SECTION 9 OPERATIONS AND MAINTENANCE PROGRAM

The process of identifying asbestos-containing materials (ACM) within a facility is the first step in controlling building occupant exposure to asbestos. Information generated during the initial building survey can be assembled into a useable format that allows the asbestos coordinator to manage and better control all ACM. This process of interim control of exposure to asbestos in buildings is known as the operations and maintenance program.

The operations and maintenance (O&M) program is a set of specific procedures and practices applied to building cleaning, maintenance, renovation and general operation to maintain the building as free from asbestos contamination as possible.

The O&M program should be initiated as soon as the building survey is complete, and draws very heavily on information generated during that survey. In accordance with AHERA requirements, the O&M program **must** remain in effect until all asbestos-containing materials are removed from the facility.

The principle objective of the O&M program is to allow continued, safe use of a building with ACM until such time that the material can be safely removed. Such ultimate removal should not be conducted haphazardly but rather planned into the normal course of building expansion, repair and renovation. Remember, the purpose of the EPA requirement is **not** to require removal of ACM but rather the safe management of the material until it can be removed.

The O&M program is not a permanent abatement option. It should be implemented as part of an overall asbestos management plan that has as it's goal the elimination of hazards associated with ACM within a facility. The O&M program is not meant to be the definition for full-scale asbestos abatement. It is meant to address the problem of disruption of ACM that may occur during repair or removal of small areas of significantly damaged ACM, or in areas where removal is necessary to facilitate maintenance or renovation activities.

ELEMENTS OF THE O&M PROGRAM

The following outline describes the basic purpose for and elements of the O&M Program. Supporting information is provided in the body of this section.

I. The purpose of the Operations and Maintenance Plan

- A. Document all locations of ACM,
- B. Abate any existing hazard,
- C. Repair/remove the source or sources of the existing hazard,
- D. Prevent any inadvertent disturbance of ACM, and
- E. Initiate special cleaning and emergency response procedures.

II. Development of the Operations and Maintenance Program

- A. Select a program Manager
- B. Public/Employee Relations
  - 1. Building Occupant Notification and Warning
- C. Training
  - 1. Custodial General Awareness
  - 2. Maintenance Work Practices

4. Emergency Procedures

5. Personal Protective Equipment

D. Respiratory Protection Program

E. Medical Surveillance

F. Specialized Cleaning Procedures

G. Contractor/Maintenance Work Permit System

H. Special Work Practices for Maintenance Activities

1. Surfacing Materials

2. Thermal System Insulation

3. Miscellaneous

I. Work Practices for Renovation and Remodeling

1. Renovation

2. Remodeling

J. Emergency Response Procedures

1. Minor Episodes

2. Major Episodes

K. Periodic Monitoring and Reassessmet

1. Visual Inspection

2. Regular Air Monitoring

L. Documentation

Each of these elements is discussed in the following sections.

ASSIMILATION OF BUILDING RECORDS/SURVEY DATA

The primary objective of the building survey is to identify where ACM is present in a structure. The AOHS format has been to arrange and maintain all

collected survey data in a computerized database. It is felt that this will provide faster and easier access to information regarding a structure and will facilitate the manipulation of this data during the long term management of asbestos in all buildings surveyed.

The database information has been arranged in a format so that the asbestos coordinator has access to the following information:

- Types of ACM present,
- Types and percentage of asbestos in materials sampled,
- Specific locations of materials sampled,
- Amounts of ACM present in a given location,
- The materials' assessed condition of relative hazard using the EPA 7 category classification system,
- The materials' assessed condition of relative hazard and response action using the AOHS 4 category classification system,
- Current occupant use and level of activity in the area,
- Potential for future disruption (high, medium, low based on use and level of activity, condition of material, etc.).

SELECTING A PROGRAM MANAGER (Use AOHS Form number 1)

Regardless of how the individual LEA or school ultimately decides how to implement their O&M program, the single biggest factor that assures it's continued success, is the appointment of one individual to oversee asbestos management for the school. The background of this individual is less important

than their familiarity with the physical buildings themselves, the mechanical systems of the buildings and contractors that will be doing maintenance work and building renovations. This individual must be concerned with the serious nature of the asbestos hazard and the degree of accuracy and professionalism required to properly deal with all issues regarding asbestos.

This individual must be the focal point of such a program and must be adequately trained and must have adequate backing of the LEA or school administration for the program to be successful.

Records must be kept for this individual and AOHS has provided forms number 1, **LEA Asbestos Coordinator/Key Persons Training Record**, and 2, **Individual Maintenance Employee Training Record**, to help in the record keeping of the appointment of this individual and his/her training. There are no specific requirements for training of asbestos coordinators, however, the inspector and management planner courses required by EPA would be good recommendations for the foundation of a training program for the coordinator. The same two hour awareness program required for the custodial staff would be a mandatory requirement.

PUBLIC/EMPLOYEE RELATIONS

BUILDING OCCUPANT NOTIFICATION AND WARNING

(Use AOHS Forms number 3 and 3A)

As a result of the survey conducted and the presence of ACM documented, a notification and warning program must be initiated. The

notification and warning program serves two purposes: (1) it alerts affected parties - students, teachers and workers alike - to a potential hazard in the building; and (2) it generates a broad involvement in the O&M program. Building occupants who are aware of the presence of ACM are less likely to disturb the material and cause fiber release. **They are also more likely to participate in the effective implementation of the ongoing O&M Program.**

Notification

Notification of building occupants and other affected individuals will be accomplished in two ways:

- Distributing notices to building occupants and workers, and to students and their guardians on at least a yearly basis until all ACM has been removed. In addition, notification will be made to the same individuals to inform them of asbestos related activities in general. This is best accomplished by using the appropriate AOHS Notification form, AOHS Form number 3, **Annual Notification of Building Occupants**, or 3A, **Notification of Asbestos Related Activities**, and a letter or narrative accompanying it to explain the specific nature of the activities and the individual to whom questions and concerns can be addressed.

- Holding two hour awareness training seminars for all custodial and janitorial workers to advise them of the uses, forms and hazards of asbestos exposure, locations of ACBM in the buildings they service, how to recognize and report damage and deterioration of existing materials. The training will also include information on the handling of ACM, the use of respirators and personal

protective equipment as well as the technical equipment and supplies to be used for controlling and maintaining ACM.

Warning

Warning, as opposed to notification, is not intended as general information but rather to serve as a final line of defense to prevent unprotected individuals from disturbing ACM, or entering areas where repair or renovation is disturbing ACM.

