in the area of the quantity and PACM or ACM remaining in the former regulated area and the final monitoring results.
- 2) For inadvertently discovered ACM/PACM there is a 24 hour notification requirement to the owner and all employers at the site.

12. Owners - Notification and Labeling

a. Building "Owners:

- 1) OSHA considers building owners as statutory employers, who must "take necessary and appropriate action to protect employees other than their own..."
- 2) OSHA is requiring the owner to receive, maintain and communicate knowledge of the location and amount of ACM or PACM to employers of employees who may be exposed.
- 3) The building owner must keep records of all information received through this notification scheme, or through other means, which relates to the presence, location and quantity of ACM and PACM in the owner's building, project or vessel and transfer all such information to successive owners.
- 4) OSHA has defined 'building owner' to include those lessees who control the management and record keeping functions of a building/facility.
- 5) When the lease expires the records go to the owner or the next lessee.

b. Owners must notify of the location of ACM/PACM:

- 1) Employers who bid for work
- 2) Tenants
- 3) Employees

c. Asbestos materials must be visibly labeled when feasible as close to the installed material as feasible:

- 1) In construction areas where there is any possibility for disturbance.
- 2) In areas of buildings where they may be disturbed by any type of construction related activity including custodial, maintenance or outside contractors.

d. Exemption: products which the manufacturer demonstrates cannot release fibers in excess of the PELs. OSHA has found that this exemption will never apply to PACM (surfacing or TSI); rarely will it apply to other asbestos containing materials.

e. Housekeeping workers must be informed that all resilient floor material that they clean buff or otherwise maintain may contain asbestos.

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13. Note on Assessments which are discussed below.

- 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."
- c. The best approach for the monitor is to see that personal air sampling is done daily, evaluate those results and also to complete the pre-abatement inspection form in the hand-outs.

14. Initial Exposure Assessment:

- a. Class I, II, III jobs: Immediately before each job or at the beginning of each job unless a Negative Initial Exposure assessment has already been made for this job.
- b. Purpose is to ascertain actual or expected employee exposures during the job, to make sure that all control systems are appropriate for the operation and will work properly.
- c. Basis of assessment:
 - 1) Assessment shall be based on personal air monitoring for this job, if feasible, and
 - 2) Consideration of all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring. The initial assessment may conclude that exposures are likely to be below the PEL only as the result of a negative initial exposure assessment.

15. Negative Initial Exposure Assessment:

It is possible, but difficult, to make a Negative Initial Exposure Assessment for any one specific asbestos job by any one of three methods:

- a. Objective Data: Use objective data to demonstrate that the product involved in the work or the process used cannot exceed PEL's.
 - 1) This is virtually impossible for Class I work,
 - 2) Very difficult to prove for Class II work and
 - 3) May apply to Class III or IV work.Note: Stricter state regulations would limit the changes in work practices to practically every situation.
- b. Historical Data: Monitoring data from prior jobs closely resembling the present job (PEL and EL):
 - 1) Within 12 months of the present job
 - 2) Monitoring and analysis done in accordance with the OSHA standard in effect at the time.

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3) Data obtained during work operations closely resembling the present job considering:

- a) Process used
- b) Type of material
- c) Control methods including placing and repositioning the ventilation equipment,
- d) Work Practices including techniques used for wetting the ACM or PACM in the various circumstances encountered
- e) Environmental conditions including impacts due to weather conditions
- f) Employee training
- g) Employee experience
- h) Workplace conditions
- i) Degree and quality of supervision
- j) Duration of the job and corresponding monitoring

c. Personal Monitoring of the Present Job: (PEL and EL for Class I and II work)

1) For Class I jobs, we must assume PEL is exceeded until we actually have test results unless the steps in b. above are completed.

2) Furthermore, the results of the first day's monitoring cannot be used to predict the results for the additional days unless the operation is identical.

Attach Personal Monitoring Data for the Present Job: (PEL and EL) when available to the Summary Sheet on the following page.

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NEGATIVE EXPOSURE ASSESSMENT SUMMARY:

1. Are the present crew and supervision at least as experienced and competent as prior crews/supervisors?

2. Do the process, conditions, materials, work practices of the historical jobs cited, closely resemble the present job being evaluated? _____

3. Does any days monitoring results indicate a mean TWA (8 hr) greater than 0.05 f/ cc for any employee?

4. Does any days monitoring results indicate a single EL value (30 min) greater than 0.5 f/ cc for any employee? _____

5. What training does the Competent Person performing this evaluation have: AHERA training as contractor/supervisor: ____ project designer _____ or inspector management planner course _____. Does the Competent Person meet the requirements in 1926.32: "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

6. What is expected employee exposures during the job: PEL statistically less than 0.1 f/cc? _____ EL statistically less than 1 f/cc? _____.

7. Are all control systems appropriate for the operation and will they work properly? _____

To confirm this, inspect the actual work setup and document with the Pre-Abatement Check List in the hand-outs.

Conclusion: After consideration of all observations, information and calculations which indicate employee exposure to asbestos, including any previous monitoring: There is _____ is not _____ a high degree of certainty that employee exposures are likely to be below the PEL using the processes and practices outlined above for this job.

Workers will use a minimum of _____ NIOSH approved respirators for this job and also perform initial and periodic personal monitoring of exposures (PEL and EL) for each shift of this job. (Class I jobs require PAPR or Supplied Air Respirators if the expected or actual exposure is from 0.1 - 1.0 f/cc for the 8 hr PEL. Supplied air must be used above 1.0 f/cc.)

Negative Initial Exposure Assessment? Yes ____ No: _____

Competent Person Print Name Competent Person Signature/date

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16. Methods of Compliance (work practices):

Note: For interior work, State regulations are still stricter except as specified below. For details See 1926.1101 (g) 4 if interested in details of the OSHA regulation. Most of the following are in addition to the DPH requirements:

- 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 .
 - 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) Class I jobs require PAPR or Supplied Air Respirators if the expected or actual exposure is from 0.1 - 1.0 f/cc for the 8 hr PEL. Supplied air must be used above 1.0 f/cc.)
 - 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.

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17. Notification to OSHA

- a. Required when controls other than specified are to be used in Class I jobs. Alternatives for Class I require a rigorous demonstration and advance notice to OSHA.
- b. When the employer intends to utilize controls other than a negative pressure enclosure for Class I jobs.
- c. In some circumstances, where modifications of glovebag or glove box systems and other control systems are to be made.

18. Exemptions:

- a. For use of a technology which is not referenced in the standard, must notify OSHA before the job including the basis for the project designer or CIH's decision. Daily perimeter monitoring must be implemented and a final clearance done. (Note: DPH regulations require the final anyway.)
- b. Glovebag Use: Applications extended without quantity limitations to TSI and surfacing. NOTE: State regulations will not permit this in interior work, so the OSHA change would only affect exterior work. Must be a 2 man glovebag. Negative pressure glovebags and boxes are also allowed for Class I work.
- c. Mini-enclosures are allowed for Class I work. (Note: must comply with DPH enclosure requirements.)

19. Flooring Work:

- a. Must assume floor tile and mastic contains asbestos unless proven otherwise as above.
- b. A CIH or a project designer must certify the PLM results.
- c. Must mist the snip point used for cutting sheet flooring.
- d. OSHA says can omit negative pressure enclosure if a Negative Initial Exposure assessment is developed. Note: DPH regulations require negative pressure enclosures anyway.
- e. OSHA allows containment to be omitted in some cases when the tiles are removed intact (non-aggressive method which does not break or dust tiles); CT would require an AWP (alternate work practice) approval by DPH.

20. Exterior work:

- a. "OSHA believes that outdoor Class I work may be safely done without (negative pressure) enclosures. Therefore 1926.1101 paragraph (g) allows all outdoor Class I work to be conducted using other control methods, such as a glovebag system...." Decontamination units are still required and including showers when feasible.
- b. Transite Panel and Siding Removal on Exteriors Other Than Roofs:
 - 1) OSHA requires job by job competent person evaluation of Class II work including transite removal.
 - 2) OSHA says that: For rare cases when the evaluation of material, condition, crew and past exposure data do not support a Negative Initial Exposure assessment, additional precautions including critical barriers and a respirator must be used.
 - 3) No cutting, breaking or abrading unless other methods cannot be used.
 - 4) Each piece sprayed with amended water before removal.
 - 5) Unwrapped pieces lowered immediately to the ground using dust tight chute, crane or hoist. Wrapped pieces lowered by the end of the shift.
 - 6) Nails shall be cut with a flat, sharp instrument.

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c. Roofing Work: updated

- 1) Keep intact to the extent feasible during removal
- 2) When not intact, wet methods are required when feasible. Not required when there is a safety hazard.
- 3) Cutting machine blades must be continuously misted during use unless a competent person determines that misting substantially decreases worker safety.
- 4) For power roof cutter with an aggregate roof, collect dust with a HEPA vacuum or HEPA dust collector. For smooth roofs, a HEPA vacuum or HEPA dust collector or wet sweeping/wiping can be used to clean up debris. Immediately bag the dust.
- 5) Do not throw or drop ACM to the ground. It can be carried, passed by hand or lowered using a covered dust tight chute, crane or hoist.
- 6) If ACM is not intact, lower unbagged material as soon as practicable but always by the end of the shift. While the material is on the roof it shall either be wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.
- 7) When intact, lower to the ground as soon as practicable by end of the shift.
- 8) Upon being lowered, transfer unwrapped material to a closed receptacle.
- 9) Roof level HVAC must be isolated or HVAC must be shut down.
- 10) For repair or removal of less than 25 sq ft during a day involving intact sections, wet methods and HEPA vacuum can be omitted unless visible dust is generated.
- 11) For intact roofing, flashing or similar work, only the following need be done:
 - a) Competent person inspection determines that roofing will remain intact.
 - b) All employees trained
 - c) No sanding grinding or abrading.
 - d) Methods which keep the material intact must be used.
 - e) No dropping or throwing to the ground.
 - f) Remove from the roof by the end of the shift.
- 12) Areas of the roof will be a regulated area where dust or debris may accumulate.
- 13) Only necessary work should be done on the roof while asbestos materials are being removed and the locations of the work should be selected to minimize exposure, such as upwind of the asbestos work. OSHA said the 20 ft barrier approach has merit, but the exact determinations should be made on site and could vary according to working conditions.

21. Removing Gaskets

Note: For interior work, also check stricter DPH regulations.

- a. If deteriorated and unlikely to be removed intact, use glovebag.
- b. Thoroughly wetted with amended water before removal and immediately placed in the disposal container.
- c. Any scraping to remove loose residue must be performed wet.

22. Additional Notes for Class III Work

- a. DPH standards for projects apply when repairs involve more than 3 ft.
- b. The incidental cutting away of ACM/PACM to access mechanical or structural components for repair or maintenance is considered Class III work.
- c. Remember: Respirators, protective clothing, personal monitoring, Isolation with signs, protection of HVAC, HEPA vacuums, training, wet methods and proper disposal are required.

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- d. Local exhaust ventilation is required if feasible.
- e. For TSI and surfacing work which involves drilling, cutting, abrasion, sanding, chipping, breaking or sawing, isolation such as mini-enclosures must be used and respirators must be worn, and where a Negative Initial Exposure assessment has not been made, tenting must be used.

23. Training requirements:

Training must be at no cost to the employee.

- a. All inspector work: 3 days AHERA Training
- b. Class I and II work = AHERA Training
 - 1) 40 hours for supervisors
 - 2) 32 hours for workers
- c. **Class III work = 16 hours** equivalent to the EPA O&M worker training plus more training if the competent person so determines
- d. Class IV work = **2 hours for all custodial and maintenance workers**
- e. Competent Person Requirements:

AHERA training as contractor/supervisor, project designer or inspector management planner course. In addition to the following requirements in 1926.32: "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

24. 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.

25. Appendices:

- a. Appendices A,C,D,E and F of the General Industry Std are binding.
- b. Appendices A,C,D and E of the construction Industry Std are binding. B,F,H,I and K are not binding.
- c. Appendix A changed the same for all standards:
 - 1) In para 1 "such as the NIOSH 7400 method" is replaced: with: "the most current version of the OSHA ID-160 Method or the NIOSH 7400 method". Recommended flow rate for personal samples increased; now 0.5- 5 liters/ minute.
 - 2) In para 2 add "Do not reuse or reload cassettes for asbestos sample collection"
 - 3) Para 11 : "Each set of samples taken will include 10% field blanks or a minimum of 2 field blanks....from the same set of cassettes as used for the samples..".Any blanks representing counts higher than the detection limit shall be rejected.
 - 4) In the quality control section, inter-lab participation is required.
- d. Appendix J was added: OSHA Method ID 191 for bulk identification of asbestos.

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C. OSHA HAZARD COMMUNICATION PROGRAM FOR THE CONSTRUCTION INDUSTRY (CFR 29 1926.59)

1. General:

a. **Deals with chemical hazards** in the work place such as:

- 1) Coatings
- 2) Spray Glues
- 3) Solvents/ Mastic Removers
- 4) Reinsulation Materials
- 5) Encapsulants
- 6) Spray poly
- 7) Surfactants

b. Employees have a right to know if working with a dangerous material and must be trained in how to work with it safely.

2. Key Elements:

- a. Comprehensive written hazard communication program.
- b. Material safety data sheets (MSDS)
- c. Labels
- d. Employee Training

3. MSDS's and how to read them:

- a. MSDS's are the key to the hazard communication standard.
- b. Manufacturers must provide and employer must obtain MSDS's for all hazardous materials which are accessible to all exposed employees.
- c. Employees must be trained on how to use a MSDS
- d. Employers must have MSDS on the job site for each chemical:
- e. Employers on the job site must share MSDS's and other hazard communication with other employers and their employees; the GC (general contractor) is responsible for coordinating this effort for the entire project.
- f. MSDS's must include:

Section I

Product identity and ingredients

Must be the same as on the container label

Must have the manufacturer's name, address and emergency phone number.

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Section II Hazardous Ingredients

Must list hazardous ingredients greater than 1% including: chemical name, synonyms and the CAS # (Chemical Abstracts Service). If carcinogens are present at more than 0.1% they must be identified as carcinogens.

In case of trade secrets, the manufacturer can withhold the name of the chemical but must give a more complete description of the hazards and the properties.

Legal exposure limits

PEL (OSHA)

TLV (ACGIH, AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS)

NIOSH LIMITS OR MANUFACTURER ESTABLISHED LIMITS

Section III Physical and chemical characteristics

Boiling point

Vapor Pressure

Vapor density

Appearance and odor

Specific gravity

Evaporation rate

Miscibility with water

Section IV Fire, Explosion and reactivity hazards

Flash point

< 100 deg F is flammable like gasoline, acetone, gases like methane and acetylene 100-200 deg F is combustible like lighter fluid, mineral spirits, fuel oil.

Extinguishing Media:

Class A for paper and wood

Class B for liquids or greases

Class C for electrical fires

Class D for metals such as magnesium or metal alloys

Fire fighting procedures and unusual explosion hazards

Here you will see instructions like "do not use water" and any special manufacturer's instructions for handling fires with this chemical.

Section V Reactivity Data

Incompatibility with other chemicals. For example if you mix chlorine bleach and ammonia, poisonous phosgene gas is released.

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Section VI Health Hazard Data

Health hazards, risk of cancer

Acute (short term) effects

Chronic (long term) effects

Routes of entry (ingestion, inhalation, skin)

Target organs such as heart, liver, etc

Signs or symptoms of exposure

Medical conditions generally aggravated by exposure

What to do if someone is exposed

Section VII Precautions for safe handling and use

Spill and leak procedures, Waste disposal method and other special precautions for handling and storing

Section VIII Control measures

How to eliminate or minimize the hazard including:

Ventilation and other engineering controls

Personal protective equipment requirements

Emergency and first aid measures

Spill and Leak procedures

Each MSDS may use different formats but all must contain the above information.

D. RESPIRATORY PROTECTION STANDARD OSHA 29 CFR 1910.134

1. Written Program See F. Below

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

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E. OTHER IMPORTANT OSHA REGULATIONS AFFECTING 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. Recording and Reporting of Injuries OSHA 29 CFR 1926.22
5. First Aid and Medical Attention OSHA 29 CFR 1926.23
6. Shower and Sanitation requirements OSHA 1910.141

F. REQUIRED WRITTEN SAFETY AND HEALTH PLANS/PROGRAMS:

The plans can be incorporated into a single Safety and Health Plan which always must be kept on the job sites. Usually the employer makes a number of copies of this plan which each supervisor brings to the job site.

1. Lead compliance plan (Required by OSHA, 1926.62)

- a. Activities in which lead is emitted:
- b. A description of the specific means that will be employed to achieve compliance and where engineering controls are required, engineering plans and studies used to determine methods selected for controlling exposure to lead:
- c. A report of technology considered in meeting the PEL
- d. Air monitoring data which documents the source of lead emissions
- e. A detailed schedule for implementation of the program including documentation such as copies of purchase orders for equipment, construction contracts, etc.
- f. A work practice program which includes items required under protective clothing housekeeping and hygiene facilities and a good work practice program such as described in Appendix B of 1926.62:
- g. An administrative control schedule, i.e. job rotation
- h. Arrangements made among contractors on multi-employer sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for compliance with 1926.62 (e) and 1926.16.
- i. Other Considerations.

2. Written Respiratory Protection Program

- a. Procedures for selecting respirators for use in the workplace;
- b. Medical evaluations of employees required to use respirators;
- c. Fit testing procedures for tight-fitting respirators;
- d. Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;
- e. Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;
- f. Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;
- g. Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;
- h. Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and
- i. Procedures for regularly evaluating the effectiveness of the program.

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3. Emergency response plan 29 CFR 1910.120 and other OSHA Regulations

- a. An organizational structure showing personnel roles, lines of authority communications and training.
- b. Pre-emergency planning
- c. Safe distances and places of refuge
- d. Site security and control measures
- e. Evacuation routes and procedures
- f. Decontamination procedures
- g. Medical emergencies - treatment and first aid
- h. Emergency alerting and response
- i. Inspection for effectiveness of the plan
- j. Personal protective equipment
- k. Procedures for handling emergency response

4. Hazard Communication/Right to Know Program (29 CFR 1926.59)

- a. Responsible individuals
- b. List of hazardous substances
- c. Labels
- d. MSDS's
- e. Non-routine tasks
- f. Multi-employer worksites
- g. Employee information and training
- h. Outside contractor policy

5. Medical Surveillance Program

- a. For all employees who do abatement 30 or more days per year.
- b. Medical examinations to determine fitness for work at no cost to the employee.
 - (1) Prior to assignment of the negative-pressure respirator.
 - (2) At least annually thereafter.
 - (3) Questionnaire .
 - (4) Physical examination directed to the pulmonary and gastrointestinal systems.
 - (5) Any other examinations or tests deemed necessary by the examining physician.
 - (6) Information provided to the physician.
 - (7) Physician's written opinion including any recommended limitations on the employee or on the use of personal protective equipment such as respirators.
- c. Medical surveillance records for each employee.
 - (1) The name and social security number of the employee;
 - (2) Copy of the employee's medical examination results.
 - (3) Physician's written opinions;
 - (4) Any employee medical complaints related to exposure to asbestos; and
 - (5) Copy of information provided to the physician.
 - (6) Record is maintained for the duration of employment plus thirty (30) years.

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Section 6-3

DPH Regulations

A. DPH ASBESTOS STANDARD: 19A 332-1-16 (AMENDED 4/04)

1. Applicability:

- a. All Interior Work
- b. Includes all structures even single family homes and ships in dry dock.
- c. Applies to schools. (Plus reoccupancy criteria in DPH School regulations are stricter.)
- d. Notification needed for friable exterior work

2. Asbestos Project: \geq 3 sq ft or 3 linear ft of asbestos material

3. Notification: (new 4/04)

a. From:

- 1) Asbestos abatement contractor
- 2) Facility owner
- 3) OR ANY PERSON WHO WILL BE CONDUCTING DEMOLITION ACTIVITIES**

b. For:

- 1) Asbestos abatement involving more than ten linear feet or twenty five square feet of ACM
- 2) OR BEFORE ENGAGING IN THE DEMOLITION OF ANY FACILITY.**

c. To:

- 1) DPH
Connecticut Dept of Public Health
410 CAPITOL AVE MS # 51 AIR
PO BOX 340308 HTFD CT 06134 (860) 509 7367
- 2) Facility owner, if notification made by asbestos contractor.

d. DPH Submittal:

- 1) On DPH forms
- 2) Postmark or hand deliver **10 calendar days before starting abatement or demolition**
- 3) For emergency, within one (1) working day after the start of asbestos abatement **OR DEMOLITION.**
- 4) Must include **A COPY OF ANY WRITTEN ORDER REQUIRING DEMOLITION**

e. EPA Submittal: No longer needed in Connecticut

f. DPH Asbestos abatement notification minimum information:

- 1) Name, address and phone number of Asbestos Abatement Contractor.
- 2) Name, address and phone number of Facility Owner.
- 4) Exact facility location.
- 5) Nature of the asbestos abatement
- 6) Facility description including size, age and use.
- 7) Amount of ACM to be removed, enclosed or encapsulated or contained in the facility or part thereof to be demolished.
- 8) Scheduled start and completion dates.
- 9) Description of work practices to be followed to comply with 19a-332a-5-12
- 10) Name and address of Asbestos waste disposal site.

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g. Prepare a separate demolition notification for each facility for which there is a proposed demolition with the following minimum information:

- 1) The name, address and telephone number of the asbestos contractor;
- 2) The name, address and telephone number of the facility owner
- 3) The exact location of the facility;
- 4) The nature of the asbestos abatement
- 5) The type of asbestos abatement activity;
- 6) A description of the facility including the size, age and use of the facility
- 7) The amount of asbestos-containing material to be removed, enclosed or encapsulated or contained in the facility or part thereof to be demolished;
- 8) The scheduled starting and completion dates;
- 9) A description of work practices to be followed to comply with Section 19a-332a-5 to Section 19a-332a-12 **AND**
- 10) The name and the location of the authorized asbestos disposal facility where asbestos-containing materials will be deposited.

4. DPH Required Records:

- a. The notification
- b. List of names and social security numbers of all staff related to the asbestos project.
- c. Log of control of access to the Work Area
- d. All records required by EPA, OSHA, AND DEP
- e. During work air sampling
- f. Post abatement reoccupancy

5. General abatement requirements:

- a. Signs
- b. Critical Barriers:
- c. Objects in the Work Area:
 - 1) Movable objects decontaminated using HEPA vacuums and/or wet cleaning methods as appropriate and removed from Work Areas to a temporary location. Otherwise dispose of as contaminated waste.
 - 2) Fixed objects within the Work Area: cover with a minimum of 4-mil plastic sheeting and tape. The distinction between movable and fixed objects is made in the definitions. The rest is a matter of common sense.
- d. Floor and Wall Plasticization:

Cover flooring and wall surfaces with polyethylene sheeting sealed with tape. Use a minimum of two layers of 4-mil polyethylene on walls and 6-mil polyethylene on floors. Floor plastic must interleave under the wall plastic so that polyethylene extends at least twelve inches up on walls, then wall polyethylene sheeting is applied to the floor thus overlapping the first layer by at least 12 in. This keeps the water from leaking out.
- e. Restricted Access to Work Area:

All persons entering the Work Area must be properly authorized and equipped with proper respiratory protection and protective clothing.

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- f. Cleaning using HEPA vacuum and amended water until there is no visible residue.
- g. Ventilation (Negative air): one air change every 15 minutes.
- h. Waste water filtered by best available technology. 5 microns or smaller porosity.
- i. Asbestos wastes wet and sealed in leak tight containers.
- j. Waste labeled per OSHA regulations:
- k. Disposal at authorized facility.

6. Worker Decontamination System:

- a. Same as OSHA 1926-1101 reference to Hygiene Facilities and it applies for any asbestos project >3 sf or Lin ft.
- b. Clean room
- c. Shower room:
- d. Equipment room
- e. Each room separated by airlocks. An airlock is a special plastic barrier.
- f. Decontamination procedures are outlined on.
- g. Contiguous decontamination system when feasible. (Must notify DPH and the facility owner when not feasible)

7. Asbestos Removal Practices:

- a. Wet Asbestos Material
- b. Remove intact or in large sections (as large as feasible) and carefully lower to the floor.
- c. Spray encapsulate all stripped surfaces
- d. Decontaminate or wrap equipment before removal from area
- e. Empty HEPA vacuum in the Work Area

- f. Negative air units:
 - 1) Remove all pre-filters and damp clean
 - 2) Change HEPA filters at start of next project after containment is established

8. Encapsulation:

- a. An abatement option involving full setup, repair and use of a spray called an Encapsulant.
- b. Spraying an encapsulant called "lock- down" is also required after asbestos abatement.

9. Enclosure

- a. First encapsulate as above
- b. Construct barriers to isolate

10. Spot Repairs

- a. Isolate with barriers (glovebag permitted)
- b. Wet material
- c. HEPA and wet clean surfaces
- d. Use leak proof disposal containers
- e. OSHA labels and NESHAP labels if appropriate
- f. Filter waste water
- g. Same disposal practices as for asbestos projects above

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11. Alternate Work Practices

- a. Licensed Project Designer must apply and get approval FROM DPH.
- b. Use forms provided by DPH
- c. \$ 200 fee. Request cannot be faxed.

12. Post abatement reoccupancy testing (finals):

No occupancy until test is satisfactorily completed

B. CHANGES IN DPH ASBESTOS REGULATIONS THIS DECADE:

1. Effective in January 1991:

- a. Friable Asbestos Material is redefined:
- b. Traditionally, friable means 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.
- c. As additionally defined in the Connecticut regulations:
- d. Also includes any non friable ACM that potentially can be broken, crumbled, pulverized or reduced to powder as the result of asbestos abatement.
- e. Exterior asbestos excluded
- f. TEM limits changed to 500 lin ft and 1500 sq ft
- g. Lab requirements for final air samples: AIHA accredited lab or AIHA registered analysts.

2. Effective October 1991:

- a. Portions of the state board of education regulations were repealed (sec 10-292-a and 10-292-b).
- b. Temporarily it was lawful to do abatement during school session. However, DPH regulations for asbestos in schools restored the requirement to get DPH permission first.
- c. Annual school updates no longer required to be submitted to state.
- d. DPH is now doing many on site school inspections focusing on schools involved in abatement- past and in progress.
- e. EPA funded the DPH to add inspectors.

3. October, 2009

- a. DPH charges fees for notifications of \$100 plus 1% of the project excluding reinsulation up to a max fee of \$5000. Jobs under 160 sq ft - flat \$100 fee only.
- b. Fee for alternate work practice is now \$200.
- c. Notification forms
- d. Reinspections (compliance inspections) \$100.

4. Dec 1, 1992 19a-333-1-13, June 2006

DPH came out with regulations to replace the repealed school regulations. The DPH regulations are nearly the same as AHERA and additionally restrict asbestos abatement while school is in session. In June 2006, DPH expanded the definition of "while school is in session" to include all times when students are in the building. If students will be in any part of the building, the LEA must submit a request for approval to DPH. The details are provided in the course handout on W.W.W.Chem-scope.com.

5. Effective Fall of 1994, State licensure requirements 19a 332-17-23 rev

6. 1998-1999 - New State licensure requirements; copy in handout on W.W.W.Chem-scope.com.

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C. 1994 DPH LICENSURE REQUIREMENTS:

1. Accreditation of training facilities.
2. Training required in a DPH approved training center
3. Contractor must be licensed and all employees receive and maintain the required training; after 7/20/00, must be certified.
4. Individual Consultants must be licensed in each discipline: Project Monitor, Inspector or Inspector/ Management Planner and Project Designer.

D. LICENSING REQUIREMENTS EFFECTIVE 6/4/99 SEC. 20-440- AND 20-441.

1. Licensure of asbestos contractors.

- a. Stricter than 1994 regulations in some respects: fee is \$625 per year.
- b. The licensed contractor will have to hire certified asbestos and supervisors.
- c. Additional submittals with license application:
 - 1) Medical monitoring
 - 2) Employee training
 - 3) Equipment specifications
 - 4) Air monitoring data
 - 5) Permits, violations, and any legal actions.

2. Certification and licensure of asbestos consultants

- a. Existing licensing for consultants will continue for each discipline and will be considered "certification and licensing".
- b. Licenses will be offered in the following disciplines of asbestos consultation:
 - 1) Inspector
 - 2) Inspector/management planner
 - 3) Project designer
 - 4) Project Monitor.
- c. Applicants simultaneously apply for certification and licensure as asbestos consultants in the same application-
- d. Training requirements are the same with the exception of the Project Monitor course and inspectors need only 4 hour refresher.

e. Inspector

- 1) Scope of Licensure and Authorization:
 - a) Review facilities records; perform visual inspection or surveillance of facilities
 - b) Identify, document or inventory materials suspected of containing asbestos
 - c) Collect bulk samples for asbestos analysis according to procedures established by applicable state or federal laws and, regulations and
 - d) Provide direct supervision to non-certified individuals collecting bulk samples of materials suspected of containing asbestos.
 - e) Inspectors shall apply current concepts and knowledge of best available technology to evaluate the conditions and accessibility ACM.

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2) Inspector Qualifications.

- a) Either a bachelor's or an associate's degree in engineering, architecture, industrial hygiene or a scientific field determined by the commissioner to be closely related and
- b) Six months employment experience in an occupation determined by the commissioner to be closely related; or two (2) months field experience under the direct supervision of a licensed inspector or management planner.
- c) 3 day inspector approved training and required refreshers

3) Exempted activities:

- a) Periodic surveillance. However, no touching or taking of samples is permitted without a license as an inspector.
- b) Compliance inspections by federal or state agency.
- c) Visual inspections to determine whether a response action is complete (must be a licensed Project Monitor).

f. Management planner (Inspector/Management Planner)

1) Scope of Licensure and Authorization:

- a) Utilize information developed from facility inspections to assess potential hazards of ACM
- b) Develop abatement response actions, operations and maintenance plans, and select and recommend abatement actions.
- c) All the authorizations of an inspector.

2) Qualifications.

- a) Either a bachelor's or an associate's degree in engineering, architecture, industrial hygiene or a scientific field determined by the commissioner to be closely related and
- b) Applicants shall have minimum of six (6) months experience in asbestos abatement, including experience in asbestos management or three (3) months field experience under the supervision of a licensed management planner.
- c) 3 day inspector plus 2 day management planner approved training and required refreshers.

g. Project Designer

1) Scope of Licensure.

- a) Apply knowledge of facility construction, design and development of abatement projects; abatement specifications; bidding documents; architectural drawings; and schematic representations of material locations.
- b) May also determine how asbestos abatement should be conducted.

2) Qualifications.

- a) Bachelor's degree engineering, architecture, industrial hygiene or a scientific field determined by the commissioner to be closely related.
- b) One year experience in asbestos abatement, including experience in asbestos abatement design or six (6) months field experience under the supervision of a licensed project designer.
- c) 3 day approved project designer training and required refreshers.

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h. Project Monitor

1) Scope of Licensure.

- a) Function as on-site representative of the facility owner or other persons.
- b) Interpret project specifications or abatement management plans.
- c) Monitor and evaluate contractor or employee compliance with applicable regulations or specifications and
- d) Ensure that abatement projects are properly conducted and completed.
- e) The Project Monitor shall not function as the asbestos contractor, or as an employee of the asbestos contractor on the same asbestos abatement project.

2) Qualifications.

- a) Either bachelor's degree in engineering, architecture, industrial hygiene or a related scientific field or an associate's degree in biology, chemistry or a closely related field.
- b) Applicants shall have a minimum of one (1) year experience in asbestos abatement, including experience in asbestos abatement project monitoring or six (6) months field experience under the supervision of a licensed Project Monitor.
- c) Training:
 - (1) Existing licensed project monitors must take the Project Monitor refresher course
 - (2) New project monitors must take the five day Project Monitor initial course and the required annual Project Monitor refreshers.

3. License and certification application for asbestos consultants.

a. Written application using prescribed forms.

- 1) Copies of training certificates.
- 2) Documentation demonstrating necessary educational and employment experience

b. Payment of a \$250 licensure fee by certified or bank check.

c. Annual Renewal of License during the month of birth with application and \$250 fee.

d. Certification expires simultaneously with training certificate. Any individual either seeking licensure or possessing licensure as an asbestos consultant shall maintain current certification in the appropriate discipline. (For those who become inactive, the longest lapse between courses is 24 months; otherwise initial training must be taken over.)

e. Denial of eligibility of applicant for licensure.

- 1) Failed to comply with the general statutes and regulations governing his profession;
- 2) Convicted of a felony
- 3) Pending or prior disciplinary action or unresolved complaint before any duly authorized professional disciplinary agency including a foreign jurisdiction;
- 4) Subject to DPH hearing:
 - a) Has committed an act that, if the applicant were licensed, would not conform to the accepted standards of practice of the profession, including but not limited to, incompetence, negligence, fraud or deceit; illegal conduct; procuring or attempting to procure a license, certificate or registration by fraud or deceit; or engaging in, aiding or abetting unlicensed practice of a regulated profession
 - b) Has a condition that would interfere with the practice of his profession, including, physical illness or loss of skill or deterioration due to the aging process, emotional disorder or mental illness, abuse or excessive use of drugs or alcohol.

f. Exemption. An individual who between July 1, 1985 and November 1, 1994, has been employed for a minimum of two (2) years as an asbestos consultant may be licensed as an asbestos consultant without the bachelor's degree, provided the applicant has met all other requirements.

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- g. Decertification. Suspension and revocation of certification. Civil penalties.
- 1) Performing work requiring certification at a job site without being in physical possession of initial and current documents of accreditation and current certificate;
 - 2) Permitting the duplication or use of one's own document of accreditation or certificate by another;
 - 3) Performing work for which certification has not been received;
 - 4) Obtaining accreditation from a training provider that does not have approval by the Department to offer training for the particular discipline;
 - 5) Violation of other Connecticut regulations or general statutes concerning asbestos;
 - 6) Obtaining certification and/or licensure through fraudulent representation of accreditation documents;
 - 7) Obtaining accreditation documentation through fraudulent means;
 - 8) Gaining admission to and completing refresher training through fraudulent representation of initial or previous refresher training accreditation documentation; or
 - 9) Obtaining licensure through fraudulent representation of licensure requirements such as education, training, professional registration, or experience.
- h. Change of office or residence address. Notify DPH within thirty days.

4. Requirements for certification and employment as an asbestos abatement site supervisor or asbestos abatement worker.

- a. Individual Certification required for work with 3 sq ft or lin ft of ACM **or more**.
- b. Must have initial and current certificates at the job location.
- c. Certification is good for one year and expires on the same date as that of accreditation.
- d. Each individual sends written application to DPH including:
 - 1) Copies of training certificates.
 - 2) List of all asbestos contractors and asbestos consultant employers over the last three years.
 - 3) Fees: Supervisor \$100 / Worker \$50.

E. ASBESTOS IN SCHOOLS: CT GENERAL STATUTES SECTIONS 19A-333-11B

Has all the requirements of AHERA But Stricter or more detailed in several respects:

- 1. Need permission to do abatement while school is in session.**
- 2. Final clearance clarification on not dividing areas in order to do only PCM finals.**
- 3. Procedures for fiber release episodes, must notify DPH within 24 hours.**
- 4. Added Requirements for response action recordkeeping. See the check list with the handout on W.W.W.Chem-scope.coms.**

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F. OTHER STATES:

1. Before considering working out of state, obtain the latest regulations from the state and determine if licensing is required.

2. **CONES: Consortium of North East States:**

a. The following states are members, require licensing and have training reciprocity:

State	Asbestos Contact/ Phone
CT	DPH/ (860) 509 7559 (860) 509 7367
MAINE	DEP ASB CERT COORDINATOR (207) 287 2651
NJ	DEPT OF HEALTH ENV HEALTH SVCES (609) 984 2193
NY	DEPT OF HEALTH ASB SAFETY TRAINING PROG. (518) 402 7940
MASS	DLI DIV ASB/LEAD LIC AND ENFORCEMENT (617) 727 9612
NEW HAMP.	BUR OF HEALTH RISK ASSESSMENT, (603) 271-5870 ASB MGMT CONTROL PROGRAM (603) 271 4609
RHODE IS.	OFFICE OF OCC. AND RADIOLOGICAL HEALTH DEPT OF HEALTH (401) 222 7795
VERMONT	DEPT OF HEALTH ASB AND LEAD REGULATORY PROGRAM (802) 863 7231

b. Remember One must pay a fee to any of these states and obtain a license before working there in the asbestos field.