Warnings will take the form of labels, posted signs or notices, and will be used either directly attached to ACM or posted at the entrance to areas where ACM is concentrated e.g. boiler rooms and also used in conjunction with small renovation or repair that involves the disruption of ACM. The warnings should be posted at entrances and around the perimeter of such a project in accordance with the OSHA Asbestos Standard for the Construction Industry (29 CFR 1926.58) when abatement work is conducted by private contractors, and the EPA Worker Protection Rule (40 CFR 763.121) when the work is conducted by state and local government employees. Standard labels and warning signs are available from most standard safety supply vendors.

Warning signs

The specific warning sign language is a matter of extreme importance. While there are several vendors that provide "standard" labels and signs, there generally seems to be much confusion over the proper wording required.

The wording for warning labels required by the AHERA requirement is:

CAUTION: ASBESTOS. HAZARDOUS.
DO NOT DISTURB WITHOUT PROPER
TRAINING AND EQUIPMENT

These warnings are to be placed on or adjacent to ACM in maintenance and mechanical areas only. There are no additional AHERA requirements for labelling.

The warning signs required by the OSHA regulations (29 CFR 1926.58) and EPA (40 CFR 763.121) for abatement projects must be worded as follows:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

It is important to remember that this sign is used as a deterrent to personal intrusion; it is meant to keep untrained people out of the area. The AHERA warning label should be used as part of the school's awareness and education program. It's purpose is to promote the awareness of the building occupants to the presence of ACM and the need to take special precautions to deal with it.

TRAINING

(Use AOHS Form 2, Individual Maintenance Employee Training Record)

Training of building occupants and other affected parties is one of the more important aspects of an effective operations and maintenance program. Training is the foundation for the O&M program and the degree of it's effectiveness can make or break the program.

Training for the implementation of the O&M program should be offered at the following levels of:

I. Custodial General Awareness

This level of training should be for two hours and is intended **only** as "awareness" training. It is not intended to make the custodial staff into asbestos experts but is meant more to include them in the management of the asbestos problem. The awareness training must include at a minimum the following:

1. Information regarding asbestos forms and uses,
2. Information on health effects associated with asbestos exposure
3. Locations of identified ACBM in their facilities
4. Recognition of damage, deterioration, and delamination
5. Name of asbestos coordinator and availability of the Management Plan.

II. Custodial Work Practices

This training course should last from 4 hours to a full day and is intended for the buildings engineering, custodial and janitorial staff. One of the main objectives of the O&M program is to clean existing contamination in the facility. This training program instructs participants in proper cleaning methods that involve the use of wet methods, HEPA vacuuming, protective equipment, and waste disposal methods.

III. Maintenance Work Practices

Maintenance workers are often required to use specialized asbestos control procedures for dealing with asbestos-containing materials. Hence, the training of maintenance workers is more specialized, requiring detailed consideration.

Where most maintenance work is conducted by in-house staff, a greater working knowledge of ACM is required. If the work is performed entirely by outside, contracted help, less specific information is required for the inside personnel, however, they would then become the focal point for assistance to the outside contractors. This will enable them to assist the asbestos coordinator in the implementation of the plan with outside personnel.

For in-house staff, training should be developed depending on the extent of potential disruption or exposure to ACM. Workers who perform minor, routine maintenance that have a low potential of ACM disruption should undergo training similar to that of the custodial staff, that is, training in the use of wet methods,

HEPA vacuuming, disposal techniques, and use of respiratory protection and personal protective equipment. Removal for other than emergencies or major response to accidental damage and fiber release episodes should only be to contain and control the situation. Full scale clean up and disposal should be performed by trained, state accredited personnel including proper documentation and verification of response action air monitoring.

If routine or even infrequent maintenance will involve the possibility of significant disruption of ACM, workers will be involved in a more extensive training program. Depending on the type of material involved, maintenance workers will need to be trained in isolating the work area from non-work areas through the use of warning, and danger signs, barriers, the use of wet methods and HEPA equipped vacuums, the use of surfactants and wetting agents to minimize fiber release, glovebag pipe insulation removal techniques, clean-up, decontamination and disposal procedures. In addition, maintenance workers in this category will need to be involved in respiratory protection and medical surveillance programs.

Training of contracted maintenance workers is not the responsibility of the school. The school should implement the policy of work permitting for all outside contractors so as to minimize the potential for accidental fiber release. It is recommended that one member of the in-house staff be trained to oversee all maintenance performed by outside contractors. Their principle effort shall be to enforce compliance with the O&M plan.

For many schools, general asbestos awareness training programs that encompass the general custodial and maintenance staff, will be enough. However, some facilities will want workers trained in dealing with ACM during

major renovation, remodeling, repair, as well as, those trained in emergency clean-up and removal procedures, who will require the most extensive training of all. These workers will probably be best served through participation in an Asbestos Abatement Supervisor's Course, similar to those currently offered by the five EPA-sponsored asbestos information centers and other organizations. The closest such training center is located at Tufts University in Medford, Massachusetts. Another training center, the Institute for Environmental Education, located in Woburn, Massachusetts, also offers a wide range of EPA training courses. Unless large numbers of staff are involved, formal in-house training is both costly and unfeasible.

RESPIRATORY PROTECTION PROGRAM

OSHA 29 CFR 1926.58 and 1910.1001 and the USEPA 40 CFR 763.121 require that employees exposed to airborne asbestos above 0.2 fibers per cubic centimeter of air (f/cc), be involved in a respiratory protection program. The respiratory protection program must be in written form and meet the minimum requirements described in OSHA 29 CFR 1910.134.

Levels of greater than 0.2 f/cc are highly unlikely for most occupants and workers in a school building, other than a maintenance or custodial worker that has removed ACM without taking proper precautions of any type. Levels this high are typically found in the asbestos abatement industry during removal in contained environments.

Respiratory protection is a highly technical form of personal protective equipment. Respirators will only provide adequate protection if they are worn

properly, maintained, cleaned and if a good "seal" can be achieved between the facepiece of the respirator and the face of the user. Respirators must be selected, issued and used with extreme caution if they are to be used successfully and provide adequate protection.

Only respirators tested and approved by NIOSH and MSHA as acceptable for asbestos shall be used. Disposable respirators shall **not** be used for any type of asbestos exposure or for any work involving contact with asbestos containing materials which may result in fiber release. Only half-face or full-face, air purifying, or powered air purifying respirators will be used depending on the degree of exposure or the potential for exposure. Respirators should only be selected once the degree of exposure to personnel has been assessed by a qualified industrial hygienist using acceptable air monitoring practices.