Section 6-4 DOT Regulations

US Department of Transportation Regulations (DOT) CFR 49 Parts 171-173

1. Research and Special Programs Administration is an arm of DOT which regulates hazardous material transportation including asbestos.
2. Amended regulations were published in the Federal Register on 12/21/90 which became effective on October 1, 1991:
3. Asbestos was divided in two categories which are now obsolete. See revisions below.
4. On Oct 1, 1992 Editorial and Technical Revisions were published which simplified the rule:
5. One shipping description of NA 2212.
6. Up to 440 lbs of asbestos allowed on cargo aircraft.
7. A placard is needed for shipments over 440 lbs.
8. Drivers must have function specific training. OSHA hazard communication training EPA training is sufficient if it covers DOT topics.

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9. Small shipments such as samples are generally exempt unless they contain a pound or more of friable asbestos. Even so, the following exemptions apply:

- a. Less than 66 lb package with inner packages securely wrapped and not exceeding 11 lbs each are exempt from marking and labeling for ground transportation.
- b. If the entire package is less than 64 lbs and the inner packages are less than one ounce (30 grams) each and inner containers are at least 8 mil plastic, glass, metal or earthenware.
- c. Non-friable ACM is exempt.
- d. Manufactured products are exempt.
- e. Air samples are in practice exempt.

10. For most abatement wastes, the shipping papers need to have the following information:

RQ- 1 LB (REPORTABLE QUANTITY)
NAME: ASBESTOS NA 2212
HAZARD CLASS: 9
MIXTURE
PACKING GROUP III
TOTAL QUANTITY _____

11. DOT Labels:

Usual OSHA label may be used on the package unless it is over 66 lbs in which case the following added label is needed:

RQ- 1 LB (REPORTABLE QUANTITY)
NAME: ASBESTOS WASTE MIXTURE NA 2212
NAME OF THE CONSIGNEE OR CONSIGNOR

(EPA NESHAP also requires the container/truck be labeled during loading and unloading)

Section 6-5

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 11
DEFINITIONS

Numbered Definitions are from the DPH regulations 20-440.

Underlined definitions are from the DPH asbestos standard 19a-332a-1-16; **bold caps** reflect new additions and ~~line out~~ reflect deleted text as of 4/04

(A definition which is numbered and underlined is the same in both standards.)

"Accredited" the individual or laboratory meets the requirements of the accrediting body.

"Adequately wetted" means sufficiently mixed or coated with water, amended water or an aqueous solution; or the use of a removal encapsulant to prevent dust emissions;

Aggressive Sampling: Conducting Air sampling where the air is agitated before and during air sampling.

A.I.A.: American Institute of Architects.

AIHA: American Industrial Hygiene Association.

Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time. See Section 5. See personal air samples, area air samples.

Air Cell: Pipe insulation with a fibrous, air filled honeycomb center.

Alternate Work Practice (AWP): A project designer function and not detailed in this course. A variance granted by DPH allowed by Asbestos Standard.

"Amended Water" means water to which a chemical wetting agent or removal encapsulant has been added to improve penetration;

(3) **"Asbestos"** means the asbestiform varieties of actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite;

(4) **"Asbestos abatement"** means the removal, encapsulation, enclosure, renovation, repair, demolition or other disturbance of asbestos-containing materials, but does not include activities which are related to (A) the removal or repair of asbestos cement pipe and are performed by employees of a water company as defined in Section 25-32a of the Connecticut General Statutes or (B) the removal of nonfriable asbestos-containing material found exterior to a building or structure other than material defined as regulated asbestos-containing material in 40 CFR 61, the national emission standards for hazardous air pollutants, as amended from time to time;

"Asbestos Abatement Project" means any asbestos abatement performed within a facility involving more than three (3) linear feet or three (3) square feet of asbestos-containing material;

"Asbestos abatement site supervisor" " means any individual ~~EMPLOYEE who is employed or engaged by an~~ **OF A LICENSED** asbestos contractor ~~to supervise an asbestos abatement project~~ **WHO HAS SPECIFICALLY BEEN TRAINED AS A SUPERVISOR IN A TRAINING PROGRAM APPROVED BY THE DEPARTMENT AND WHO HAS BEEN ISSUED A CERTIFICATE BY THE DEPARTMENT. ;**

"Asbestos abatement worker" means any employee of an ~~an~~ **A LICENSED** asbestos contractor who engages in asbestos abatement; **HAS COMPLETED A TRAINING PROGRAM APPROVED BY THE DEPARTMENT AND HAS BEEN ISSUED A CERTIFICATE BY THE DEPARTMENT.**

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"Asbestos-containing material" (ACM) A material which contains more than 1% Asbestos by EPA test Method # 600/R-93/116 (PLM).

Asbestos Containing Building Material: (ACBM) ACM which is surfacing, thermal system insulation, or miscellaneous materials. ACBM is a specific AHERA term referring to ACM in a school which is in one of those three categories and not excluded from AHERA. For example ACM roofing is not an ACBM, ACM brake linings are not an ACBM.

"Asbestos consultant" means a certified and licensed individual who engages in any activity involving asbestos consultation services: inspector; management planner; project designer or Project Monitor;

(9) "Asbestos contractor" means any licensed person engaged in asbestos abatement whose employees actually perform the asbestos abatement work;

(10) "Asbestos consultation services" means the inspection or evaluation of a facility for asbestos hazards, including, but not limited to, the development of asbestos abatement plans, site inspections, air monitoring and the provision of industrial hygiene services related to asbestos abatement;

Asbestosis: Lung Disease caused by asbestos.

Authorized Person: Properly trained and equipped persons who are:

- 1) Employed by the asbestos contractor or consultant or
- 2) Other persons representing or working for the owner, consultant and / or asbestos contractor who may be tradesman doing class IV work or for other valid reasons.
- 3) Federal, State or local inspectors.

AWP: See alternate work practice.

Cassette: air monitoring filter assembly.

Category 1 (NESHAP) non-friable asbestos means resilient flooring, asphalt roofing, gaskets, and packings > 1% asbestos by PLM.

Category 2 (NESHAP) non-friable asbestos means any other non-friable material with > 1% asbestos by PLM.

"Certified" or "Certification" when referring to an individual means that a certificate has been issued by the department under the provisions of Sections 20-4401 through 20-440-8 of the Regulations of Connecticut State Agencies to an individual upon successful completion of an approved training or refresher training course, the receipt of a document of accreditation issued by the training provider and the fulfillment of any other requirements of the department. Certification is required for employment as either an asbestos abatement worker or asbestos abatement site supervisor and is a condition for licensure as an asbestos consultant. Asbestos consultant disciplines for which certification may be issued include: inspector, management planner, project designer and Project Monitor;

CFM: Cubic feet per minute. Volume moving past a reference point per unit time. HEPA vacuum

Change order: A change in the work after the contract signing. This is the owner's acknowledgement of extra or less work to be done which differs from the original contract. "Add-on" or "extra".

Cilia: Hair-like projections that line the bronchial tubes.

Clean Room: = Clean change 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. See Decon.

Crawl space: A confined space, usually at basement or attic level, where one can't normally stand erect.

CONES: Consortium of North East States: CT, MA, VT, ME, RI, NH, NY, and NJ.

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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 3 feet apart form an Airlock.

Decon or Decontamination Enclosure System: A series of connected rooms, with Airlocks and Curtained Doorways, clean room, shower and dirty room.

Demolition (NESHAP) means any work involving taking out load supporting building members or intentional burning.

Damaged Friable Miscellaneous ACBM: Friable miscellaneous ACBM which has suffered deterioration of the internal structure so that cohesion is weak or has delaminated from the substrate (adhesion). Such damage or deterioration may be illustrated by the separation of ACBM into layers; separation of ACBM from the substrate; flaking, blistering, or crumbling of the ACBM surface; water damage; significant or repeated water stains, scrapes, gouges, mars or other signs of physical injury on the ACM, Asbestos debris originating from the ACBM in question may also indicate damage.

Damaged Friable Surfacing ACBM: Friable surfacing ACBM which has deteriorated or been damaged to the extent that the material lacks cohesion or adhesion. Such damage or deterioration may be illustrated by the separation of ACBM into layers; separation of ACBM from the substrate, flaking, blistering, or crumbling of the ACBM surface; water damage; significant or repeated water stains, scrapes, gouges, mars or other signs of physical injury on the ACBM. Asbestos debris originating from the ACBM in question may also indicate damage.

Damaged or significantly damaged thermal system insulation ACBM: Thermal system insulation ACBM WHICH has lost its structural integrity, its covering, is crushed, water stained, gouged, punctured, missing, or not otherwise intact. Damage may be further illustrated by occasional punctures, gouges, or other signs of physical injury to ACBM; occasional water damage on the protective coverings/jackets; or exposed ACBM ends or joints, or asbestos debris originating from the ACBM in question.

Demolition (DPH) means the wrecking or taking out of any load-supporting structural member of a facility ~~and any related razing, removing or stripping of asbestos~~ **TOGETHER WITH ANY RELATED HANDLING OPERATIONS OR THE INTENTIONAL BURNING OF ANY FACILITY**

DEP: CT Dept of Environmental Protection

DPH: or (16) "Department" means the Connecticut Department of Public Health.

DOT: US Department of Transportation

"Emergency Asbestos Abatement Project" means an asbestos abatement project which was not planned but results from a sudden unexpected event. This includes operations required by non-routine failures of equipment;

EPA means the United States Environmental Protection Agency.

Encapsulation An asbestos abatement option which means treating ACBM with an encapsulant material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent fiber release. The material may be a penetrant, which penetrates and hardens the asbestos material; or a bridging encapsulant, which covers the surface of the material with a protective coating. Both are applied to the surface of the material using airless spray equipment at low pressure in order to reduce fiber release during applications.

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Enclosure, to enclose: A method. An asbestos abatement option involving surrounding ACM with an airtight barrier.

Enclosure (s): Synonym for Containment. Also refers to the abatement Work Area containment system which includes plastic enclosures such as the worker decontamination enclosure, the equipment decontamination enclosure, the Work Area enclosure.) See also negative pressure enclosure, mini-enclosure. Throughout Section 4.

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. See Decon.

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

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

Exposure Factors: Conditions which may permit or enhance a fiber release.

(18) "Facility" means the interior and exterior of any private or public building or structure including but not limited to those used for institutional, residential (including single family homes), commercial or industrial purposes and vessels while ashore or in dry dock;

(19) "Facility owner" means the person having title to the facility. For purposes of publicly owned property only, the facility owner shall be defined to be the chief executive officer of the federal, state or municipal agency which owns or controls the use of the facility;

Final Clearance: Inspection and air testing done by a project monitor after asbestos abatement.

Fixed Object: A unit of equipment or furniture in the Work Areas which cannot be removed from the Work Area.

Friable ACM: EPA- 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.

Functional Space: A room, group of rooms, or homogeneous area including crawl spaces or the space between a dropped ceiling and the floor or roof deck above), such as classroom(s), a cafeteria, gymnasium, hallway(s), designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions.

"Glovebag" means 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.

"High-efficiency particulate air (HEPA)" means a filtering system capable of trapping and retaining at least 99.97 percent of all monodispersed particles 0.3 micrometer in diameter or larger;

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

Homogeneous Area: An area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture and appears to have been installed at the same time.

HVAC means heat, ventilation and air conditioning;

Inspection: The process of locating ACBM, determining its condition, and reporting the results

"Inspector" means any licensed individual who identifies, assesses the condition of, or collects bulk samples of suspected asbestos-containing material;

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Latency Period: Time between exposure and onset of a disease.

LEA: Local Education Agency:

1. Any local educational agency as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 3381).
2. The owner of any nonpublic, nonprofit elementary, or secondary school building.
3. The governing authority of any school operated under the defense dependents' education system provided for under the Defense Dependents' Education Act of 1978 (20 U.S.C. 921, et seq.).

"License" means a document issued by the department authorizing an asbestos contractor to engage in asbestos abatement work or an asbestos consultant to engage in any activity directly involved with asbestos consultation services. Licensure shall be restricted pursuant to the limitations of each discipline.

Lock-down: Final spray after abatement using an encapsulant.

"Management planner" means any licensed individual who uses data gathered by asbestos inspectors to assess asbestos hazards, determine-responses and develop implementation plans;

mm: Millimeter. 0.001 meter.

Mesothelioma: Rare form of cancer.

Mini-Enclosure or Mini-Containment: A small full containment.

Miscellaneous Material: ACM or ACBM other than surfacing or TSI, such as transite, floor and ceiling tiles, roofing, mastics, tars, putties, glues, caulks, preformed sheets, paint, transite and electrical wiring.

Movable Object: A unit of equipment or furniture in the Work Area which can be removed from the Work Area.

MSDS: Material Safety Data Sheet.

Negative Air Units or Negative Pressure Exhaust Ventilation: 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.

Negative Pressure Enclosure = or negative pressure containment):

"NESHAP" asbestos regulations (40 CFR 61, Subpart M) means National Emission Standard for Hazardous Air Pollutants;

NIST (NIST/NVLAP): National Institute of Standards and Technology/National Voluntary Laboratory Accreditation Program. Accredits labs for PLM and TEM.

NIOSH: National Institute for Occupational Safety and Health.

NIOSH 582: Required 5 day training course for PCM analysts.

(28) "Non-friable asbestos-containing material" means any asbestos-containing material that hand pressure cannot crumble, pulverize or reduce to powder when dry; See also Category 1, 2.

O&M: Operations and Maintenance.

Operations and Maintenance Program: (O&M) A program of work practices to maintain friable ACBM in good condition, ensure clean up of asbestos fibers previously released, and prevent further release by minimizing and controlling friable ACBM disturbance or damage.

O&M Scale 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.

OSHA means the Occupational Safety and Health Administration of the United States Department of Labor;

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OSHA Method ID-160: Microscopic method that only counts asbestos fibers, (Same as the method in Appendix B of 1926.1101) may be used for samples other than final samples.

PACM: Presumed ACM (OSHA)

PAPR: Powered air purifying respirator.

PAT: Proficiency Analytical Testing program. See AIHA.

PCB'S: Polychlorinated biphenyls. Highly toxic oils used in transformers and fluorescent light ballasts. Ballasts or transformers which do not say "PCB free" should be treated as PCB containing. Must be disposed of as Hazardous Waste; contact DEP for a list of Licensed Hazardous Waste contractors to be contacted for disposal instructions.

PCM: Phase contrast microscopy. See NIOSH 7400.

Permissible Exposure Limit (PEL): for asbestos 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. (See TWA). PEL's exist for other substances and are listed in CFR 29 1910.1000, subpart Z.

Personal Samples: Air samples collected in breathing zone.

Plasticize: To cover floors and walls with plastic sheeting as specified in the DPH regulations, Section 4.

PLM: Polarized light microscopy. The method used for determining if materials are asbestos containing. More than 1% asbestos found by this method proves a material is ACM under all the asbestos regulations.

Poly: Short for polyethylene (plastic) sheet.

Potential damage: Circumstances in which:

- (1) friable ACBM is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities,
- (2) there are indications that there is a reasonable likelihood that the material or its covering will become damaged, deteriorated, or delaminated due to factors such as changes in building use, changes in operations and maintenance practices, changes in occupancy, or recurrent damage.

Potential significant damage: Circumstances in which:

- (1) Friable ACBM is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities;
- (2) there are indications that there is a reasonable likelihood that the material or its covering will become significantly damaged, deteriorated, or delaminated due to factors such as changes in building use, changes in operations and maintenance practices, changes in occupancy, or recurrent damage
- (3) the material is subject to major or continuing disturbance, due to factors including, but not limited to, accessibility.

PPE: personal protective equipment

Preventative measures: Actions taken to reduce disturbance of ACBM or otherwise eliminate the reasonable likelihood of the material becoming damaged or significantly damaged.

"Project designer" means any licensed individual who determines how asbestos abatement work should be conducted and who prepares for purposes of an abatement project, plans, designs, procedures, workscope or other substantive direction or criteria;

"Project monitor" means any licensed individual who functions as an on-site representative of the facility owner or other persons by over-seeing the activities of the asbestos abatement contractor.

PSIG: Pounds per square inch gauge pressure. Gauge pressure automatically zeros out the normal atmospheric pressure of about 14.7 PSI or about 760 mm of mercury.

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RACM: NESHAP regulated ACM.

"Removal" means the taking out or stripping of any asbestos-containing materials from surfaces or structural components of a facility;

Renovation (NESHAP) means altering a facility component in any way including stripping of asbestos.

"Renovation" means altering, in any way other than demolition, one or more structural components. Operations in which load-supporting structural members are taken out are excluded;

"Repair" means the restoration of damaged asbestos-containing material; including but not limited to the sealing, patching, enclosing or encapsulating of damaged asbestos-containing material to prevent fiber release;

Respirator: A device used to protect against inhalation hazards.

"Response action" means a method, including removal, encapsulation, enclosure, repair and operation and maintenance that protects human health and the environment from ACM;

Rotometer: flow measuring device.

Routine Maintenance Area: An area, such as a boiler room or mechanical room, that is not normally frequented by students and in which maintenance employees or contract workers regularly conduct maintenance activities.

Salient: A limited area of significantly different material or condition within a homogeneous area

SCFM: Standard cubic feet per minute. CFM corrected to standard conditions of pressure and temperature, i.e., 760 mm of mercury and 70 degrees F.

School: Any elementary or secondary school as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854). AHERA

School Building:

1. Any structure suitable for use as a classroom, including a school facility such as a laboratory, library, school eating facility, or facility used for the preparation of food.
2. Any gymnasium or other facility which is specially designed for athletic or recreational activities for an academic course in physical education.
3. Any other facility used for the instruction or housing of students or for the administration of educational or research programs.
4. Any maintenance, storage, or utility facility, including any hallway, essential to the operation of any facility described in this definition of School Building under paragraphs (1), (2), or (3).
5. Any portico or covered exterior hallway or walkway.
6. Any exterior portion of a mechanical system used to condition interior space.

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.
Procedure

(34) "Spot repair" means any asbestos-abatement activity involving not more than three (3) linear feet or three (3) square feet of asbestos-containing material;

Stripping: Taking of Asbestos materials from any surface.

"Structural Component" means any pipe, duct, boiler, tank, reactor, turbine, furnace or other component at or in a facility or any structural member of a facility;

"Structural Member" means any load-supporting member of a facility such as beams and load-supporting walls or any non-load supporting member, such as ceilings and non-load supporting walls;

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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 soap. A chemical wetting agent added to water to improve penetration.

Synergistic effect: Combination of more than one hazard multiplies the risk of disease.

Transite: Hard gray ACM sheet or tubing.

TEM: Transmission Electron Microscopy: see also final clearance.

TSI = Thermal System Insulation: 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.

"TSCA" means Title II of Toxic Substance Control Act, 15 U.S.C. 2641 et seq.

TWA: Time weighted average:

Vibration: The periodic motion of friable ACM which may result in the release of asbestos fibers.

"Visible Residue" means any debris or dust on surfaces in areas within the enclosed work area where asbestos abatement has taken place and which is visible to the unaided eye. All visible residue is assumed to contain asbestos;

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. Synonym of shower.

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

"Work Area" means the specific area or location where the actual asbestos abatement work is being performed or such other areas of a facility which the Commissioner determines may be hazardous to public health as a result of such asbestos abatement.

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. See Decon.

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<u>SECTION</u>	<u>PAGE</u>	<u>MANAGEMENT PLANNER TRAINING CONTENTS</u>
12	121	MANAGEMENT PLANNER COURSE OVERVIEW
13	123	ASSEMBLING AND SUBMITTING THE MANAGEMENT PLAN
14	141	HAZARD ASSESSMENT AND PRIORITIZATION; SELECTION OF RESPONSE ACTIONS FINANCING ABATEMENT OPTIONS
15	156	OPERATIONS AND MAINTENANCE
16	168	CASE STUDY IN DEVELOPING AN O&M PLAN

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SECTION 12**OVERVIEW****A. BACKGROUND:**

On October 22, 1986, President Reagan signed into Law the Asbestos Hazard Emergency Response Act (AHERA). This Public Law 99-519 resulted in EPA promulgating The Asbestos-Containing Materials in Schools Rule (40 CFR 763 Subpart E). This Rule requires all public and private elementary and secondary schools to inspect for friable and non-friable asbestos, develop asbestos management plans, and implement response actions in a timely manner.

The asbestos Management Plan describes the means and methods by which a school will address asbestos containing building materials (ACBM) identified by the inspection.

B. ROLE of MANAGEMENT PLANNER AND OTHER PROFESSIONALS:**1. Role of the Management Planner:**

- a. Designs and writes the O&M Program
- b. Makes basic decisions as to selection of response actions
- c. Sets work priorities
- d. Compiles the management plan.

- e. Assesses the hazard itself
(Inspector only assesses the condition. For example, the Management Planner makes the recommendation to remove asbestos in a certain area because the inspector reports significantly damaged asbestos thermal system insulation.)

- f. Protection of building occupants

2. Project Designer, Architects and Engineers:

- a. The Project Designer writes the specifications detailing how abatement response actions are to be done.

- b. Must be Accredited in the specific discipline.

- c. The Project Designer May be an architect or engineer or work with them. The architect's main function relates to design of the overall construction project and usually coordinating all phases of construction. Asbestos abatement is one phase of the construction.

- d. Engineers are also involved in the design phase of the overall construction project. Structural Engineers deal with buildings; Civil Engineers deal with building grounds.

3. Project Monitor:

- a. Monitors the abatement response actions
- b. Collects air samples
- c. Performs the final reoccupancy test.

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C. COURSE TOPICS:

Section 13: ASSEMBLING AND SUBMITTING THE MANAGEMENT PLAN

- A. EVALUATION AND INTERPRETATION OF SURVEY RESULTS
- B. PLAN REQUIREMENTS IN TSCA TITLE II SEC 203 (I)(1)
- C. USE OF THE MANAGEMENT PLAN AS A PLANNING TOOL
- D. RECORD KEEPING

SECTION 14: HAZARD ASSESSMENT AND PRIORITIZATION

SELECTION OF RESPONSE ACTIONS

- A. ROLE OF THE INSPECTOR VS MANAGEMENT PLANNER IN ASSESSMENT
- B. REVIEW OF DAMAGE CLASSIFICATIONS
- C. DECISION TREE FOR ASSESSMENT OF ACBM
- D. OVERVIEW OF RESPONSE ACTIONS
- E. ADVANTAGES AND DISADVANTAGES OF CONTROL OPTIONS
- F. WORK PRACTICES FOR RESPONSE ACTIONS
- G. STAGING AND PRIORITIZATION OF WORK IN OCCUPIED AND UNOCCUPIED BUILDINGS.
- H. FINANCING ABATEMENT OPTIONS, ECONOMIC ANALYSIS

SECTION 15: OPERATIONS AND MAINTENANCE

- A. PURPOSE AND OVERVIEW OF THE O&M PLAN
- B. EPA GUIDANCE DOCUMENTS
- C. ACTIONS TO BE TAKEN BY CUSTODIAL AND MAINTENANCE STAFF
- D. REDUCING DISTURBANCE OF ACBM
- E. SCHEDULING O&M FOR OFF HOURS
- F. RE-SCHEDULING OR CANCELING RENOVATION IN ACBM AREAS
- G. BOILER ROOM MAINTENANCE
- H. PROPER WASTE DISPOSAL
- I. IN-HOUSE PROCEDURES
- J. EMPLOYEE TRAINING
- K. EMPLOYEE PERSONAL PROTECTION PROGRAM
- L. RESPONDING TO FIBER RELEASE EPISODES
- M. PERIODIC SURVEILLANCE
- N. POSTING OF SIGNS IN ROUTINE MAINTENANCE AREAS

SECTION 16: CASE STUDY IN DEVELOPING AN O&M PLAN

- A. DEVELOPING THE O&M PROGRAM
- B. IMPLEMENTING THE O&M PROGRAM
- C. PROBLEMS THAT HAVE BEEN EXPERIENCED
- D. CLASS EXERCISE
 1. Inspection and assessment data are presented for a hypothetical school building. The data is presented as a question and answer session using slides and the course manual for reference.
 2. Review of Section 10-11: REGULATIONS (with emphasis on plan requirements and management plan related regulations)
 3. Review of Section 5: LEGAL IMPLICATIONS FOR THE MANAGEMENT PLANNER including:
 4. Liabilities associated with interim control measures
 5. In house maintenance repair and removal
 6. Use of results from previous inspections
 7. Implementation of the O&M plan and problems to be anticipated

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SECTION 13

ASSEMBLING AND SUBMITTING THE MANAGEMENT PLAN

**A. EVALUATION AND INTERPRETATION OF SURVEY RESULTS,
HOW TO USE THE INSPECTOR'S DATA**

1. List of Inspection Documents:

- a. Site narrative
- b. List of homogeneous sampling areas
- c. List of ACBM
- d. Sample records.
- e. Floor plans showing sampling and ACBM locations
- f. AHERA Training Certificates of Inspector
- g. Preinspection Planning data
- h. Hazard assessment
- i. Laboratory reports
- j. Summary

2. Check the information:

- a. Compare with Required Elements Check List (below)
- b. All Documents Identified:
 - 1) Name of the School Building
 - 2) Date of the Inspection
 - 3) Name(s) of the Inspectors of that date.
- c. No Ambiguity
- d. Laboratory Results Compared to Field Inspector's Data Sheet
 - 1) All Homogeneous areas tested
 - 2) Lab results consistent within a Homogeneous Sampling Area
 - 3) Keyed to proper location

B. PLAN REQUIREMENTS IN TSCA TITLE II SEC 203 (I)(1)

The following is a check list which includes all the Federal Plan Requirements and is the same form as used by the Connecticut Dept of Health:

REQUIRED ELEMENTS FOR LEA ASBESTOS MANAGEMENT PLAN

Submission with Asbestos Management Plan Required (Connecticut)

This "Required Elements" form must be completely filled out and submitted by each local education agency (LEA) with its asbestos Management Plan. If the "Required Elements" form is missing or incomplete, the entire Management Plan will be rejected as incomplete.

Carefully completing this form will help assure that the Management Plan meets federal requirements and will facilitate accurate and timely state review.

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Directions

This form lists the federally required elements of each LEA asbestos Management Plan. The form is completed by listing all the page numbers where a specified element appears in the Plan. When completed, therefore, the form will index the Management Plan's required elements.

In addition, questions are posed for a number of elements that require either (1) affirmation that information for those elements of the Management Plan is complete, or (2) an explanation of what is missing and why the required element is incomplete. Inadequate explanations for missing elements will be treated as incomplete responses.

Format

The "Required Elements" form is organized into 13 sections. Citations to federal regulations mandating specific elements are given in the appropriate sections. Space is provided in the form for the page numbers in the Plan where the specific elements are contained. Space also is provided for responses to questions posed in the form. If additional space is needed, continue on the back of the same page.

REQUIRED ELEMENTS FOR LEA ASBESTOS MANAGEMENT PLAN

Directions: List the pages of the Management Plan that contain the specified elements and give complete responses to each question.

I. General Inventory - 763.93 (e)(1)

A list with the name and address of each school building and whether the building contains friable ACBM, nonfriable ACBM, or ACBM assumed to be ACM.

Page Numbers _____

II. Exclusions for inspections completed before December 14, 1987 - 763.93

(e)(2) - 763.99 (IF NO EXCLUSIONS were declared for inspections before December 14, 1987, check box and skip to III.)

(Mark N/A at B, D, E, or F if that type of exclusion not declared)

A. Date(s) of inspection(s). (Required for all exclusion except (F), which is the exclusion for school buildings constructed after October 12, 1988.)

Page Numbers _____

Q: Do the pages listed give the inspection dates for each homogeneous or sampling area receiving an exclusion?

Yes _____ No _____

If no, Please Explain.

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B. Statement(s) by accredited inspector(s) that, based on sampling records:
 (Check the appropriate box for exclusions being declared.)

Friable ACBM was identified in the homogeneous or sampling area(s).

Nonfriable ACBM was identified in homogeneous or sampling area(s).

Material determined not to be ACBM in homogeneous and sampling area(s) was sampled in substantial compliance with Sec. 763.85(a).

List the pages that include statements that qualify each type of exclusion (as checked above).

Page Numbers _____

Q. Do the page numbers listed give a statement for each homogeneous or sampling area that is receiving an exclusion?

Yes_____ No_____

If no, Please explain.

Each statement by an accredited inspector must include: (i) signature of the accredited inspector, (ii) date of signature, (iii) accreditation agency (state or EPA approved), and (iv) accreditation number (if applicable).

Q. Do the statement(s) contained in the pages listed give all four categories of information for each inspector declaring an exclusion?

Yes_____ No_____

If no, Please explain.

For each of the above exclusions (friable ACBM, non friable ACBM, and material not ACBM), the additional information specified in (C) is required.

C. Blueprint, diagram, or written description of each school building that identifies clearly (a) each location and approximate square or linear footage of homogeneous areas where material was sampled and if possible (b) the exact location where each bulk sample was collected and the date of collection.

Page Numbers of blueprint, diagram, or written description of school buildings where material was sampled for ACM.

Q. Do the pages listed contain a blueprint, diagram, or written description for each school building where an exclusion is being declared based on samples?

Yes_____ No_____

If no, Please explain.

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Required Plan Elements Check List (cont)

Q. Does the blueprint, diagram or written description of each school building identify clearly the locations and approximate square or linear footage as specified above?

Yes _____ No _____
 If no, Please explain.

For each bulk sample analyzed, list the pages that give the following three categories of information:

- i. Copies of analysis Page Numbers _____
- ii. Dates of analysis Page Numbers _____
- iii. Other lab reports Page Numbers _____
 (if any prepared)

Q. Do the pages listed provide all three categories of information for every bulk sample collected and analyzed?

Yes _____ No _____
 If no, Please explain.

D. Statement(s) by accredited inspector(s) that, based on records of the inspection(s), suspected ACBM in homogeneous or sampling area(s) is assumed to be ACM.

Page Numbers _____

Q. Do the pages listed include statement(s) for all homogeneous or sampling area(s) receiving an exclusion for suspected ACBM assumed to be ACM?

Yes _____ No _____
 If no, Please explain.

Each Statement by an accredited inspector must include: (i) signature of the accredited inspector, (ii) date of signature, (iii) accreditation agency (state or EPA approved), and (iv) accreditation number (if applicable).

Q. Do the statements contained in the pages listed give all four categories of information for each inspector declaring an exclusion?

Yes _____ No _____
 If no, Please explain.

E. Statement(s) by accredited inspector(s) that, based on inspection records and contractor and clearance records, no ACBM is present in homogeneous or sampling area(s) where asbestos removal operations were conducted before December 14, 1987.

Page Numbers _____

Q. Do the pages listed include statement(s) for all homogeneous or sampling area(s) receiving an exclusion based on removal operations?

Yes _____ No _____
 If no, Please explain.

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Required Plan Elements Check List (cont)

Each statement by an accredited inspector must include: (i) signature of the accredited inspector (ii) date of signature, (iii) accreditation agency (state or EPA approved), and (iv) accreditation number (if applicable).

Q. Do the statements contained in the pages listed give all four categories of information for each inspector declaring an exclusion?

Yes _____ No _____

If no, Please explain. N/A

F. A signed statement by an architect or project engineer responsible for the construction of a new school building built after October 12, 1988, or an accredited inspector, that no ACBM was specified as a building material in any construction document for the building, or, to the best of his or her knowledge, no ACBM was used as a building material in the building.

Page Numbers _____

G. A copy of written assessments required to be made under Sec. 763.88 of material that was identified before December 14, 1987, as (a) friable ACBM, (b) friable suspected ACBM assumed to be ACM, (c) nonfriable material that is newly friable, or (d) thermal system insulation.

Page Numbers _____

Q. Do the pages listed include written assessment(s) for all areas of these types (a-d) that are receiving exclusions?

Yes _____ No _____

If no, Please Explain.

The written assessment(s) must include the following information: (i) name of assessor, (ii) signature of assessor, (iii) date, (iv) accreditation agency (state or EPA approved), and (v) accreditation number (if applicable).

Q. Do the assessments contained in the pages listed give all five categories of information regarding each assessor and written assessment?

Yes _____ No _____

If no, Please explain.

H. Descriptions of any response actions or preventive measures taken.

Page Numbers _____

Q. Do the pages listed give a description of each response action or preventive measure taken in the areas receiving an exclusion?

Yes _____ No _____

If no, Please explain.

The following additional information regarding response actions and preventive measures is required "if possible". List the page numbers that give the following:

i. Names and addresses of the contractors involved.

Page Numbers _____

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- ii. Start and completion dates of the work.
 Page Numbers _____
- iii. Results of any air samples analyzed during and upon completion of the work.
 Page Numbers _____
- III. For inspections completed on or after December 14, 1987 - 763.93 (e)(3)-763.85

A. A copy of the inspection report(s) completed under Sec, 763.85.
 Page Numbers _____

Q. Do the pages listed contain inspection reports for every LEA building covered under AHERA, except those buildings (or parts of buildings) receiving exclusion?

Yes ___ No ___

If no, please explain.

Each inspection report must include the following information: (i) dates of inspection, (ii) name of each accredited person performing the inspection, (iii) signature of each accredited person performing the inspection, (iv) accreditation agency (state or EPA approved), and (v) accreditation number (if applicable).

Q. Does each inspection report give all five categories of information?

Yes ___ No ___

If no, Please explain.

B. A blueprint, diagram, or written description of each school building that identifies clearly:

- i. Each location and approximate square or linear footage of homogeneous areas where material was sampled.
- ii. The exact location where each bulk sample was collected
- iii. Dates of collection
- iv. Homogeneous areas where suspected ACBM is assumed to be ACBM.

Page Numbers of blueprints, diagrams, or written descriptions, of school buildings where material was sampled for ACM or assumed to be ACM?

Q. Do the pages listed contain a blueprint, diagram, or written description for each school building where material was sampled for ACM or assumed to be ACM?

Yes ___ No ___

If no, Please explain.

Q. Does the blueprint, diagram, or written description of each school building identify clearly the location and approximate square or linear footage of each homogeneous area where material was sampled, the exact location where each bulk sample was collected, the dates of collection, and each homogeneous area where ACBM is assumed to be ACM?

Yes ___ No ___

If no, Please explain.

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C. List of homogeneous areas identified in (B) above that indicates whether those areas are surfacing material, thermal system insulation, or miscellaneous material (Sec. 763.85).

Page Numbers__ _____

Q. Does the list cover each homogeneous area identified in (B) and classify each area as surfacing material, thermal system insulation, or miscellaneous material?

Yes__ __ No_____

If no, Please explain.

D. Bulk sample procedure.

i. Description of the manner used to determine sampling locations.

Page Numbers __ _____

Q. Do the pages listed describe the manner used to determine sampling locations for every sample collected?

Yes__ __ No_____

If no, Please explain.

List the pages that give the following information regarding the inspector(s) who collected the bulk samples.

ii. Name Page Number _____

iii. Signature Page Number_____

iv. Accreditation Agency Page Number_____ (State or EPA approved)

v. Accreditation Number Page Number_____ (if applicable).

Q. Do the pages listed above give all four categories of information for every inspector who collected bulk samples?

Yes__ __ No_____

If no, Please explain.

E. Analysis of bulk samples.

List the pages that give the following four categories of information regarding analyses of bulk samples.

i. Copies of analyses. Page Number__ _____

ii. Dates of analyses. Page Number__ _____

iii. Name and address of laboratories that analyzed bulk samples. Page Number__ _____

iv. Statement(s) of laboratory accreditation Page Number_____

Q. Do the pages listed give all four categories of information for every bulk sample collected and analyzed?

Yes__ __ No_____

If no, Please explain.

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List the pages that give the following information regarding all person(s) who performed the analyses of bulk samples.

v. Name Page Number__ _____

vi. Signature Page Number__ _____

F. A copy of written assessments under Sec. 763.88 of all friable ACBM, friable suspected ACBM assumed to be ACM, and thermal system insulation.