To assure that proper protection is afforded the user, all employees required to wear respirators must be originally fit tested to ascertain that the respirator assigned actually fits and will provide adequate protection.

There are two types of fit testing, qualitative and quantitative. Qualitative is a judgmental test performed by the user every time they use the respirator, while quantitative fit testing is an actual measurement of the degree of fit. Quantitative fit testing is moderately expensive but is essential for the selection of respiratory protection to be verified. AOHS is one of the few firms to offer such testing.

In the operations and maintenance program, any janitor, custodian, engineer or other employee who works directly with ACM, should be included in a respiratory protection program. Although careful implementation of the O&M plan

should preclude any unreasonable exposures, those workers who have the potential for high exposure should still be included in the program. The high degree of administration and cost of developing and implementing a respiratory protection program is another reason to justify the removal of ACM in an expeditious manner

MEDICAL SURVEILLANCE

In accordance with the OSHA Asbestos Standard for the Construction Industry (29 CFR 1926.58), the OSHA Asbestos Standard for General Industry (29 CFR 1910.1001) and the US EPA Worker Protection Rule (40 CFR 763.121), any employee who is exposed to at least 0.1 f/cc of asbestos for 30 or more calender days per year, or any employee required to wear an air purifying, negative pressure (cartridge) respirator, must be involved in a medical surveillance program.

It is critical to insure that anyone that is required to wear a respirator, be physiologically capable of the added stress associated with it's use. Individuals with predisposing respiratory disorders, such as asthma or allergies, or heavy smokers may not be capable of wearing a respirator. In fact, the use of the respirator will actually present a danger to such individuals and a liability problem to the school.

In the O&M program, the use of negative pressure (half mask cartridge) respirators by custodial and maintenance workers will dictate their involvement in the medical surveillance program.

The purpose of the medical surveillance program is to establish an employees "fitness for duty" (to wear a respirator), and to detect any changes in the gastrointestinal and cardiopulmonary systems. Changes which may indicate the presence of an asbestos related diseases.

The main requirements of the medical surveillance program are initial and periodic medical examinations. The initial examination can be omitted if the employee has had a comparable exam within the last twelve months. Periodic examinations are required at least annually, and must be performed before the employee is issued and required to wear a negative pressure respirator. An employee should not be issued a respirator until an examining physician reports the their acceptability for using a respirator.

Each medical examination must include, at a minimum:

- Completion of the mandatory medical questionnaires included in the OSHA standards. These questionnaires can be found as Appendices to the OSHA and EPA Worker Protection Rule. There is one each for the initial and periodic examinations. These questionnaires also include sections on work history, which must be completed. Copies of both the initial and periodic questionnaires are included in the copies of the standards included in the Appendix of this volume.

- A physical examination, with emphasis on the cardiovascular and gastrointestinal systems; and

- A pulmonary function test, which includes the forced vital capacity (FVC) and the forced expiratory volume in one second (FEV1).

The examining physician may also require other tests as part of the medical examination. The chest x-ray is now optional and is administered at the discretion of the physician. However, it is recommended that an initial chest x-ray be used in order to establish baseline conditions for the employee.

Following the examination, the physician must provide the employer with the following:

- A written opinion as to whether the employee has any detected medical conditions that would place the employee at increased risk of health impairment from exposure to asbestos;

- Any recommended limitations on the employee or on the use of personal protective equipment, such as respirators; and
- 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.

The physician is not to reveal in the written opinion given to the employer any specific findings unrelated to asbestos exposure. Also, the employer must provide a copy of the physicians written statement to the employee within 30 days of receipt.

The employer must provide the examining physician with the following:

- A copy of the OSHA Asbestos Standard;

- A description of the employer's duties as they relate to asbestos;

- The employee's actual or anticipated level of exposure

- A description of any personal protective equipment and respiratory protective devices used or to be used; and

- Information from previous medical examinations of the employee that is not otherwise available to the examining physician.

Finally, the school must maintain medical records for at least 30 years following termination of employment.

SPECIALIZED CLEANING PROCEDURES (Use AOHS Form number 6)

Cleaning up existing asbestos contamination within facility is one of the primary objectives of the O&M program. Dry brooms, mops, dust cloths and standard vacuum cleaners, when used, simply resuspend asbestos fibers into the air creating an unnecessary hazard. Therefore, it is essential that specialized cleaning procedures be implemented as part of the O&M program.

Specially trained and properly equipped custodial workers should conduct a thorough initial cleaning in a facility as soon as the previously mentioned elements of the O&M program are in place. These workers should be equipped with 1/2 face dual-cartridge high efficiency air purifying respirators, as defined in the written respiratory protection program, at a minimum, for cleaning in areas

where there is damaged ACM which has contaminated the area and must be cleaned.

A combination of wet mopping/wiping and HEPA vacuuming should be used to clean surfaces within a facility. The HEPA equipped vacuum will trap any loose asbestos fibers that would normally pass through the filter on a conventional vacuum. Wet wiping with rags soaked with amended water will remove debris that the vacuum will not and the amended water will help trap the rags to the rag. A new product which is now available is a polypropylene wiping rag/mop which develops a static charge and promotes collection of any fibrous material. Dry mopping, sweeping or use of conventional vacuum cleaners should never be used for the clean up of potentially asbestos contaminated materials.

Irregular surfaces, such as curtains, books, furniture and carpeting should be cleaned using HEPA equipped vacuum cleaners. Many manufacturers offer several "nozzles" and attachments to make HEPA vacuuming of irregular surfaces less difficult. Carpeting may also be cleaned using steam cleaners in conjunction with HEPA vacuums. Care should be taken to ensure that the liquid waste generated during steam cleaning is disposed of properly as asbestos waste. The water should be bagged or drummed and stored with any other asbestos scrap or waste awaiting pick up and disposal. There are obvious benefits to having a substantial amount of this work performed by outside accredited, contractors because of the strict regulatory requirements.

Other surfaces, such as walls, non-carpeted floors, light fixtures, equipment housings, air handling ducts, file cabinets etc., should be cleaned using wet mops and/or polypropylene dust cloths and wiping rags. Amended

water is tap water to which a non-sudsing surfactant (soap) is added. Only amended water should be used as the wetting agent for cleaning purposes.

Periodic or routine cleaning of areas where there is damaged or friable ACM is less rigorous than the initial cleaning and is usually implemented on a daily or weekly schedule depending on the extent of the ACM within the facility and the level of contamination. Surfaces should be wet wiped and/or HEPA vacuumed routinely to prevent the accumulation or disturbance of asbestos containing dust. Respiratory protection may not be required for the custodial crew performing periodic cleaning. However, areas where ACM is frequently disturbed may warrant continued use of respiratory protection.