Page Numbers__ _____

Q. Do the pages listed include written assessments of all friable ACBM, friable suspected ACBM assumed to be ACM, and thermal system insulation?

Yes_____ No_____ If no, Please explain.

Q. Do the assessments contained in the pages listed give all five categories of information regarding the assessor and written assessment?

Yes___ No_____ If no, Please explain.

IV Designated Person - 763.93 (e)(4)

A. Name, address and phone number of LEA's designated person.

Page Numbers__ _____

B. Training received by designated person, including date training received, length of training (hours), and course name.

Page Numbers__ _____

V. Response Action Recommendations - 763.93 (e)(5) - 763.88 (d)

A. Written recommendation made to the LEA regarding response actions.

Page Numbers_____

The written recommendation must contain the following information: (i) name of Management Planner making recommendation, (ii) signature of the Management Planner, (ii) date, (iv) accreditation agency (state or EPA approved), and (v) accreditation number (if applicable).

Q. Does the written recommendation contained in the pages listed give all five categories of information for the Management Planner?

Yes___ No_____ If no, Please explain.

VI. Response Actions - 763.93 (e)(6)

A. Detailed descriptions of preventive measures and response actions to be taken.

Page Numbers__ _____

i. Methods to be used for preventive measures and response actions to be taken.

Page Numbers_____

ii. Locations where such actions and measures will be taken.

Page Numbers_____

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iii. Reasons for selecting each response action or preventive measure.
 Page Numbers _____

iv. Schedules for beginning and completing each preventive measure and response action.
 Page Numbers _____

Q. Do the pages listed in A(i - iv) give the methods, location, schedules, and reasons for selection for every preventive measure and response action to be taken?

Yes ___ No ___ If no, Please explain.

VII. Assurance of Accreditation - 763.93 (e)(7)

Statement that person(s) who inspected for ACBM and who will design or carry out response action, except O&M, are or will be accredited by:

- i. The state's approved accreditation program, Page Number _ _
or
- ii. An EPA approved course or another state's approved accreditation program. Page Number _ _

VIII. ACBM Remaining After Response Action - 763.93 (e)(8)

A detailed description in the form of a blueprint, diagram, or written description of ACBM, or assumed ACM, that does or will remain after response action.

Page Numbers _____

IX. Activity Plans - 763.93 (e)(9)

- A. Plan for reinspection Page Number ___ ___
- B. Plan for periodic surveillance Page Number ___
- C. Operations and maintenance plan Page Numbers _____
- i. Management Planner recommendation Page Number_ ___
regarding additional cleaning.
- ii. The LEA response to that recommendation. Page Number_ ___

X. Notifications -763.93 (e)(10) and (g)(4)

- A. Method to notify workers and building occupants, or legal guardians, about the following activities:
 - i. Inspections/reinspections Page Number_
 - ii. Response actions Page Number_
 - iii. Post-response action activities including:
 - Periodic surveillance. Page Number_
 - Reinspection Activities Page Number_

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Required Plan Elements Check List (cont)

B. Notification of parent, teacher, and employee organizations groups of the availability of the Management Plan:

- i. Description of steps taken Page Number _____
- ii. Dated copy of the notification Page Number_ ____

XI. Resource Evaluation - 763.93 (e)(11)

An evaluation of resources needed to complete response actions successfully and carry out reinspection, operations and maintenance activities, periodic surveillance, and training.

Page Numbers__ _____

XII. Names and Signatures of Responsible Parties

A. Management Plan Consultants - 763.93 (e)(12) and (f)

i. Name and statement of accreditation (state-approved program or EPA-approved course) for each consultant who contributed to the Management Plan.

Page Numbers_____

ii. Name and signed statement by Management Planner that Management Plan complies with AHERA requirements (Optional).

Page Numbers_____

B. Designated Person Sign-Off - 763.93 (i)

Signed certification by designated person that general LEA responsibilities under 763.84 have been met or will be met.

Page Numbers __ _____

XIII. Recordkeeping - 763.93 (h) and (b-h)

A. For each preventive measure and response action already taken since December 14, 1987, provide the following information (if none taken, write N/A for page numbers).

i. A detailed written description of the action

Page Numbers_____

List the pages that give the following eight categories of information regarding each measure or action described in the pages listed above (A[i]).

1. Methods used. Page Number_____
2. Location of measure or action. Page Number_____
3. Reasons for selection of each measure or action Page Number_____
4. Start and completion dates. Page Number_____
5. Names and addresses of all contractors involved. Page Number_____
6. Accreditation agency (if applicable) (State or EPA approved). Page Number_____
7. Accreditation number (if applicable). Page Number_____
8. Storage or disposal site if ACM was removed. Page Number_____

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Required Plan Elements Check List (cont)

Q. Do the pages listed above give all eight categories of information for every preventive measure and response action already taken since December 14, 1987?

Yes_____ No_____ If no, Please explain.

ii. Documentation of air sampling at completion of response actions.

List the pages that give the following nine categories of information for air sampling locations:

- | | |
|--|------------------|
| 1. Name and signature of any person collecting any air sample. | Page Number__ __ |
| 2. The locations where those samples were collected. | Page Number__ __ |
| 3. Date of collection. | Page Number__ __ |
| 4. Name and address of analyzing laboratory. | Page Number__ __ |
| 5. Date of analysis. | Page Number__ __ |
| 6. Results of analysis. | Page Number__ __ |
| 7. Method of analysis. | Page Number__ __ |
| 8. Name and signature of person performing analysis. | Page Number__ __ |
| 9. Laboratory accreditation statement. | Page Number__ __ |

Q. Do the pages listed give all nine categories of information for every air sampling location?

Yes_____ No_____ If no, Please explain.

B. Employee training already conducted since December 14, 1987 (16 hours of training required before employee disturbs ACBM) Sec. 763.92 (a)(1 and 2).

List the pages that give the following five categories of information for each employee trained.

- | | |
|----------------------------------|-------------------|
| i. Name. | Page Number _____ |
| ii. Job Title. | Page Number _____ |
| iii. Date training was completed | Page Number _____ |
| iv. Location of training | Page Number _____ |
| v. Number of hours completed | Page Number _____ |

Q. Are all five categories of information provided for every employee who received 16 hours of training?

Yes__ __ No_____ If no, Please explain.

C. If the initial cleaning required under Sec. 763.91 (c) already has been conducted, list the pages that give the following information, otherwise list N/A.

- | | |
|---|------------------|
| i. Name of each person performing the cleaning. | Page Number __ |
| ii. Date of cleaning | Page Number__ __ |
| iii. Locations cleaned | Page Number__ __ |
| iv. Methods used | Page Number__ __ |

D. For operations and maintenance activities conducted under 763.91(d) since December 14, 1987, list the page(s) that give the following five categories of information. (If no O&M activities have been conducted, list N/A.)

- | | |
|---|------------------|
| i. Name of person(s) performing the activity. | Page Number__ __ |
| ii. Start and completion dates. | Page Number__ __ |
| iii. Location. | Page Number__ __ |
| iv. Description of activity | Page Number__ __ |
| v. If removal, the name and location of storage and disposal sites. | Page Number__ __ |

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Required Plan Elements Check List (cont)

Q. Area all five categories of information provided for every operations and maintenance activity conducted since December 14, 1987?

Yes_____ No_____ If no, Please explain.

Required Plan Elements Check List (cont)

E. For each time that a major asbestos activity is performed under Sec. 763.91 (e) since December 14, 1987, list the page(s) that give the following seven categories of information.

- i. Name and signature of person(s) performing activities. Page Number__ __
- ii. State of accreditation (or EPA) Page Number__ __
- iii. Accreditation number (if applicable) Page Number__ __
- iv. Start and completion dates of activities. Page Number__ __
- v. Location of activities Page Number__ __
- vi. Description of activities Page Number__ __
- vii. If ACBM removed, name and location of storage or disposal site. Page Number__ __

F. For each fiber release episode that has occurred since December 14, 1987, list the pages that give the following seven categories of information.

- i. Date and location of episode. Page Number__ __
- ii. Method of repair, preventive measures or response action. Page Number__ __
- iii. Name of person performing the work. Page Number__ __
- iv. If removal, the name and location of storage and disposal sites. Page Number__ __

Q. Are all four categories of information provided for every fiber release episode since 12/14/87?

Yes_____ No_____ If no, Please explain.

Additional Comments:

LEA Designated Person

Name:_____

Title:_____

Address:_____

Phone Number:_____

Signature:_____ Date:_____

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C. USE OF THE MANAGEMENT PLAN AS A PLANNING TOOL

ACTIVITY PLAN:

1. **Notifications to PTO and staff.**
2. **Two hour awareness training for maintenance and custodial staff**
3. **Posting of signs in Routine Maintenance areas.**
4. **Schedule periodic surveillance every six months.**
5. **Additional sampling as required.**
6. **O&M program training and supplies or outside arrangements.**
7. **Planning for Response Actions.**
8. **Procedures for maintenance, repair and remodeling.**
9. **Reinspections**
10. **Fiber Release Episodes:**
11. **Resource Evaluation:**
12. **Preventative Measures:**

1. Annual Notification to PTO (parent teachers organization):

- a. Location and availability of the Plan
- b. Include a schedule of the following events for the year:
 - 1) Inspections and Reinspections
 - 2) Response actions
 - 3) Periodic surveillance.
- c. Other Building Occupants:
The method for notifying other occupants must be described in the Plan.
- d. Still required even if the school is shown to be asbestos free.**

2. Two Hour Awareness Training:

All custodial and maintenance workers regardless of actual job functions. Must include:

- a. Asbestos and its various uses and forms.
- b. Health effects associated with Asbestos exposure.
- c. Location of ACBM in school building in which they work.
- d. Recognition of damage, deterioration, and delamination of ACBM.
- e. Name and phone number of the AMP Coordinator.
- f. The Availability and location of Management Plan.

3. Signs:

The Plan must state where warning signs will be posted per 763.95:

- a. Warning labels must be attached immediately adjacent to all ACBM in routine maintenance areas. The labels should be easily read because of large size or bright color which say:

"CAUTION: ASBESTOS. HAZARDOUS.
DO NOT DISTURB WITHOUT PROPER TRAINING AND EQUIPMENT."

- b. Each type of material must be labeled repeatedly so that there is no doubt that these are asbestos materials.

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4. Surveillance:

- a. Every 6 months, all areas that contain ACBM.
- b. Does not have to be an Accredited Inspector, must be able to detect any changes in the condition of the ACBM.
- c. The following information must be recorded:
 - 1) Date of surveillance.
 - 2) The name of the person conducting the surveillance.
 - 3) Any observable changes in the condition of ACBM.

5. Additional Sampling:

The Planner may elect to collect additional building material samples after reviewing the inspection report and meeting with the LEA. The most common reason is that materials listed as assumed ACBM such as ceiling tiles, sheetrock and plaster are very burdensome for the LEA to manage. Such materials are often proven to be non asbestos containing.

6. O&M Activity Planning (to minimize the risk of exposure):

- a. Alter existing O&M procedures that could cause the release or spreading of asbestos fibers.
- b. Schedule necessary maintenance and renovation when there are no occupants in the area.
- c. Institute procedures to reduce the level of any exposure to both maintenance personnel and occupants of the building.
- d. Purchase of equipment
- e. Delegation of O&M workers and 16 hour training if the LEA is to perform O&M repairs in house.

7. Planning for Response Actions:

- a. Cost analysis and priorities.
- b. Response to major fiber release episodes
- c. Long term removal plan
- d. Remodeling

8. Maintenance, Repair and Remodeling:

Major cause of fiber release episodes.

- a. Plan must include instructions to control work in ACBM areas:
 - 1) In-house maintenance and custodial staff
 - 2) Outside contractors.

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b. Instructions might include:

- 1) Notification procedure for planned outside contractor work including any demolition, installation, repair or renovation:
- 2) Specific training for maintenance and custodial employees to avoid disturbing Asbestos materials during maintenance work.
- 3) An inspection process.
- 4) Arrangement for Abatement work.
- 5) Procedures for emergency repairs

9. Plans for Reinspection:

- a. Must indicate that reinspections are to be done every 3 years.
- b. The Plan must be updated at least every three years with the reinspection or sooner if it is determined that the Plan is no longer adequate for the site.

10. Fiber Release Episodes:

- a. Plan to manage a Fiber Release Episode which is the falling or dislodging of ACBM.
- b. Minor Fiber Release Episode - amount of ACBM is < 3 sq ft or lin ft
Major Fiber Release Episode - amount of ACBM \geq 3 sq ft or 3 lin ft.
- c. All custodial and maintenance staff must be able to recognize damage to ACBM based on the training received. Debris in building areas where ACBM is located or obvious punctures, gaps, torn covers, or delamination indicate a Fiber Release Episode.
- d. Advance preparations should be made by the LEA for Accredited Contractor Personnel to respond to a major fiber release episode or to respond in the event emergency repairs are needed.
- e. The individuals or organizations who are to be used in the event of a major fiber release episode should be listed. (Accredited Persons only):
- f. General procedure in the event of a Fiber Release Episode.
 - 1) Close off the area.
 - 2) Protect air inlets and returns.
 - 3) Contact the Asbestos Coordinator at once.
 - 4) Asbestos Coordinator determines extent of the ACBM dislodged and whether the remediation can be done by O&M personnel or Accredited workers will be needed.
 - 5) Notify DPH within 24 hours for a major fiber release episode.

See Section 15 L. for more details.

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11. Resource Evaluation:

The Plan must indicate the resources available to the school which should be sufficient to successfully complete response actions, carry out reinspections, O&M Activities, periodic surveillance, and training:

12. Preventative Measures:

a. Plan must describe preventative measures to be taken to protect the building occupants which may eliminate the reasonable likelihood of undamaged ACBM becoming damaged.

b. The measures must be specific for each material:

c. The following is an example:

Material Description: PIPE INSULATION

Location: TUNNEL

PREVENTATIVE MEASURES which may eliminate the reasonable likelihood of undamaged ACBM becoming damaged:

Staff training

Signs Applicable- YES, AT ENTRY

Restricted use: specify NO ACCESS WITHOUT RESPIRATOR AND SUIT _____

Training

Vibration dampers _____ mechanical balancing to reduce vibration _____

Sound proofing _____

Air flow reduction _____ do not store materials here shielding _____

Additional supervision in area _____ rodent control

Asbestos Work Orders used for outside contractors

Repairs/improvements regarding potential water damage yes _____ no _____ N/A _____

HVAC system changes possible to eliminate potential transport

Changes to minimize vandalism or impact: use change _____ barriers _____ N/A

Bldg/equipment repairs planned to remove vibration potential yes _____ no _____ N/A

IMPROVED PRACTICES:

OTHER SPECIFIC PREVENTATIVE MEASURES FOR THERMAL INSULATION:

All exposed pipe insulation was removed, except for the tunnel which is to be kept isolated and not entered except by those with proper training and equipment.

Before entry into wall or ceiling surfaces, have the area inspected by a licensed accredited asbestos inspector.

Keep the required signs on the tunnel door.

If thermal ACBM is removed, the replacement insulation should be labeled "asbestos free". This is particularly important if only part of the ACBM is removed from a space or say a fitting from a piping system is replaced.

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D. RECORD KEEPING

EPA Recommends that States develop and require the use of standardized forms for recording the results of inspections in schools or public and commercial buildings and that the use of these forms be incorporated into the curriculum of training conducted for Accreditation.

1. Use of Field Inspectors Data and Lab Results:

a. Records to Assemble:

The inspector's report including lab data is discussed in the Inspection portion of the text in Section 8 - 4. The key items for the MANAGEMENT Planner to Assemble and check are listed in Section 13 A.

b. Assembly:

Once the MANAGEMENT planner has verified and/or corrected the data, the inspector's report as corrected is simply arranged in logical order and becomes a section of the plan. In the Management Plan Case Study in Section 16 a suitable arrangement is shown.

c. Using the Data:

Hazard Assessment, Recommending Response Actions and Establishing Priorities and other functions are discussed below in Section 14.

2. On going record keeping system:

a. Planners Duties:

- 1) Establish a workable record keeping system as an integral part of the Plan and include instructions for the LEA to keep the records on an ongoing basis.
- 2) Provide completed documents representing the data at the time of issuance of the plan.
- 3) Provide Blank forms for recording ongoing events.

b. On Going Records Which Must be Specified:

- 1) Employee training.
- 2) O&M activities.
- 3) Periodic surveillance.
- 4) Reinspections every three years.
- 5) Notifications each year.
- 6) Preventative measures implemented.
- 7) Asbestos abatement activities
- 8) Certificates for Accredited persons.
- 9) Documentation of proper procedures for building renovation and remodeling.
- 10) Reports of hazard assessments
- 11) Justification for response actions chosen
- 12) Medical screening and surveillance records
- 13) Bulk analysis and air monitoring results
- 14) Certification of asbestos free replacement materials used
- 15) Initial and periodic cleaning

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c. Record Keeping Procedures:

- 1) The LEA must maintain records at each school as required by AHERA.
- 2) The length and conditions of storage should be specified, generally at least 30 years.
- 3) Locations of the records and persons responsible must be specified.

d. Response Actions:

For the completion of Response actions pursuant to Sec 763. 90 i (AHERA Regulations):

- 1) Name and signature of each person collecting air samples
- 2) Location where each sample was collected
- 3) Date of collection
- 4) Name and address of the laboratory
- 5) Date of analysis
- 6) Results of analysis
- 7) Method of analysis
- 8) Name and signature of person performing the analysis
- 9) A statement that the laboratory meets the AHERA accreditation requirements

e. Ongoing Awareness Training:

New custodial and maintenance employees trained within 60 days

f. Cleaning: For cleaning required by sec 763.91 c, the name of each person performing the cleaning and a description of the methods used.

g. O&M: For each O&M Activity:

- 1) The name of each person performing the activity
- 2) The start and completion date
- 3) The location of the activity
- 4) If ACBM is removed, the name and location of the storage or disposal site.

h. Asbestos Abatement Projects:

- 1) Name and signature and copy of Accreditation Credentials for each abatement person
- 2) Description of the Asbestos Abatement Project
- 3) Starting and completion date
- 4) Copies of Notifications to DPH
- 5) Location of the project
- 6) The quantity of ACBM removed
- 7) An amendment to the Management Plan indicating clearly which ACBM is to be removed from the Plan if applicable
- 8) Waste disposal documentation
- 9) Contractors daily logs showing names and times of entry into the asbestos work area.
- 10) Reports of all testing associated with the project including air monitoring and Final Clearance.

i. Annual PTO Notifications: Same content as initial notification.