CONTRACTOR/MAINTENANCE WORK PERMIT SYSTEM

(Use AOHS Form number 7)

Minimizing inadvertent disruption of ACM during maintenance and renovation operations is often one of the most difficult tasks faced by the asbestos program manager. Initiating a permit system, where all work orders for internal work or that work done by outside contractors are submitted to the asbestos coordinator, is a simple yet effective way of controlling disruption of ACM during these activities.

Under the recommended permitting system, all requests for maintenance or renovation activities such as plumbing, heating and HVAC repairs as well as telephone, fire protection, communications or computer cabling, are given to the asbestos coordinator and a permit to proceed will be issued by the asbestos coordinator prior to the project or individual job beginning. The asbestos

coordinator would review all pertinent records involving the areas where the work is to be performed, for information about the presence of ACM where work is to be performed. A physical inspection of the area in question to ensure that records reflect actual conditions is strongly recommended prior to the issuance of a permit to proceed.

If the work to be performed involves destruction of any of the building materials not sampled during the initial survey, sheetrock, joint compound, sealed ceiling spaces, or buried piping systems, the asbestos coordinator should assure that representative samples of these materials are collected for the determination of asbestos content. In lieu of sampling, the asbestos coordinator should assume the material to be positive for asbestos and follow the proper work procedures for ACM.

If no asbestos is present, the work order is issued and the planned action can proceed. If ACM is found to be present in the area, the asbestos coordinator will either equip properly trained maintenance/renovation workers to deal with the ACM during the operation or contract with an abatement contractor to remove the ACM prior to beginning the maintenance activity. As an alternative, workers in house may be trained and capable of dealing as an "emergency response" team. In this manner, they could remove any ACM present before the beginning of the work and could also respond to emergency situations.

Due to the nature of the Asbestos hazard, removal and emergency response beyond containing a situation by isolating the area and wetting it down, is best left to a licensed abatement contractor with whom the school has established a prior emergency response contract.

In worst-case situations (e.g. large amounts of ACM) non-critical maintenance/renovation work should be deferred until the ACM in the area can be dealt with in the proper manner.

In all situations, the work permit should be issued by the asbestos coordinator, regardless of whether there is ACM present or not. The principle purpose of the permit is **not** to issue the permit but rather to review the area where work will take place for the presence of ACM and the potential of fiber release as a result of the proposed activity. The permit system allows the asbestos coordinator to be the determining factor as to whether the work should proceed and his/her involvement before the work begins should eliminate accidental fiber release and the need for emergency response.

AOHS Form number 7 has been provided as an acceptable work permit system form and should be used for such situations.

If preparation for the maintenance work requires full scale removal, all the appropriate documentation **(AOHS Forms number 8, 10, 11, and 12)** must be filled out and retained. If the amount of material to be removed is less than 3 linear or square feet, AOHS Form number 9 should be used to document a Small Scale, Short Duration Activity.

SPECIAL WORK PRACTICES FOR MAINTENANCE ACTIVITIES

Normal maintenance activities can disturb ACM and raise levels of airborne asbestos. Maintenance workers should be cautioned against conducting any

maintenance work in a manner that may disturb ACM. The biggest detriment to doing this is that many maintenance and custodial workers are used to handling ACM with no precautions or respect for the hazard. This will most likely be the greatest barrier to smooth implementation of the Management Plan. Part of the custodial training will include proper procedures that are to be employed whenever there is a possibility of disturbing ACM in a manner that may create a fiber release episode.

The most significant reason for ultimately removing all ACM is to avoid the possible problems that can arise from damage to ACM which results in fiber release. Most "normal" maintenance activities - mopping, waxing floors, cleaning windows and vacuuming - are not apt to result in fiber release. "One time" or repair activities, such as hanging pictures or blackboards, or replacing ceiling tiles (many types of ceiling tiles contain asbestos) can result in fiber release and are the activities that need to be controlled.

The ultimate objective of the overall asbestos management program should be removal of all ACM as expeditiously as possible to avoid the undue expense and administrative time required to deal with the issue of controlling ACM.

The three categories of materials, surfacing, thermal system insulation and miscellaneous all require very different controls.

Surfacing such as plaster, stucco acoustical material or fireproofing architectural products should be removed before any maintenance activities are performed. There is such a high likelihood of fiber release that it is virtually

impossible for custodians to perform "normal maintenance" without creating fiber release.

Thermal system insulation that is damaged should be removed or repaired to prevent fiber release from the damaged areas during normal maintenance activities. Bridging agents, "wet wrap", and encapsulants are commercially available that can be used to repair minimally damaged TSI prior to any work being conducted in such an area. This will also prevent accidental fiber release.

Miscellaneous materials are perhaps the easiest materials to deal with for the maintenance personnel, and they are also the ones that typically present the most problems. Miscellaneous asbestos containing materials, vinyl asbestos floor tiles, ceiling tiles, and transite (asbestos cement millboard) are all potential problem materials. The current EPA position on at least the floor tile and transite is that they are not friable and do not constitute an exposure hazard. As soon as they become friable, when they are cracked or broken, they must then be handled as friable ACM and handled accordingly.

The nature and extent of special work practices should be tailored to reflect the likelihood that the ACM will be disturbed and that fibers will be released. Four categories of potential disturbance are defined: (1) Contact with the ACM is very unlikely; (2) Accidental disturbance is possible; (3) A small amount of ACM (less than three square feet or three linear feet) will be disturbed; and (4) A large amount of ACM (three or more square feet or linear feet) will be disturbed. In either case 3 or 4, the material should be removed by a competent abatement contractor prior to the maintenance activities beginning. The following sections on surfacing materials, thermal system insulation, and other types of ACM describe

precautionary work practices in detail. It should also be noted that once small amounts of ACM are disturbed, the area must decontaminated, and precautions taken to prevent further damage or fiber release from the damage.

SURFACING MATERIALS

Contact with ACM Unlikely

In some buildings with ACM, many routine maintenance activities can be conducted without contacting the ACM. For example, changing light bulbs in a fixture on a ceiling with asbestos-containing acoustical plaster can usually be performed without jarring the fixture or otherwise disturbing the ACM. (The top of the fixture should have been wet-cleaned previously to remove settled fibers.) In these situations, few precautions other than normal care are needed. Emergency response materials; HEPA vacuum, respirators, wetting agents and the like should be available in the building. These do not have to be taken to the site, but should be available at a known location in the building.