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SECTION 14

HAZARD ASSESSMENT AND PRIORITIZATION

EVALUATION AND SELECTION OF CONTROL OPTIONS

FINANCING OF ABATEMENT OPTIONS

A. ROLE OF THE INSPECTOR AND MANAGEMENT PLANNER IN ASSESSMENT

Inspector assesses the physical condition only; the Management Planner assesses the hazard itself. The Planner reviews the inspector's condition assessment, determines response actions and establishes priorities.

B. REVIEW OF DAMAGE CLASSIFICATIONS AND EXPOSURE FACTORS

(See Section 8):

1. **Significant damage: > 10 % overall or 25% local**
2. **Potential significant damage**
3. **Potential damage**
4. **No Damage**
5. **Nature and extent of existing damage,**
6. **Friability**
7. **Accessibility**
8. **Activity**
9. **Proximity to repair items**
10. **Visibility**
11. **Environmental factors including vibration and water damage**
12. **Use of adjoining space**
13. **Air plenums**
14. **Population exposed**
15. **Interaction between environmental factors such as vibration with building configuration such as accessibility and use of adjoining spaces.**

C. DECISION TREE FOR ASSESSMENT OF ACBM

1. Text of EPA Guidance: (40 CFR 763, E, Section 763.9)

- a. The LEA should select the appropriate response actions consistent with the hazard assessment. Nothing shall prohibit removal of ACBM from a school building at any time, should removal be the preferred response action of the LEA. In selecting the response action, the LEA may consider local circumstances, including occupancy and use patterns within the school building, and its economic concerns, including short and long-term costs.

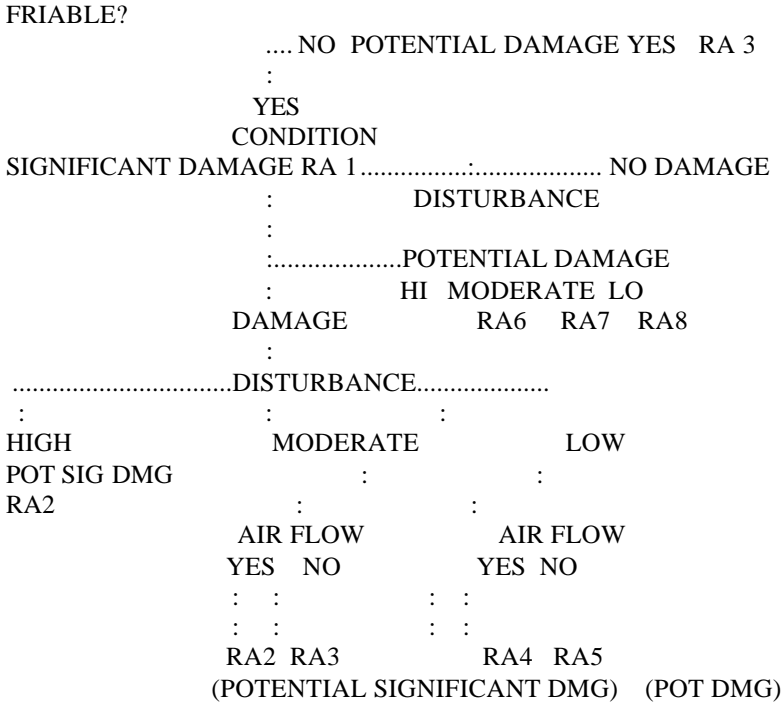
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- b. When there is damaged or significantly damaged thermal system insulation, the LEA shall:
- 1) At least repair the damaged area.
 - 2) Remove the damaged material if it is not feasible, due to either technological factors or economic considerations, to repair the damage.
 - 3) Maintain all thermal system insulation ACBM and its covering in an intact state and undamaged condition.
- c. When damaged friable surfacing ACBM or damaged friable miscellaneous ACBM is present in a building, the LEA will correct the damage with one of the following response actions:
- 1) Encapsulation
 - 2) Enclosure
 - 3) Removal, or
 - 4) Repair of the damaged material.
- d. When significantly damaged friable surfacing ACBM or significantly damaged friable miscellaneous ACBM is present in a building, the LEA will correct the problem area with the following response actions:
- 1) Immediately isolate the functional space and restrict access, unless isolation is not necessary to protect human health and the environment.
 - 2) Remove the material in the functional space, or enclose or encapsulate the damaged material if these actions are sufficient to contain fibers.
- e. When any friable surfacing, miscellaneous, thermal system insulation ACBM, or friable miscellaneous ACBM that has potential for damage is present in a building, the LEA will at minimum, implement an O&M program.
- f. When any friable surfacing, miscellaneous, or thermal system insulation ACBM that has potential for significant damage is present in a building, the LEA shall:
- 1) Design and implement an O&M program.
 - 2) Put in place preventive measures that will eliminate the chance that the ACBM or its covering will become significantly damaged, deteriorated, or delaminated.
 3. Remove the material as soon as possible if the needed preventative measures cannot be implemented. Immediately isolate the area and restrict access if necessary to avoid exposure of the building occupants or the spread of fibers.

The decision tree functions as a flow sheet as illustrated on the pages following.

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2. Decision Tree for Surfacing:

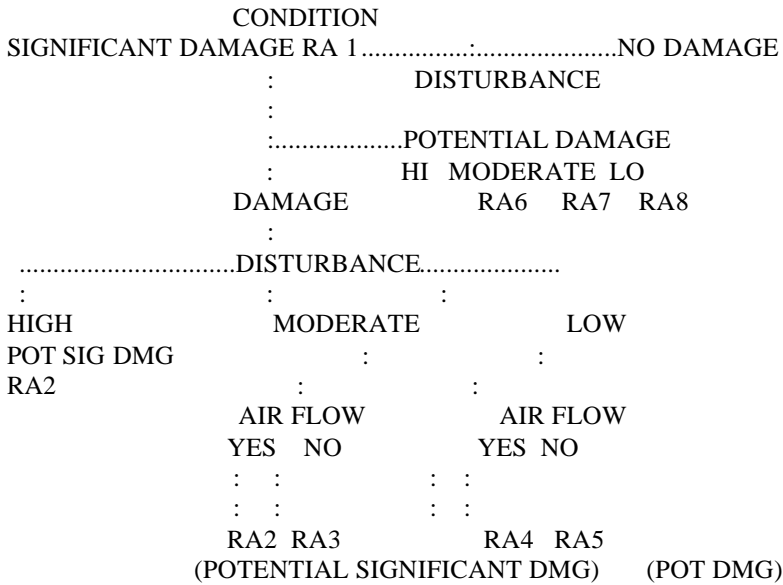


RESPONSE ACTION KEY:

- RA1. ISOLATE AREA AND RESTRICT ACCESS. REMOVE AS SOON AS POSSIBLE.
- RA2. CONTINUE O&M. REMOVE ASAP OR REDUCE DAMAGE POTENTIAL
- RA3. CONTINUE O&M. SCHEDULE REMOVAL WHEN PRACTICAL.
- RA4-5. CONTINUE O&M. SCHEDULE REMOVAL WHEN PRACTICAL. LOWER NUMBER= HIGHER PRIORITY.
- RA6-7. CONTINUE O&M. TAKE PREVENTATIVE MEASURES TO REDUCE DISTURBANCE.LOWER NUMBER= HIGHER PRIORITY.
- RA8. CONTINUE O&M UNTIL MAJOR RENOVATION OR DEMOLITION REQUIRES REMOVAL OR UNTIL HAZARD ASSESSMENT WORSENS.

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3. Decision Tree for Thermal Insulation:



RESPONSE ACTION KEY:

- RA1. ISOLATE AREA AND RESTRICT ACCESS. REMOVE AS SOON AS POSSIBLE.
- RA2. CONTINUE O&M. REPAIR OR REMOVE ASAP OR REDUCE DAMAGE POTENTIAL
- RA3. CONTINUE O&M. SCHEDULE REMOVAL WHEN PRACTICAL.
- RA4-5. CONTINUE O&M. SCHEDULE REMOVAL WHEN PRACTICAL. LOWER NUMBER= HIGHER PRIORITY.
- RA6-7. CONTINUE O&M. TAKE PREVENTATIVE MEASURES TO REDUCE DISTURBANCE. LOWER NUMBER= HIGHER PRIORITY.
- RA8. CONTINUE O&M UNTIL MAJOR RENOVATION OR DEMOLITION REQUIRES REMOVAL OR UNTIL HAZARD ASSESSMENT WORSENS.

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D. OVERVIEW OF RESPONSE ACTIONS:

1. Encapsulation

An asbestos abatement option which means treating ACBM with an encapsulant material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent fiber release. The material may be a penetrant, which penetrates and hardens the asbestos material; or a bridging encapsulant, which covers the surface of the material with a protective coating. Both are applied to the surface of the material using airless spray equipment at low pressure in order to reduce fiber release during applications. Encapsulation is ideal for dusting transite and anything with good anchorage but not good for materials that are delaminating or wet. It is never used on spray on surfacing.

2. Removal

An asbestos abatement option which means stripping ACBM from surfaces and disposal.

3. Enclosure

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

4. O&M

Operations and Maintenance Program: (O&M) means an ongoing program of work practices to maintain friable ACBM in good condition, ensure clean up of asbestos fibers previously released, and prevent further release by minimizing and controlling friable ACBM disturbance or damage.

5. Isolation

A response option which generally includes shutting off of doors and keeping an area vacant until funds are available to conduct abatement.

6. Repair

A response option which returns ACBM to intact state. usually as part of an O&M Program.

E. ADVANTAGES AND DISADVANTAGES OF CONTROL OPTIONS:

1. Removal

a. Advantages:

- 1) Eliminates asbestos source
- 2) Eliminates need for ongoing costs such as O&M.
- 3) Can be used in most situations.

b. Disadvantages:

- 1) High Initial cost
- 2) Improper removal may raise fiber levels.
- 3) Replacement may be necessary.
- 4) May render equipment useless if proper substitute materials are not available.
- 5) May require major destruction of associated or nearby equipment.
- 6) Inaccessible ACBM beyond protrusions usually remains and is invisible.

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2. Encapsulation

a. Advantages:

- 1) Initial costs usually lower than for removal if replacement is avoided.
- 2) Replacement not needed.
- 3) Initial fiber release potential during abatement usually lower than for removal.
- 4) Ideal for strongly bound materials such as transite to prevent surface dusting or erosion.

b. Disadvantages:

- 1) Asbestos source remains and must be removed later.
- 2) Containment barriers, Decontamination Units, Negative Air, etc still needed.
- 3) For surfacing, weight of encapsulant may cause material to fall.
- 4) Repair of damaged or deteriorating surfaces is required before spraying or wrapping.
- 5) Likely to add to cost of later removal.
- 6) Long-term costs could be higher than for removal.
- 7) Inaccessible ACBM remains and is invisible.
- 8) Not suitable for fluffy material, delamination or wet material.
- 9) Needs periodic inspection and repair.

3. Enclosure

a. Advantages:

- 1) Initial costs usually lower than for removal, especially if enclosure is planned part of renovation.
- 2) Reduces exposure in area outside enclosure.
- 3) Usually replacement not required.
- 4) Ideal for isolated areas such as crawl spaces which do not need to be accessed.
- 5) Disturbance in enclosed area is unlikely.

b. Disadvantages:

- 1) High Initial cost if major changes are needed such as relocating fixtures and utilities.
- 2) Asbestos source remains and must be removed eventually.
- 3) Difficult or impossible access for periodic reinspection.
- 4) Fiber release can continue behind enclosure.
- 5) Long-term costs could be higher than for removal.
- 6) Inaccessible ACBM remains and is invisible.
- 7) Not suitable for ceilings when severe damage or water damage is evident.

4. O&M

a. Advantages:

- 1) Initial cost always lower than abatement
- 2) Reduces exposure risk if properly conducted.
- 3) Ideal for systems which have ACBM in good condition.

b. Disadvantages:

- 1) Continued Ongoing cost.
- 2) Asbestos source remains and must be removed eventually.
- 3) Long-term costs may be higher unless abatement can be postponed until renovation or demolition.
- 4) Ongoing liability.
- 5) Not suitable where damaged material exists which can't be repaired.

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F. WORK PRACTICES FOR RESPONSE ACTIONS:

1. Abatement Projects, Removal, Encapsulation and Enclosure:

a. Project Defined:

Work involving ≥ 3 square or 3 linear ft of ACM in a facility at about the same time.

b. Air Monitoring and Final Clearance Testing:

1) EPA Mandatory Final reoccupancy Testing

- a) TEM clearance must not be provided by the Asbestos Contractor
- b) Surfaces dry,
- c) Visual inspection - no visible residue may remain.
- d) Final air samples collected Aggressively

1)) PCM may be used if the work involves less than 160 sq ft of ACBM or more than 260 linear ft of ACBM

a)) At least 5 samples must be taken in each Work Area.

b)) Each of 5 aggressive air samples in the Work Area must have a concentration of 0.010 fibers/cc or less.

2)) For larger areas TEM must be used.

a)) Air monitoring volumes must be at least 1200 liters

b)) The average of samples in the work area must be less than 70 structures/sq mm or be statistically lower than an equal number of samples taken non aggressively outside the work area.

2) Federal OSHA Requirements CFR 1926.1101 (Contractor mandatory daily personal air samples):

- a) 30 min excursion limit samples
- b) 8 hour time-weighted average concentration samples.
- c) Results recorded at the work site within 24 hours
- d) Lab Requirements:

1)) Must participate in the NIOSH PAT Program for Asbestos

2)) Training in NIOSH 582 for analysts.

3)) Interlab QC program with at least 3 other labs besides PAT rounds.

3) All samples by PCM, NIOSH Method 7400, except for finals when TEM is required.

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4) State of Connecticut requirements

- a) AIHA Accredited Lab for final samples.
- b) Connecticut Approved Public Health Laboratory.
- c) Collected by Accredited Supervisor / Monitor.

5) Optional Recommended Sampling

- a) Pre-Abatement Air Sampling to establish prevalent ambient air concentrations under normal building activity before Abatement work.
- b) During Abatement Monitoring representative of the air outside the Decontamination Enclosure System (Decon), and Negative Air Unit exhausts and other locations.

c. Notifications in CT

- 1) DPH >10 linear or 25 sq ft or any demolition
- 2) DEP for disposal in the State of Connecticut

d. Accreditation and Training Requirements:

- 1) Accreditation and training: (4 days for workers and five days for supervisors and monitors)
- 2) Respirator training, fit testing, and medical surveillance required by 1926.1101.
- 3) Fire, electrical, emergency evacuation and OSHA Hazard Communication.

e. Personal Protection:

(OSHA as described in 29CFR 1910.134 and 1926.1101 for Asbestos.)

- 1) Protective clothing and respirators until the Final Clearance Tests successfully completed.
- 2) Posting signs to comply with OSHA 1926.1101.
- 3) Controlled Work Area
- 4) Site log.

5) Decontamination procedures

- a) HEPA Vacuum gross contamination from protective clothing
- b) Equipment Room- remove all clothing except respirator, and
- c) Shower
- d) Clean(change) Room

6) Hygiene Practices- No smoking, drinking, eating, or chewing.

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f. Work Operations:

- 1) Precleaning
- 2) Critical Barriers
- 3) HEPA filtered Negative Air flow
- 4) Containment .
- 5) Removal, Encapsulation, or Enclosure
- 6) Final Clearance Testing.
- 7) Proper disposal

g. Materials

- 1) Polyethylene sheet, 2 layers:
 - a) 4-mil thickness for walls
 - b) 6-mil thickness for floors must be used.
- 2) Polyethylene bags, 6-mil.
- 3) Duct tape and spray glue
- 4) Surfactant for Amended Water
- 5) Asbestos-free replacement materials and according to codes.
- 6) Signs, OSHA 1926.1101.

h. Tools and Equipment

- 1) Spray equipment
- 2) Impermeable waste containers with OSHA labels
- 3) Personal Air Monitoring equipment
- 4) Protective clothing
- 5) Respirators
- 6) Grounded power cables, and GFCI units,
- 7) HEPA vacuums
- 8) HEPA Negative Air Units to cause at least four air changes/ hour
- 9) General Construction equipment
- 10) Shower decontamination enclosures, with water filtration units

i. Preparation of the Work Areas:

- 1) Where necessary, electric power shut down.
- 2) Shut down and isolate HVAC
- 3) Critical Barriers - Separate Work Areas from non work Areas with 6-mil polyethylene.
- 4) Set up Decontamination units (Decons) and Negative Air Units
- 5) Plasticize flooring and wall surfaces
- 6) Emergency exits must be maintained.