Where maintenance is performed in parts of the building free of ACM, no special precautions are usually necessary. An exception would be work causing vibrations at a distant location where ACM may be present.

Accidental Disturbance of ACM Possible

Routine maintenance and repairs includes light fixtures, plumbing fixtures and pipes, air registers, HVAC ducts, and other accessible parts of building utility systems. Where these fixtures or system parts are near friable ACM,

maintenance work may unintentionally disturb the ACM and release asbestos fibers.

For example, maintenance work on ventilation ducts in an air-handling room where asbestos fireproofing is present only on structural beams could be conducted without contacting the ACM. However, the fireproofing could be disturbed accidently during the course of the work.

The following precautions and procedures should be used if accidental disturbance of ACM (or dust and debris containing asbestos fibers) is possible:

- Approval (work permit) should be obtained from the asbestos coordinator manager before beginning work. The asbestos coordinator or worker's supervisor should make an initial visit to the worksite.

- The work should be scheduled after normal working hours (nights or weekends), if possible, or access to the work area should be controlled: doors should be locked from the inside and signs posted to prevent unauthorized persons from entering the work area (e,g., "MAINTENANCE WORK IN PROGRESS, DO NOT ENTER",

- The air-handling system, if it is a central HVAC, should be shut off or temporarily modified to prevent the distribution of any released fibers to areas outside the work site.

- A 6-mil polyethylene plastic dropcloth should be placed beneath the location of the maintenance work, extending at least 10 feet beyond all

sides of the work site. Alternatively, a rectangular enclosure constructed of 6-mil plastic on a frame can be positioned underneath the maintenance area to inhibit the spread of fibers from fallen ACM. (Mobile enclosures such as a Klean Kube are available commercially.)

- Workers should wear at least air-purifying respirators with HEPA filters and protective clothing including a body suit and hood.

- The ACM in the vicinity of the maintenance work should be misted lightly with amended water. Use a mister that produces a very fine spray. Be sure that the electrical system is shut off before spraying around any electrical conduits of fixtures.

- After the maintenance work is completed, the fixture, register, or other component, and all tools, ladders and other equipment should be HEPA-vacuumed or wiped with a damp cloth.

- If any debris is apparent on the drop cloth, floor or elsewhere, it should be HEPA-vacuumed.

- The plastic drop cloth (or enclosure) should be wiped with a wet cloth, carefully folded, and discarded as asbestos waste.

- All cloths, vacuum bags/filters, and other disposable materials should be discarded in sealed and labeled plastic bags as asbestos waste.

- Workers should HEPA-vacuum the outside of respirators, protective clothing, and exposed skin at the work site. The clothing should then be discarded as asbestos waste. If the ACM was disturbed during the course of the work, the workers should leave their respirators on, and clean their respirators while in a shower.

Disturbance of ACM Intended or Likely

Some maintenance and repair activities will, unavoidably disturb the ACM. For example, installing new sprinkler or piping systems, will necessitate hanging pipes from structural members or ceiling. If the beams or ceilings are insulated with ACM, the ACM will be scraped away to install hangers. Likewise, pulling cables or wires through spaces with ACM or ACM debris is likely to dislodge pieces of the ACM or disturb ACM debris. Furthermore, anytime tiles are moved to enter the space above a suspended ceiling, settled dust on top if the tiles will be resuspended. If the beams or decking above the ceiling are covered with ACM, the dust is likely to contain asbestos fibers. All of these examples involve disturbance of ACM or asbestos dust and debris, and will likely result in elevated levels of airborne asbestos fibers.

In any of these situations, the area should be decontaminated and/or any ACM should be removed prior to any work being conducted by the school staff or any outside contractor. If the school decides that the material does not need to be removed or until such a time that it can be removed, the following conditions for protection of human health and the environment must be followed.

Small Disturbances

The following procedures are appropriate for maintenance activities which involve small-scale (less that 3 square feet) removal of surfacing ACM or when disturbance of ACM dust and debris or unintentional contact with the ACM is likely.

- Approval should be obtained from the asbestos program manager before beginning work, and the work should be supervised.

- The work should be scheduled after normal working hours (nights or weekends). Special consideration should be given to after hour use of the schools for sporting events, meetings and evening classes. If this is not possible access to the work area should be controlled: doors should be locked from the inside and signs posted to prevent unauthorized persons from entering the work area (e,g., "MAINTENANCE WORK IN PROGRESS, DO NOT ENTER", or, if asbestos levels are high enough to trigger the OSHA Rule (the PEL or higher), "DANGER - ASBESTOS: CANCER AND LUNG DISEASE HAZARD: AUTHORIZED PERSONNEL ONLY: RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA"). Note, emergency exits must remain in operation.

- The air-handling system should be shut off or temporarily modified to prevent the distribution of fibers from the work site to other areas in the building.

- Workers should wear, at a minimum, powered air-purifying respirators with HEPA filters and protective clothing including a body suit, hood boots, and gloves.

- A 6-mil polyethylene plastic dropcloth should be placed beneath the location of the maintenance work, extending at least 10 feet beyond all sides of the work site. (In the case of entry into the space above a suspended ceiling, the work site would be the area of the tiles removed to gain access). Alternatively, a rectangular enclosure constructed of 6-mil plastic on a frame can be positioned underneath the maintenance area to inhibit the spread of fibers from fallen ACM. (Mobile enclosures of this type are available commercially).

- If entry to the space above a suspended ceiling is necessary, the entry tile(s) should be removed carefully with as little jarring as possible. The air above the opening, the top of the removed tile, and all tiles surrounding the opening, and the ACM likely to be disturbed should be misted with amended water. Use a mister with a very fine spray. A thorough misting in the air helps fibers to settle more quickly. Cleaning ceiling tiles with a Hepa vacuum cleaner is also effective as long as care is taken not to vibrate tiles and disturb the ACM.

- Selected workers must wear personal monitors as required by OSHA unless previous experience with the same ACM and similar operations indicates that fiber levels are likely to be less than the PEL. The testing should be performed by individuals that OSHA considers "competent persons".

- During the course of the work, any ACM which is removed should be collected by the HEPA-vacuum. This is best accomplished by placing the vacuum hose just below the ACM being removed.

- Upon completion of the work, any visible debris on the top of the suspended ceiling, on the drop cloth, on the floor, or anywhere else should be collected by cleaning with a HEPA vacuum.

- All equipment and tools should be wiped with damp cloths or HEPA-vacuumed.

- The plastic sheet should be wiped with a damp cloth, carefully folded, and discarded as asbestos waste.

- All debris, cloths, and vacuum bags/filters should be discarded in sealed and labeled plastic bags as asbestos waste.

- Workers should vacuum their disposable suits before leaving the work area (or remove and discard them as asbestos waste and put on a clean disposable suit), proceed to a shower room, shower with their respirators on, and clean their respirators while in the shower.

Large Disturbances

Any maintenance work which involves removal of 3 or more square feet of surfacing material or 3 linear feet of thermal system insulation should be

considered a large-scale disturbance of ACM. Moreover, if the maintenance work is part of general building renovation, EPA National Emission Standards for Hazardous Air Pollutants (NESHAPs) require prior notification for removal of ACM if more than about 160 square feet or friable surfacing ACM or 260 linear feet of thermal system insulation is to be removed. Even if NESHAPs does not strictly apply, building owners should consider removing all ACM from any part of a building where this type of major renovation will occur. This type of removal is best left to an outside abatement contractor. Regardless of who performs the removal, the work should proceed as follows:

- All of the procedures for asbestos removal should be followed: construction of containment barriers and decontamination facilities; use of a negative pressure ventilation system; monitoring outside of containment barriers during removal, use of protective clothing and "type C" respirators by workers; proper disposal of asbestos debris; and proper cleanup of the work site followed by air testing. Most of these procedures are required by OSHA (See Chapters 5 and 6 of the Purple book and the OSHA rule for the construction industry for a detailed discussion of these steps.) Personal air monitoring is also required by OSHA unless SCBA of "type C" respirators are used.

- Once the worksite has been adequately isolated and all precautionary measures have been taken, the maintenance work should begin. If the work involves cutting, drilling grinding, or sanding the ACM, special tools equipped with HEPA vacuum attachments must be used (OSHA requirement). Where the ACM is simply scraped off the substrate, the hose from a HEPA vacuum cleaner should be placed just below the

removal site to catch the ACM. Upon completion of the work, the vacuum bags and filters should b discarded as asbestos waste.

- Where the ACM was disturbed as part of the maintenance activity, it should be repaired with non-asbestos plaster or spackling compound or sprayed/painted with an encapsulant or latex paint (see Section 5.1.3 of the Purple Book for specifications). This should be done before final cleanup of the work site.

THERMAL SYSTEM INSULATION

Maintenance activities affecting asbestos-containing thermal system insulation generally involve plumbing-type repairs, or repairs to the heating, ventilation and air conditioning (HVAC) system. Frequently, the ACM must be removed to provide access to the valve, flange, duct, or related system part needing maintenance.

Contact With ACM Unlikely

Maintenance activities or repairs which can be performed without contacting or disturbing the ACM require little more than normal care and good workmanship. (Respirators and a HEPA vacuum cleaner should be available if needed.) For example, valves which are either uncovered or covered with non-asbestos insulation can be repacked and repaired without disturbing asbestos lagging on nearby pipes. As with surfacing ACM, the only precautions necessary are to have emergency response materials available.

Accidental Disturbance of ACM Possible

Even maintenance tasks that involve no direct contact with ACM may cause accidental disturbance. For example, vibrations created by maintenance activities in one part of piping network will be transmitted to other parts. Vibrations could then cause fibers to be released from insulation which is exposed (not covered with a protective jacket) or not in good condition. If in doubt about the possibility of fiber release, thoroughly inspect the thermal system insulation before undertaking the maintenance or repair work. Then, either correct the problem before starting, or assume that the maintenance work may cause accidental disturbance and fiber release. In this case, the following procedures should be used.:

- Work approval and site preparation procedures as described under Surfacing Material should be followed.

- Plastic sheets (6-mil polyethylene) should be cut and taped around any insulation which might be accidently disturbed. The plastic should be misted with amended water before taping it shut. If the locations where insulation could be disturbed are too numerous for isolation with plastic, workers should perform the maintenance work wearing air-purifying respirators, at a minimum, and protective clothing, including disposable suits and hoods.

- Cleanup procedures, as described under Surfacing Material, should be followed. Special care should be taken when removing the plastic from the

insulation to minimize disturbance of any ACM dust or debris that may have fallen from the insulation.

Disturbance of ACM Intended or Likely

Where asbestos-containing insulation must be removed to maintain or repair the thermal system, the ACM will obviously be disturbed. As with surfacing ACM, the amount to be removed or manipulated will determine the procedures to be used.

- Work approval and site preparation procedures as described for surfacing ACM, should be followed.

- Maintenance workers should wear at least air-purifying respirators with HEPA filters and protective clothing (suit, hood, and boots) in case of a fiber release accident.

- The asbestos-containing insulation should be removed as necessary for the repairs, and the repairs made using standard glove bag techniques, where possible, (see the EPA publication: "Asbestos-in-Buildings Technical Bulletin: Abatement of Asbestos-Containing Pipe Insulation," 1982-2 and the OSHA construction industry rule). Glove bags are fastened around the part to be repaired, the insulation is removed with knives and saws to make the part accessible, and the repairs are made using tools contained in the glove bag tool pouch. the open faces of the remaining asbestos-containing insulation are then sealed with an encapsulant or latex

paint, all surfaces are wet-wiped ar HEPA-vacuumed, and all debris is sealed in the glove bag and removed, together with the bag.

- If a bag is ruptured during the course of the repairs, work should stop, the area should be sealed off, and all procedures recommended for large-scale asbestos removal should be followed. Thorough clean-up of the work site, Followed by air testing is, especially important to assure that fibers which may have escaped are removed. Sealing tape applied quickly to a small puncture could prevent significant release of fibers to the room, provided the ACM inside the bag was thoroughly wetted as it was removed.

- At the conclusion of the work, maintenance workers should clean their clothing as above (if fibers escaped from the glove), shower with their respirators on, and clean their respirators while in the shower.

- All glove bags and any other used materials (including disposable clothing) should be contained (double bagged and labelled) and held for disposal through an acceptable transporter to an approved landfill. Use **AOHS Form number 11** to record this activity.

- Non-asbestos insulating material can be installed, as necessary, to replace insulation which was removed.

Large Disturbances

NOTE: It is highly recommended that all ACM be removed before any work is conducted that would result in fiber release. This is true for both small and large disturbances alike.

NOTE: OSHA is now in the process of making a determination of the acceptable use of glovebags and may restrict their use to only small scale, short duration (less than 3 linear or 3 square feet) as opposed to the current method of using multiple for long runs of pipe covering.