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j. Removal Procedures:

- 1) Spray with Amended Water using airless sprayer
- 2) Strip and bag the wet Asbestos waste
- 3) Seal filled containers with the wet Asbestos waste in the Work Area.
- 4) Wet clean the outside of the sealed bag and double bag.
- 5) Package wastes in impermeable dust tight containers
- 6) All containers labeled in large legible letter:

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

- 7) Wet clean to remove all visible material.
- 8) HEPA vacuum.
- 9) Apply Encapsulant to cleaned surfaces and to plastic barriers

k. Encapsulation:

(\geq 3 linear or 3 square feet of Asbestos material is Abatement project)

- 1) Encapsulant: liquid material applied to ACM, Controls possible release of Asbestos fibers
 - a) Bridging Encapsulant- membrane over the surface
 - b) Penetrating Encapsulant- Penetrates into ACM and binds its components together
- 2) Encapsulation Procedure:
 - a) Remove damaged, loose, or hanging areas of ACM
 - b) Place in sealable plastic bags for transport.
 - c) Repair damaged areas using Asbestos free replacement material.
 - d) Apply final spray with Encapsulant using an airless sprayer.
- 3) Applications:
 - a) Good for cohesive, hard ACM such as transite or ACM located in inaccessible areas.
 - b) Not useful if the ACM has poor adhesion or cohesion or subject to water damage.
 - c) Generally not applicable where vibration can continually deteriorate the physical condition of the material.
 - d) Always consult the encapsulant manufacturer as for example whether to use a bridging or penetrating encapsulant.
- 4) Properties of an ideal encapsulant:
 - a) Impact, chemical, oil, heat, abrasion resistance
 - b) Resistant to water damage
 - c) Flexible
 - d) Water dispersible and sprayable
 - e) Non-toxic
 - f) Non-flammable
 - g) Impervious to vapor
 - h) Compressive Strength
 - i) Dry to touch in 2 to 3 hours

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I. Enclosure

- a) Physical barriers are constructed between ACBM and building occupants such as ceilings, walls, PVC or aluminum tubing.
- b) Rarely used alone. When feasible, materials may be first encapsulated.
- c) Work practices will vary according to the configuration of the area. For example minimal set up is required if the enclosure consists of sealing the end of a pipe tunnel but the usual area preparation must be done if the work involves disturbance of ACM.

m. Final Clearance Testing

- 1) After cleaning make a visual inspection. If satisfactory the first layer of plastic may be lightly misted and removed. If work is incomplete or that there are visible accumulations of residue, repeat the cleaning until the Work Area is in compliance.
- 2) After successful completion of the visual inspection, apply Encapsulant (lockdown) i.e., apply a thin coat of Encapsulant to cleaned surfaces and to plastic barriers.
- 3) Allow the Work Area to dry at least overnight and then remove the cleaned second (outer layer) of plastic from walls and floors except for Critical Barriers. The windows, doors and HVAC vents must remain sealed and any Negative Air Units and Decons must remain in operation.
- 4) Perform a final cleaning using wet wiping and HEPA vacuuming as appropriate.
- 5) The area is now ready for reoccupancy testing (See air monitoring above.)

n. Disposal (See OSHA, NESHAP and DEP Regulations).

- 1) EPA Approved landfill
- 2) Air tight, double container, wet waste
- 3) OSHA and NESHAP labels
- 4) Manifests and dump receipts

2. O&M Scale Work: (See In-House Procedures below.)

G. STAGING AND PRIORITIZING OF WORK IN BOTH VACANT AND OCCUPIED BUILDINGS

1. Prioritize According to Decision Tree Requirements

- a. Plan the work in order of priority according to the decision tree requirements above when school is not in session.
- b. Consider grouping the work in adjacent areas or additional ACBM in the same area.

For example, 20 sq ft of pipe risers in a classroom may be significantly damaged. This room and two adjacent rooms are scheduled for complete renovation within 2 years and the asbestos floor tile will need to be removed as part of the renovation. The LEA will save money in the long run if he schedules the floor tile removal at the same time as the pipe risers.

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2. The need for Containment Barriers

a. The "Work Area" is an area where Asbestos Abatement operations are performed which is isolated by physical boundaries, "Containment" to prevent the spread of Asbestos fibers.

- 1) Sealed with plastic barriers
 - a) Wall and floor covering
 - b) Critical Barriers
- 2) Equipped with HEPA filtered negative air
- 3) Equipped with a Decontamination Enclosure System.

b. The Containment is the primary means to confine airborne fibers to the Work Area.

- 1) Negative air HEPA filter draws air into the work area and discharges filtered air outside. This flow creates a negative pressure in the work area which combined with the air tight containment keeps the fibers inside.
- 2) Decontamination unit includes a dirty area, a shower and a clean change area through which workers must exit to prevent tracking of contamination into non work areas and bringing fibers out on clothing and person.

3. Determine Resources Needed

a. Whether O&M Scale or Abatement Project

1) Abatement Project:

(involving 3 linear or 3 sq ft. of ACBM or more) must be designed and conducted by persons accredited to design and conduct response actions. A containment area must be constructed with negative air pressure and full decontamination and worker protection. Final aggressive air sampling is required.

2) O&M scale work:

Short duration small scale response actions applies to a single area to be repaired with less than 3 linear or 3 sq ft. of ACBM. O&M scale work must be done at least by trained and equipped O&M personnel as specified under O&M in section 15 below. Specifications are not required. The Planner must be sure to include instructions for carrying out O&M scale work in the Management Plan.

b. Time needed to do the work

- 1) Availability of non-school hours- Will a night, weekend etc be sufficient.
- 2) Potential for temporary repair until time is available

c. Cost of project

- 1) Is money available for the entire project?
- 2) Can urgent repairs be done until money is available?

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4. Temporary Measures:

(When time or funds are not yet available)

- a. Repair:
- b. Isolation- close off space affected and use alternate spaces.
- c. Shut down of facility:
 - 1) Hazard exists
 - 2) No other option available.

5. Vacant Buildings:

- a. Same regulations apply since the building is to reoccupied in the future except:
 - 1) When immediate demolition is to occur and
 - 2) No one will re-enter, even construction workers.
- b. Modifications such as alternate work practices are more feasible.
- c. There is reduced hazard to occupants since there is time to react to inadvertent contamination.

H. FINANCING ABATEMENT OPTIONS, ECONOMIC ANALYSIS:**1. Resource Evaluation:**

a. Plan Requirements:

The Plan must indicate the resources available to the school which should be sufficient to successfully carry out:

- 1) Response actions
- 2) Reinspections
- 3) O&M Activities
- 4) Periodic surveillance
- 5) Training:

b. Resources to List:

- 1) Outside professionals
- 2) In house staff
- 3) Equipment
- 4) Budget which would be available

c. Cost Estimates Given for Viable Response Actions:

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2. Development of Cost Estimates:

a. Small areas add \$3-500 plus square foot costs

b. Typical Cost Averages Including Disposal:

1) Removal:

- a) Pipe insulation: \$14/sq ft , \$4-5/sq ft replacement
- b) Surfacing and large vessels: \$20/square ft, \$7/ft replacement
- c) Floor tile removal: \$3-4/square ft, Replacement \$2.25/sq ft
- d) Floor tile mastic removal from concrete add \$2 /sq ft. No replacement cost.
- e) Drop ceiling tile panel removal \$2 /sq ft. \$.50 replacement cost.

2) Encapsulation:

Similar cost to removal because of containment costs but the cost of replacement is eliminated.

3) Enclosure

Construction costs plus cost of any encapsulation needed.

4) O&M

Typical cost is \$1000-3000/year for a small system of 6 schools, either separately or in addition to one of the above actions.

5) Repair :

Repair cost is typically \$50-100/sq ft because of the small areas involved.

c. Escalation factors

- 1) Work 10-20 ft high 1.15
- 2) Work >20 ft high 1.3
- 3) Off hours 1.3
- 4) Emergency response 1.3
- 5) Confined space 1.15
- 6) Additional layers of flooring 1.3 per layer
- 7) Live steam lines or hot areas 1.3
- 8) Exterior work 1.3
- 9) Amosite 1.15
- 10) Dirt floor 1.1
- 11) Rush work (limited window of time): 1.15
- 12) Phased work 1.1

d. Stored material: add labor to remove

- 1) Contaminated: \$70/man hour
- 2) Uncontaminated: In house staff may be used

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3. Present Costs of Abatement vs Future O&M and Abatement Costs:

- a. Present value calculations including inflation and interest rates
- b. Building Plans for renovation
- c. Life expectancy of the building
- d. Potential increased or decreased costs due to more stringent regulations or less stringent regulations
- e. Seasonal cost variables.

4. Obtaining Funds:

- a. State of CT Bureau of Grants Processing
- b. ASHAA Contact Regional Asbestos Coordinator.

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SECTION 15

OPERATIONS AND MAINTENANCE

A. PURPOSE OF THE O&M PLAN:

1. Overview:

The O & M Plan is intended as a system of interim control measures and maintenance to avoid asbestos contamination. As long as friable ACBM remains in the building, an O&M program is needed to maintain ACBM in intact and undamaged condition. The AHERA Regulations state that:

"The local education agency shall implement an operations maintenance, and repair program... whenever any friable ACBM is present in a building that it leases, owns, or otherwise uses as a school building. Any material identified as non-friable ACBM must be treated as friable ACBM... when the material is about to become friable as a result of activities performed in the school building."

An O&M program includes protection of workers, worker training, scheduling of periodic surveillance, initial cleaning, and other necessary O&M activities. Proper maintenance, re-inspection, and periodic monitoring are often the most cost effective solutions for managing asbestos hazards.

2. Purpose:

- a. Clean up asbestos fibers previously released
- b. Prevent future release by minimizing ACBM disturbance or damage
- c. Monitor the condition of ACBM and maintain ACBM in good condition.

B. DISCUSSION OF APPLICABLE EPA GUIDANCE DOCUMENTS

1. EPA OTS TS 799, JULY 1990, "MANAGING ASBESTOS IN PLACE, A BUILDING OWNER'S GUIDE TO OPERATIONS AND MAINTENANCE PROGRAMS OF ASBESTOS-CONTAINING MATERIALS"
2. "Asbestos Exposure Assessment in Buildings" Inspection Manual October 1982
3. "Simplified Sampling Scheme for Friable Surfacing Materials" EPA 560/5-86-030A, Oct 1985
4. "A Guide to Performing Reinspections under the Asbestos Hazard Emergency Response Act (AHERA).", EPA 700/B 92/001 February 1992

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C. ACTIONS TO BE TAKEN BY CUSTODIAL AND MAINTENANCE STAFF:

1. Proper Cleaning Procedures:

The procedures must be specified in the Plan:

a. Initial Cleaning:

1) Once friable ACBM has been identified initial cleaning must be done before any response action is begun (other than O&M).

2) AHERA requirements for initial cleaning:

a) Steam or HEPA clean all carpets.

b) HEPA vacuum or wet clean all other floors and all other horizontal surfaces.

c) Dispose of all debris, filters, mopheads, and cloths in leak tight containers for proper disposal.

b. AHERA Requirements for Additional Cleaning:

The Planner is required to include the requirements for additional cleaning in the Plan. He must also include in the Plan the response by the LEA to the requirements specified.

2. Other Procedures (Examples):

1) For maintaining asbestos containing floor tile, wet mop and keep waxed. Do not use abrasive cleaning materials such as steel wool pads on power buffers.

2) No ordinary vacuums or dry cleaning in ACBM areas

D. REDUCING DISTURBANCE OF ACM

1. Training

2. Periodic Surveillance

3. Preventative Measures

4. Proper Boiler Room Maintenance

5. Signs

E. SCHEDULING O&M FOR OFF HOURS.

1. Routine Operations for Off Hours:

a. Maintenance and surveillance above drop ceilings where ACBM exists.

b. Maintenance in Isolated damaged ACBM areas such as tunnels, closed off rooms, crawl spaces and attics.

c. Changing filters in HVAC

d. Any other non emergency work which may disturb ACBM.

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2. Emergency repairs:

- a. During school hours: limit to emergency procedures such as:
 - 1) Isolating the areas
 - 2) Evacuation of occupants
 - 3) Shut down of local HVAC
 - 4) Emergency cleaning.
- b. After school hours: the work can be completed.
- c. Emergency Projects: Asbestos abatement professionals should be available to respond on short notice first.

F. RE-SCHEDULING OR CANCELING RENOVATION IN AREAS WITH ACM

1. Controlling Maintenance, Repair and Remodeling:

- a. Approval Process:
 - 1) Direct approval needed prior to mechanical work.
 - 2) First determine whether the work will disturb ACBM.
 - 3) If not, document that the work did not involve any ACBM.
 - 4) If ACBM is involved, use an Asbestos Work Order (sample to follow).
 - 5) Size up work to determine how much ACBM may be disturbed and whether O&M Personnel or outside Accredited Abatement Persons are needed.
- b. Training:

O&M, Maintenance and custodial employees should be instructed as part of their training to avoid disturbing Asbestos materials during maintenance work.
- c. Inspection:

All building work should be monitored.

2. Schedule Abatement work before Renovation.

3. Cancel Renovation work if abatement is not feasible.

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GENERAL BUILDING WORK AUTHORIZATION

DATE: _____

Building Name: _____

DESCRIBE THE WORK TO BE PERFORMED: _____

IDENTIFY THE ORGANIZATION OR INDIVIDUAL(S) WHO WILL PERFORM THE WORK: _____

IDENTIFY THE SPACE(S) INVOLVED IN THIS WORK: _____

ASBESTOS COORDINATOR'S AUTHORIZATION MUST BE SIGNED PRIOR TO COMMENCEMENT OF WORK.

I HEREBY CERTIFY THAT, ACCORDING TO THE RECORDS, THE ABOVE DESCRIBED
ACM-SPACE(S) DO NOT CONTAIN ASBESTOS CONTAINING BUILDING MATERIALS.

Signature

Title

date

OR

THE ABOVE IDENTIFIED ACM-SPACES(S) CONTAIN ASBESTOS CONTAINING BUILDING MATERIALS, AND
THE WORK MUST BE UNDERTAKEN IN ACCORDANCE WITH ALL APPLICABLE HEALTH AND SAFETY RULES AND
REGULATIONS BY LICENSED AND ACCREDITED PERSONS.

Signature

Title

Date

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G. BOILER ROOM MAINTENANCE:

1. Signs posted to identify ACBM.
 2. Keep door locked
 3. No ladders leaning on ACBM
 4. Do not use as storage area
 5. Do not walk on boiler and tanks
 6. Do not use normal vacuum cleaner- Use HEPA vacuum or wet clean area
 7. Inspect regularly
 8. Repair small tears in insulation promptly
 9. Do not paint or duct tape ACBM
 10. Use approved materials and procedures for repair
 11. Call Accredited contractor for any ACBM work of 3 sq or lin ft. or more
12. Report problem ACBM areas for scheduled removal or repair such as:
- a. High use valves
 - b. Possible corroded areas
 - c. In the way of travel or of routine work
 - d. Showing signs of damage or deterioration.

H. PROPER WASTE DISPOSAL

1. Waste Materials:

- a. ACBM wastes
- b. Used suits
- c. Cleaning materials such as rags and mops.
- d. Any contaminated objects which cannot be cleaned.

2. Packaging:

- a. Sealed leak tight containers, Double contained
- b. Thoroughly wet
- c. Properly labeled (OSHA labels)
- d. See Glovebag instructions below.

3. Storage:

- a. Secure locked area
- b. Out of the way of accidental contact
- c. Not with other stored wastes or materials
- d. Do not reopen to add more waste; use fresh containers.
- e. Store up to several bags before contacting disposal contractor.

4. Transport and Disposal:

- a. DOT certified driver
- b. Manifests per NESHAP regulations
- c. EPA approved landfill.

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I. IN HOUSE PROCEDURES: WORK PRACTICES FOR O&M SCALE WORK:

1. General:

- a. < 3 sq ft or 3 lin ft of ACM vs 16 hour training
- b. Isolate area
- c. Workers wear respirator and other protective clothing.
- d. Signs
- e. HVAC protected
- f. Wet methods and HEPA vacuum
- g. Proper disposal in sealed containers

2. Glovebag technique:

- a. Insulated sections of pipes especially a fitting.
- b. Bag assembly sealed over a pipe section and pipe insulation is then removed from within the bag using wet methods.
- c. Glovebag becomes part of the disposal package.
- d. Two properly trained and equipped persons are required
- e. Materials

6-12 mil bag fitted with long-sleeved gloves and a tool pouch.

Water sprayers with Amended water and Encapsulant

Duct tape

Polyethylene disposal bags (six mil)

HEPA vacuum cleaner

Removal tools including bone saw, stapler, knife, scrapers, brushes, wire cutters and rags.

Polyethylene plastic (6 mil)

Respirator and disposable suits with hood and feet covering

Diplag or comparable wettable cloth

signs and labels

Reinsulation materials

Smoke tube kit

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f. Procedure:

- 1) Follow the manufacturer's directions where applicable. Use respirator and suit.
- 2) Isolate the area and post warning signs on the perimeter.
- 3) Shut down or modify the HVAC serving the work area.
- 4) Mix the surfactant with water in the sprayer.
- 5) Secure adjacent pipe as needed.
- 6) Clean up debris on the floor and other surfaces and cover the floor with 6 mil poly.
- 7) Wrap duct tape at the boundaries of the work
- 8) Slit the top of the glovebag open (if necessary), and cut down the sides to accommodate the size of the pipe with about two inches to spare.
- 9) Place the tools into the pouch in the glovebag including some pre-cut wettable cloth to fit the exposed insulation ends.
- 10) Place one strip of duct tape along the edge of the open top slit of the glovebag for reinforcement when stapling.
- 11) Place the glovebag around the section of pipe to be worked on, and staple the top together through the tape at intervals of about one inch.
- 12) Fold the stapled top flap back, and tape it down with a strip of duct tape to seal along the top.
- 13) Tape the ends of the glovebag to the pipe.
- 14) Smoke test the bag for leaks. If leaks are found, tape closed using duct tape and re-test with smoke.
- 15) Insert the wand from the water sprayer through the bag and tape tightly around the wand. One person works with the gloves while the second person directs the water spray at the work.
- 16) Cut the pipe cover with the appropriate tool. Use the bone saw to cut the insulation at each end of the section to be removed.
- 17) Slit the insulation from end to end using the knife along the bottom of the pipe.
- 18) Lift the insulation off the pipe and gently place it in the bottom of the bag.
- 19) Scrape and scrub off pipe, clean tools and place in pouch.
- 20) Encapsulate the ends using a bridging or penetrating encapsulant as appropriate. Moisten and wrap the wettable cloth over the exposed ends of the insulation.
- 21) Remove the water wand from the water sleeve, and attach the HEPA vacuum. Turn on the vacuum just long enough to collapse the bag)

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- 22) Remove the vacuum, dry the plastic around the opening and seal the opening with duct tape)
- 23) From outside the bag, twist the tool pouch section) Place duct tape over the twisted portion and then cut the plastic at the tape to separate the tool bag from the glovebag.
- 24) Discard washing, rags brushes with the asbestos waste.
- 25) Twist the bag several times, tape it and slip a six mil disposal bag under the glovebag. Open the top of the glovebag and fold it gently into the disposal bag.
- 26) Twist the top of the bag closed, fold over, and seal with duct tape.
- 27) HEPA clean any residue on the floor plastic, lightly mist and combine with the wastes.
- 28) Wet clean or HEPA vacuum the work area.
- 29) After cleaning is complete, remove the disposable suits, place in a waste bag, seal closed as above and contain in an outer waste bag.
- 30) HEPA vacuum the exterior of the respirator and leave the work area. Remove the respirator)
- 31) Store waste in a secure area until it can be properly disposed of.