Maintenance activities which involve removal of 3 linear feet or more of asbestos-containing insulation (e.g., several valves need attention in a utility room or block insulation needs to be removed for boiler repair) should be considered large-scale disturbances. In some situations, glove bag techniques may be appropriate and the procedures described above under "small disturbances" should be followed. When glove bags are not feasible, the maintenance activities should be conducted using all the procedures recommended for large-scale asbestos removal. ACM removal is typically conducted by abatement contractors. If maintenance personnel are to conduct the removal, they must be thoroughly trained in removal techniques (OSHA requirement for private employers, EPA Worker Protection Rule for school employees). However, if the maintenance activities are likely to cause disturbance of ACM on pipes, boilers, or ducts at sites other than just those undergoing repair (due to vibration, for example), then the entire room or area should be isolated and large-scale asbestos removal procedures employed. NESHAPs regulations require that asbestos-containing thermal system insulation be removed prior to building

renovation if 260 linear feet or more of ACM would be broken up or made inaccessible for subsequent removal prior to demolition. (As noted in the previous section, NESHAPs, also requires the removal of friable surfacing ACM prior to renovation or demolition if 160 square feet or more of material would be broken up or made inaccessible.)

MISCELLANEOUS ACM

Other types of ACM should also be addressed in the special O&M program. They include vinyl asbestos floor tiles, asbestos ceiling tiles, transite wall board and counter tops, asbestos roof tiles, and various textile products such as stage curtains. Disturbance of these materials should be avoided. Where this is not possible, procedures should be used as described above for large-scale removal of ACM. Cutting, drilling, grinding, or sanding of ACM must be performed with tools equipped with HEPA-filtered vacuum systems (OSHA requirement).

Floor tile should be maintained in good condition and removed large scale only in the event of building renovation.

Ceiling tiles that contain asbestos, especially those in classrooms that are more prone to damage, should be scheduled for removal and replacement with non-asbestos containing tiles. As individual tiles are removed and replaced, those that contain asbestos must be misted with amended water, carefully removed and placed in double 6 mil. labeled bags for disposal. This type of work constitutes removal and all requirements for removal must be implemented,

including barriers, personal protective equipment, monitoring, notification, and record keeping of the response action.

Transite should be painted with high quality latex paint to act as an encapsulant until such a time that it becomes damaged and requires replacement, or until building renovations require it's removal. At that time, it must be treated as friable material if it will be cracked or broken, and removed as any other ACM.

Vinyl asbestos floor tile is perhaps the biggest grey area in the asbestos management field. The current EPA position with floor tile is the same as with ceiling tile and transite. As long as the material is not cracked or broken, it is not considered friable and is not subject to the same requirements for removal. As soon as a tile breaks, it is friable and requires complete control.

The current wisdom is that the degree of care and time required to handle floor and ceiling tiles and transite so that they don't break is as expensive or more so than if the material was originally handled as ACM for removal purposes. In most cases, it is easier, faster and less regulatory threatening to simply treat the material as ACM and remove it accordingly.

OTHER MEASURES

Whenever friable ACM is present in a building which uses a central heating, ventilating and air conditioning (HVAC) system, special procedures should be followed when changing filters. The filters should be misted with water or amended water as they are removed, placed in plastic bags, sealed, and

discarded as asbestos waste. Workers should wear at least an air-purifying respirator and disposable protective coveralls.

WORK PRACTICES FOR RENOVATION AND REMODELING

Renovation

Building renovation or building system replacement can cause major disturbance of ACM. Moving walls, adding wings, and replacing heating or air-conditioning systems involve breaking, cutting, or otherwise disturbing ACM that may be present. Prior removal of ACM is highly recommended in these situations, and is required by NESHAPS if the amount of ACM likely to be disturbed is greater than the threshold amounts (160 square feet of surfacing material or 260 linear feet of thermal system insulation). If prior removal is not undertaken, the renovation project should be considered equivalent to an asbestos removal project. All the procedures and precautions for asbestos removal recommended by EPA and required by OSHA as previously discussed should be employed. A key step in considering a renovation project is checking on the location and type of ACM that may be affected. Clearance should be obtained from the asbestos program manager before serious project planning is begun.

Remodeling

Remodeling or redecorating involves less dramatic structural alteration. However, disturbance of ACM or materials contaminated with asbestos fibers is still possible. Where the remodeling involves direct contact with ACM (e.g.,

painting or wall papering over ACM), all of the procedures and precautions recommended by EPA and required by OSHA for asbestos removal should be followed.

Any materials which have not been previously sampled that may contain asbestos should be sampled before any major renovation or remodeling commences. Such materials would include; sheetrock, joint compound, transite, floor tile, ceiling tile, and plaster.

If "other" types of ACM have to be removed as part of the renovation project, the removal should be done with care to avoid breaking the material. For example, small sections of asbestos-containing floor tiles can be removed by applying dry ice or heat from a portable heater to the tops of the tiles and then prying them up. Glued carpet may require a mechanical chipper to separate the carpet from the floor. Before a chipper is employed, test the carpet adhesive for asbestos, If it contains asbestos, the project should be treated as an asbestos removal project with all proper controls.

EMERGENCY RESPONSE PROCEDURES

As long as ACM remains in a building, a fiber release episode can occur. Custodial and maintenance workers should report to the asbestos program manager the presence of debris on the floor, water or physical damage to ACM, or any other evidence of possible fiber release.

Fiber release episodes can also occur during maintenance or renovation projects. The asbestos program manager should call an abatement contractor or

to clean up debris and make repairs as soon as possible. If an outside contractor is to be used, a company should be selected and retained by contract for quick response action as needed.

Minor Episodes

Minor episodes, such as a small section of insulation (less than 3 linear feet) falling from a pipe or a careless worker bumping into a beam and dislodging a small amount of fireproofing ACM (less than 3 square feet), can be treated with standard wet cleaning and HEPA-vacuumed techniques:

- Workers should wear air-purifying respirators with HEPA filters, at a minimum.

- Workers should thoroughly saturate the debris with water or amended water using a mister with a very fine spray. The debris should then be placed in a labeled, 6-mil plastic bag for disposal and the floor should be cleaned with damp cloths or a mop. Alternatively, the debris can be collected with a HEPA vacuum.

- All debris and materials used in the cleanup should be discarded as asbestos waste.

- Workers should vacuum their disposable suits and exposed skin before leaving the work site (or remove them, discard them as asbestos waste, and put on clean, disposable suits), proceed to a shower room, shower with their respirators on, and clean their respirators while in the shower.

- The damaged ACM should be repaired with asbestos-free spackling, plaster, cement, or insulation, or sealed with latex paint or an encapsulant.

Major Episodes

Major fiber release episodes are serious events. Large amounts of ACM falling from heights of several feet may contaminate an entire building with asbestos fibers. If 3 square feet or more of surfacing ACM or 3 linear feet or more of thermal system insulation delaminates or is dislodged from its substrate, the episode should be considered major. A large breach in a containment barrier for a maintenance or abatement project should also be considered a major episode. The following response procedures should be used:

- The area should be isolated as soon as possible after the ACM debris is discovered. Where the area can be sealed by doors, they should be locked from the inside (escape corridors must remain in operation) and signs posted to prevent unauthorized personnel from entering the work area ("DANGER - ASBESTOS; CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA").

- The air-handling system should be shut off or temporarily modified to prevent the distribution of fibers from the work site to other areas of the building. If possible, doors, windows, and air registers should be sealed with 6-mil plastic sheets and tape.

- All the procedures recommended by EPA and required by OSHA for large-scale removal of ACM should then be used. These include containment barrier, negative pressure ventilation, personal respiratory protection and protective clothing, decontamination facilities, and air testing.

- Workers should wear either a SCBA or "type C" respirator and protective clothing, including total body coveralls with hoods and boots, and gloves. Personal air monitoring may be conducted by a competent person on representative workers, but is not required by OSHA when SCBA or "type C" respirators are used.

- Fallen debris should be sprayed with amended water and placed in plastic bags for disposal. Shovels are useful for collecting the debris. The floor should be thoroughly cleaned with a HEPA vacuum cleaner.

- Walls, ceilings, pipes, boilers, or other surfaces where ACM was damaged or delaminated should be repaired temporarily. This might involve replastering with asbestos-free material, spraying with an encapsulant, or taping with duct tape. In some cases, ACM beyond the immediate area of damage may need to be removed to prevent additional episodes.

- The air should be tested for asbestos fibers before the plastic barriers are removed and the area reoccupied. Testing should follow the requirements of the AHERA standard for sampling to verify completion of response actions. The air should be sampled at the specified number of locations

and analyzed by either phase contrast microscopy or transmission electron microscopy, in accordance with the limits prescribed in the standard.

- After the barriers have been taken down, a decontamination of the entire building or a portion of it should be considered. The need for this will depend on how rapidly the response team reacted to the episode and, in particular, how quickly the HVAC system was turned off. A thorough decontamination includes HEPA vacuuming and/or wet wiping all carpets, furniture, and other surfaces. Decontamination of the HVAC system would involve disassembling and cleaning (HEPA-vacuuming or wet wiping) ducts, ventilators, registers, and other system parts. System filters should also be removed and replaced.

- All equipment used in the cleanup operation should be washed or wiped with damp cloths. All disposable materials (e.g., cloths, mop heads, filters, coveralls) should be discarded as asbestos wastes.

Each fiber release episode must be documented. **AOHS Form number 5** should be completed and retained to comply with this requirement.

These procedures should be employed whether the building owner uses in-house staff or an outside asbestos abatement contractor. If an outside contractor is used, the procedures should be thoroughly discussed and a thorough performance specification and scope of work developed and signed by the abatement contractor to help assure proper abatement techniques and compliance with appropriate regulations.

PERIODIC ACM SURVEILLANCE

Periodic surveillance of both this O&M program and the condition of all ACM assessed must be conducted as outlined in Volume I, Section 6. In conjunction, **AOHS Form number 4** should be completed and filed for the purpose of documenting the surveillance activities.

Air monitoring could be used as a supplement to the physical inspection process. If air monitoring is conducted, transmission electron microscopy (TEM) **not** phase contrast microscopy (PCM), should be used as the method of analysis. TEM is specific for asbestos fiber determination and is currently the only method available for the analysis of such low fiber concentrations as would be found in schools and commercial buildings.

Since analysis by TEM is expensive, air monitoring which employs TEM is typically used on a one-time basis and provides a "snap-shot" view of building conditions. Such a one-time view can be very misleading because airborne asbestos levels vary from day to day and from room to room. Low readings are, therefore, possible even when the ACM is in poor condition. For this reason, EPA does not recommend air monitoring for the initial assessment of exposure potential. However, if the ACM is currently in good condition, increases in airborne asbestos levels may provide an early warning of deterioration or disturbance of the ACM.

Measuring dust accumulation for asbestos is another way to supplement physical reinspection. A trend of increasing asbestos content in dust samples

would be evidence for release of asbestos fibers in the building. Although dust measurement is becoming more popular, no standardized collection ans analysis procedures are available. Some asbestos consultants use an air sampling pump to "vacuum" fibers from surfaces; others favor some sort of "wipe sample" method. EPA is currently evaluating several collection and analysis protocols for asbestos dust. Until this study is concluded, EPA does not recommend dust measurement as part of ACM surveillance in and O&M program.

RECORDKEEPING

All written records discussed in this section should be maintained as part of a thorough recordkeeping process. To review, these include:

- The written O&M plan itself, including work practices;

- Building plans and drawings;

- Survey data;

- Copies of notification and warning programs;

- Descriptions, times, dates, and attendants of training programs;

- Medical surveillance records;

- Copies of all permits and documentation of custodial, maintenance, renovation, and emergency response actions performed; and

- Periodic ACM surveillance records.

OSHA requires that records of exposure measurement (air sampling) be retained for at least 30 years. Records for each employee subject to the medical

surveillance program must be maintained for the duration of employment, plus 30 years. All employment training records must be retained for the duration of employment, plus one year.

OSHA requires that each employee's record of exposure and medical surveillance be made available to the employee. EPA recommends that all written elements of the O&M program similarly be made available for inspection.

RECOMMENDED REFERENCE DOCUMENTS

The following is a listing of publications which may assist the school system in understanding the depth and breadth of the asbestos issue in general and may provide additional information to the school to help justify much of the expense and time required for implementation of this most important regulation. These documents are generally available from the regional office of the EPA or can usually be purchased through the Government Printing Office. Both agencies have offices in the J.F.K Federal Building in Boston.

"Guidance for Controlling Asbestos-Containing Materials in Buildings"; (Purple Book); EPA 560/5-85-024, June 1985.

"Measuring Airborne Asbestos Following an Abatement Action"; (Silver Book); EPA 600/4-85-049.

"Asbestos in Buildings: Guidance for Service and Maintenance Personnel"; EPA 560/5-85-018.

"Abatement of Asbestos-Containing Pipe Insulation"; Technical Bulletin No. 1986-2, 1986.

"A Guide to Respiratory Protection for the Asbestos Abatement Industry"; (White Book); EPA 560/OPTS-86-001, September 1986.