3. Encasement Applications: For shielding pipe in good condition:

- a. Metal sleeves
- b. PVC
- c. Canvas wet wraps
- d. Muslin with straps
- e. Fiber mesh cloth

4. Replacement Materials:

- a. Fiberglass
- b. Calcium Silicate
- c. Mineral wool
- d. Insulating cement

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J. EMPLOYEE TRAINING

1. Training Requirements for O&M Workers: (Only up to \leq 3 sq ft or 3 lin ft of ACBM involved)

- a. 16 hour training: Hands-on training is essential
- b. Two hour awareness training and 14 hours additional training.
- c. Need not be obtained at an EPA training center, but it is preferred.
- d. Instructor should be qualified to teach the subject matter
- e. Must cover information on:
 - 1) Health effects
 - 2) How to recognize ACBM and damaged ACBM
 - 3) How to handle ACBM
 - 4) Use of respirators and protective suits
 - 5) Proper disposal
 - 6) Use of glovebags and mini containments
 - 7) Use of HEPA vacuum and Lockdown sprays
 - 8) General removal, repair and cleaning techniques.

2. Custodial and Maintenance Workers: (not authorized to disturb ACBM.)

- a. Minimum of two hours awareness training
 - 1) Prior to implementation of the O&M program
 - 2) Regardless of actual job functions
 - 3) New custodial and maintenance employees shall be trained within 60 days after commencement of employment.
- b. This two hour training must include:
 - 1) Information regarding asbestos and its various uses and forms.
 - 2) Information on the health effects associated with asbestos exposure.
 - 3) Location of ACBM identified in the school building in which they work.
 - 4) Recognition of damage, deterioration, and delamination of ACBM.
 - 5) Name and phone number of the Asbestos Coordinator and Site Manager.
 - 6) The Availability and location of the Management Plan.

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2. Symptoms:

- a. Debris in building areas where ACBM is located
- b. punctures, gaps or delamination .

3. Procedures:

a. Minor Fiber Release Episode:

- 1) Limit access to the area
- 2) Protect air inlets and returns
- 3) Call the Asbestos Coordinator at once.
- 4) Respirator and a disposable suit used.
- 5) HEPA vacuum any visible residue.
- 6) Thoroughly mist the debris area with a fine spray of amended water.
- 7) If debris is continuing to fall from the damaged area, it may be first necessary to repair or clean the damaged area before completing the wet wiping.
- 8) Always inspect adjacent areas for early signs of failure.
- 9) Determine the cause of the damage, if possible, and report in table on Section 10, page 12 of the sample management plan. The Asbestos Coordinator may decide to recommend preventative measures to avoid further damage.
- 10) Before leaving any work area, remove disposable suit after a thorough HEPA vacuuming.
- 11) Discard ACBM wastes properly.

b. Major Fiber Release Episode:

- 1) Restrict access and call the AMP coordinator at once. Emergency evacuation is appropriate if it is believed that fibers have been dispersed to occupied areas. Notify DPH within 24 hours.
- 2) Post signs to prevent entry into area by unauthorized persons.
- 3) Shut off or temporarily modify the air handling system, as applicable to prevent the distribution of fibers to other areas in the building.
- 4) The Response Action for any major fiber release episode must be designed by Accredited Asbestos Abatement Project Designer and conducted by Accredited Asbestos Abatement Persons.

M. PERIODIC SURVEILLANCE:

1. Frequency: Every 6 months after the Plan is in effect

2. Scope: All areas that contain ACBM

3. Qualifications of investigator:

The person conducting periodic surveillance does not have to be an Accredited Inspector, but he should be familiar with the building and the ACBM in order to accurately detect any changes in the condition of the ACBM.

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4. Records:

The following information must be recorded:

- a. Date of surveillance.
- b. The name of the person conducting the surveillance.
- c. Any observable changes in the condition of ACBM.

N. POSTING OF SIGNS IN ROUTINE MAINTENANCE AREAS.

1. Specify how and where: as for example:

- a. Warning labels must be attached immediately adjacent to all ACBM in Routine Maintenance areas. The labels should be easily read because of large size or bright color which say: "CAUTION: ASBESTOS. HAZARDOUS. DO NOT DISTURB WITHOUT PROPER TRAINING AND EQUIPMENT."
- b. A list of specific areas needing warning labels should be developed for each school by the Management Planner.
- c. Each type of material must be labeled repeatedly so that there is no doubt that these are Asbestos materials. Brightly colored 3 x 5 inch self adhesive labels spread out in each location would be suitable.

2. Specify Ongoing Protection of Signs: as for example:

Signs checked during periodic surveillance to see that they remain legible and in place.

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SECTION 16

CASE STUDY IN DEVELOPING AN O&M PLAN

A. DEVELOPING THE O&M PROGRAM:

1. Appoint Program Manager (AMP Coordinator)

- a. Proper training and qualifications-
- b. Authority to act

2. Establish Authority and Responsibilities, e.g. who does:

- a. Training
- b. Surveillance
- c. Posts signs
- d. Writes annual notification letter
- e. O&M staff vs outside professionals
- f. Control of maintenance and renovation
- g. Maintenance of Paperwork
- h. Arrangements for Response Actions

3. Establish Written Procedures per Section 15.

4. Establish Checking and Review Process

B. IMPLEMENTING THE O&M PROGRAM:

1. AMP Coordinator:

- a. Establish Written Time Table for Each Activity (vs the Name of the person to do the work).
- b. Follow up to see that the work is accomplished.
- c. Take any Corrective Action Needed

2. Order and Place Signs.

3. Order Training Services and Needed Supplies:

- a. 2 hour awareness:
 - 1) Prepare a roster of all maintenance and custodial employees with their job title and date of hire.
 - 2) Arrange for interpreters as needed to ensure all understand the material
 - 3) Schedule the work at the school where the individuals work
- b. 16 Hour training:
 - 1) Cost analysis -occasional outside professionals vs in- house staff.
 - 2) Order equipment or outside services.
 - 3) For in-house staff, develop respiratory program.

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4. Set up Ongoing Work:

- a. Surveillance
- b. Cleaning
- c. Notifications
- d. Response Actions

C. PROBLEMS THAT HAVE BEEN EXPERIENCED:

1. LEA did not carry out follow up work adequately.

a. Training and record keeping:

- 1) Failure to do initial 2 hour awareness training.
- 2) Failure to train new employees
- 3) Failure to keep records at each school of all training activities

b. Surveillance:

- 1) Not done
- 2) Probably done but not documented
- 3) Documented but not effectively done.

c. Post signs

- 1) Not done
- 2) Probably done but signs deteriorated or removed

d. Annual notification letter

- 1) Not done
- 2) Probably done but no copy in file

e. O&M staff activities

- 1) Inadequate records of repair work
- 2) Inadequate repair work

f. Control of maintenance and renovation

- 1) Inadequate or no control over contractors and utility company work
- 2) Asbestos considered at last minute resulting in budget problem.

g. Maintenance of Paperwork

- 1) Records not easy to find, should be organized in a master binder
- 2) Records sent to each school but cannot be always found. No transmittal records kept. No control to prevent users of documents from taking away or mis-filing documents.

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h. Arrangements for Response Actions

- 1) Specifications not done by Accredited project designer.
- 2) Records of response actions incomplete.

2. Principal Causes of Problems:

- a. Inadequate Mention in Plan
- b. Plan too confusing
- c. LEA chain of command problems
- d. Retirement or other loss of key individuals
- e. Inadequate funding
- f. Inadequate training.
- g. Inadequate ACBM locations given in inspection report

D. CASE STUDY:

In the pages to follow is an exercise which shows summarized field inspection data and an O&M Plan. The student is to review this plan and list deficiencies.

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For initial training, Insert Mackrille management plan at the end, 2002

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REINSPECTION:

A. GENERAL:

1. See copies of EPA guidance and regulations in the Handout on W.W.W.Chem-scope.com.
2. The purpose is to find out what has changed since the last inspection.
3. You must re- assess all ACBM.
 - a. Friable ACBM
 - b. Non-Friable ACBM which may have become friable.
4. Look for anything that was missed on the first inspection, new building additions and renovations.
5. Complete paperwork on the site.
6. Name of School, Inspectors name and date on every page
7. Number your pages and indicate how many pages there are on the first page.
Check for completeness. Bind all the pages together.
8. Be prepared to do some sampling in case you find something new.

B. PREPARATIONS:

1. Find out which schools are available. At the same time, obtain the holiday schedule and hours of availability for each building.
2. Make copies of the prior inspection data:
 - a. Site narrative
 - b. list of homogeneous sampling areas
 - c. list with location of ACBM
 - d. Floor plans showing sampling and ACBM locations
 - e. Prior Hazard assessment for each ACBM area

Stamp as extra copies.

Remember if anyone writes new data on any of these pages, they are no longer extra copies and the extra copy stamp must be lined out. Write any new information in red ink.

3. Set a schedule and assign each inspector a list of schools to do. The inspector is responsible for each school he is assigned to.
4. Arrange for access.
Try for holidays and weekends at schools where someone is there or Reinspection can be done during weekdays also. Don't sample in occupied areas.

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REINSPECTION: 2.

C. PROCEDURE

1. Systematically walk the building, working from the drawings and the site narrative. If all is correct, write on the top of the page "No change".
2. Locate the ACBM listed and assess. Verify the assessments are correct and if so, write on the top of each assessment form. "No change"
3. All documents, drawings and notes related to the inspection must have the following common minimum information:
 - a. Name of the School Building
 - b. Date of the Re-Inspection
 - c. Name(s) of the Inspectors of that date.
4. Only one name for one area or space at a location uniformly on drawings and all documents where the space is mentioned and no other ambiguity as to the identification of a space.
5. Only one name to describe a homogeneous sampling area of material.
6. Neat, at least legible documents.
7. Make sure all signs are placed in routine maintenance areas.
8. List any newly discovered ACBM assume or sample on the list of homogeneous sampling areas. Take any new samples as needed using the usual paperwork.
9. Red ink any corrections on the assessment sheets.
10. If the site narrative disagrees with the present building, red ink in the changes use additional sheets as needed. For example room 222 was originally listed as having green 9x9 floor tile and now has carpet. Look under the carpet and see if the tile is still there; if so red ink "carpet over".

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Times	Topics
8:00AM - 9:00 AM	Registration and Introduction including student sharing
9:00AM - 9:05 AM	Break
9:05AM - 10:15 AM	Review and discussion of changes in and interpretation of applicable state and federal laws, regulations, policies and guidelines
10:15AM-10:20 AM	Break
10:20AM-11:00 AM	Review and discussions of changes, developments or changes in state-of the art procedures and equipment
11:00AM-11:05 AM	Break
11:05AM-12:00 PM	(MAIN) Review of key areas of initial training specific to each discipline (this is done with unique hands on excersizes including assignments, crossword puzzles, interactive games such as "Are you smarter than your class mates", picture field trips with discussions, videos from recent job sites, purchased videos, youtube videos, "field-trips" to job sites when appropriate and safe for the students, review of recent training center emails on important topics, discussion of interesting, challenging situations participants have encountered. Discussion of unique regulatory interpretations from CT DPH, EPA and OSHA that participants have encountered.
12:00PM-1:00PM	Lunch
1:00PM-2:00PM	(MAIN) Review of key areas of initial training specific to each discipline (this is done with unique hands on excersizes including assignments, crossword puzzles, interactive games such as "Are you smarter than your class mates", picture field trips with discussions, videos from recent job sites, purchased videos, youtube videos, "field-trips" to job sites when appropriate and safe for the students, review of recent training center emails on important topics, discussion of interesting, challenging situations participants have encountered. Discussion of unique regulatory interpretations from CT DPH, EPA and OSHA that participants have encountered.
2:00PM-2:05PM	Break
2:05PM-2:35PM	(MAIN) Review of key areas of initial training specific to each discipline (this is done with unique hands on excersizes including assignments, crossword puzzles, interactive games such as "Are you smarter than your class mates", picture field trips with discussions, videos from recent job sites, purchased videos, youtube videos, "field-trips" to job sites when appropriate and safe for the students, review of recent training center emails on important topics, discussion of interesting, challenging situations participants have encountered. Discussion of unique regulatory interpretations from CT DPH, EPA and OSHA that participants have encountered.
2:35PM - 3:05PM	Course review typically done with a game called Jeopardy and is specific to the course discipline
3:05PM - 3:10PM	Break
3:10PM - 4:00PM	Examination, exam correction and course evaluation

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ASBESTOS INSPECTOR 4 HOUR REFRESHER TRAINING COURSE OUTLINE

Times	Topics
8:00AM - 9:00 AM	Registration and Introduction including student sharing
9:00AM - 9:05 AM	Break
9:05AM – 9:45 AM	Review and discussion of changes in and interpretation of applicable state and federal laws, regulations, policies and guidelines
9:45AM-9:50 AM	Break
9:50AM-10:30 AM	Review and discussions of changes, developments or changes in state-of the art procedures and equipment
10:30AM-10:35 AM	Break
10:35AM-11:15 AM	Review of key areas of initial training specific to each discipline (this is done with unique hands on excersizes including assignments, crossword puzzles, interactive games such as “Are you smarter than your class mates”, picture field trips with discussions, videos from recent job sites, purchased videos, youtube videos, “field-trips” to job sites when appropriate and safe for the students, review of recent training center emails on important topics, discussion of interesting, challenging situations participants have encountered. Discussion of unique regulatory interpretations from CT DPH, EPA and OSHA that participants have encountered.
11:15AM – 11:30AM	Course review typically done with a game called Jeopardy and is specific to the course discipline
11:30AM – 12:00PM	Examination, exam correction and course evaluation

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24 HR ASBESTOS INSPECTOR
COURSE PROGRAM

DAY 1

TIME	TOPIC
8:00- 9:15	REGISTRATION AND PRE-COURSE QUIZ INSPECTOR TRAINING OVERVIEW PHYSICAL PROPERTIES OF ASBESTOS BACKGROUND AND HISTORY OF ASBESTOS USE POTENTIAL HEALTH EFFECTS
9:15-9:45	FUNCTIONS, QUALIFICATIONS AND ROLE OF INSPECTORS AND OTHER PROFESSIONALS LEGAL AND INSURANCE ISSUES
9:45-10:00	BREAK
10:00-11:30	BUILDING SYSTEMS
11:30-12:00	LUNCH
12:00-1:30	PUBLIC/EMPLOYEE/BUILDING OCCUPANT RELATIONS, PREINSPECTION PLANNING
INSPECTING FOR FRIABLE AND NON	FRIABLE ASBESTOS, AHERA REQUIREMENTS
2:30-2:45	BREAK
2:45-4:00	THE INSPECTION (CONT) HOMOGENEOUS AREAS, SUSPECT ACM MATERIALS

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DAY 2

TIME	TOPIC
8:00-9:00 AM	ASSESSMENT OF ACBM, FEDERAL AND STATE REQUIREMENTS
9:00- 10:00	BULK SAMPLING AND DOCUMENTATION OF ACBM
10:00-10:15	BREAK
10:15- 11:30	RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING
11:30-12:00	LUNCH
12:15-1:45	RECORD KEEPING AND PREPARING THE INSPECTION REPORT, INSPECTIONS AND REINSPECTIONS
1:45-2:00	BREAK
2:00-2:15	PREPARATIONS FOR FIELD TRIP
2:15-4:00	FIELD TRIP TO A LOCAL SCHOOL BUILDING EACH INSPECTOR TRAINEE WILL RECORD INSPECTION AND ASSESSMENT INFORMATION FOR ASSIGNED PARTS OF THE BUILDING

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24 HR ASBESTOS INSPECTOR COURSE PROGRAM
DAY 3

TIME	TOPIC
8:00- 10:00 AM	EPA, OSHA AND STATE REGULATIONS
10:00-10:15	BREAK
10:15-11:30	SAMPLE CONTROL AND LABORATORY ANALYSIS LECTURE AND DEMONSTRATION REVIEW OF INSPECTION REPORTS BULK SAMPLING WORKSHOP (AS INDIVIDUALS COMPLETE THE HANDS ON SAMPLING, THEY WILL RECEIVE INDIVIDUAL ASSISTANCE WITH THEIR INSPECTION REPORTS.)
11:30-12:00	LUNCH
12:00-2:00	DISCUSSION OF INSPECTION REPORTS
2:00-2:15	BREAK
2:15-3:00	REVIEW
3:00-4:00	EXAMINATION

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ASBESTOS MANAGEMENT PLANNER TRAINING PROGRAM
DAY 1

8:00-8:30 AM	COURSE REGISTRATION COURSE OVERVIEW
8:30-10:00	ASSEMBLING AND SUBMITTING THE MANAGEMENT PLAN
10:00-10:15	BREAK
10:15-11:30	HAZARD ASSESSMENT AND PRIORITIZATION SELECTION OF RESPONSE ACTIONS
11:30-12:00	LUNCH
12:00-2:00	THE OPERATIONS AND MAINTENANCE (O&M) PROGRAM
2:00-2:15	BREAK
2:15-3:00	LEGAL IMPLICATIONS FOR MANAGEMENT PLANNERS
3:00-4:00	REGULATORY REVIEW FOR MANAGEMENT PLANNERS

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ASBESTOS MANAGEMENT PLANNER TRAINING PROGRAM
DAY 2

8:00-9:45 AM	OPERATIONS AND MAINTENANCE (O&M)
9:45-10:00	BREAK
10:00-11:30	CASE STUDY IN DEVELOPING A MANAGEMENT PLAN AND O&M PROGRAM AND WORK SHOP TRAINEES WILL COMPLETE ESSENTIAL ELEMENTS OF A MANAGEMENT PLAN FOR THE SPACES INSPECTED ON DAY 2.
11:30-12:00	LUNCH
12:00-1:30	CASE STUDY WORK SHOP (CONTINUED)
1:30-1:45	BREAK
1:45-3:15	REVIEW
3:15-4:00	EXAMINATION